

# R&S®NRX

## Power Meter

### User Manual



1178556602  
Version 11

**ROHDE & SCHWARZ**  
Make ideas real



This manual describes the R&S®NRX (1424.7005K02) with firmware version FW 02.61 and later. In addition to the base unit, the following options are described:

- R&S®NRX-B1 (1424.7805K02)
- R&S®NRX-B4 (1424.8901K02)
- R&S®NRX-B8 (1424.8301K02)
- R&S®NRX-B9 (1424.8601K02)
- R&S®NRX-K2 (1424.9208K02)
- R&S®NRX-K4 (1424.9308K02)
- R&S®NRX-K301 (1444.0041K02)

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Subject to change – data without tolerance limits is not binding.

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1178.5566.02 | Version 11 | R&S®NRX

Throughout this document, R&S® is indicated as R&S.

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# 1 Safety and regulatory information

The product documentation helps you use the product safely and efficiently. Follow the instructions provided here and in the following sections.

## Intended use

Combined with the supported sensors, the R&S NRX base unit is intended for power measurements in development and production. The supported sensors are listed in the specifications document.

Observe the operating conditions and performance limits stated in the specifications document.

## Target audience

The target audience is developers and technicians. The required skills and experience in power measurements depend on the used operating concept. While manual operation is suitable for beginners, remote control requires expertise in power measurements.

Depending on the used R&S sensor, the applications vary greatly. A profound knowledge of the intended application and test setup is recommended.

## Where do I find safety information?

Safety information is part of the product documentation. It warns you of potential dangers and gives instructions on how to prevent personal injury or damage caused by dangerous situations. Safety information is provided as follows:

- In [Chapter 1.1, "Safety instructions"](#), on page 11. The same information is provided in many languages in printed format. The printed "Safety Instructions" for "Mains-Powered Products, Not Heavy" (document number 1171.1771.99) are delivered with the product.
- Throughout the documentation, safety instructions are provided when you need to take care during setup or operation.

## 1.1 Safety instructions

Products from the Rohde & Schwarz group of companies are manufactured according to the highest technical standards. To use the products safely, follow the instructions provided here and in the product documentation. Keep the product documentation nearby and offer it to other users.

Use the product only for its intended use and within its performance limits. Intended use and limits are described in the product documentation such as the specifications document, manuals and the printed "Safety Instructions" document. If you are unsure about the appropriate use, contact Rohde & Schwarz customer support.

Using the product requires specialists or specially trained personnel. These users also need sound knowledge of at least one of the languages in which the user interfaces and the product documentation are available.

Reconfigure or adjust the product only as described in the product documentation or the specifications document. Any other modifications can affect safety and are not permitted.

Never open the casing of the product. Only service personnel authorized by Rohde & Schwarz are allowed to repair the product. If any part of the product is damaged or broken, stop using the product. Contact Rohde & Schwarz customer support at <https://www.rohde-schwarz.com/support>.

### **Lifting and carrying the product**

The maximum weight of the product is provided in the specifications document. You can lift or carry the product by yourself, if you can manage the weight on your own. Alternatively, you can use lifting or transporting equipment. Follow the instructions provided by the equipment manufacturer.

### **Choosing the operating site**

Only use the product indoors. The product casing is not waterproof. Water that enters can electrically connect the casing with live parts, which can lead to electric shock, serious personal injury or death if you touch the casing.

If Rohde & Schwarz provides accessories designed for outdoor use of your product, e.g. a protective cover, you can use the product outdoors.

You can operate the product up to an altitude of 2000 m above sea level. If a higher altitude is permissible, the value is provided in the specifications document. The product is suitable for pollution degree 2 environments where nonconductive contamination can occur. For more information on environmental conditions such as ambient temperature and humidity, see the specifications document.

### **Setting up the product**

Always place the product on a stable, flat and level surface with the bottom of the product facing down. If the product is designed for different positions, secure the product so that it cannot fall over.

If the product has foldable feet, always fold the feet completely in or out to ensure stability. The feet can collapse if they are not folded out completely or if the product is moved without lifting it. The foldable feet are designed to carry the weight of the product, but not an extra load.

If stacking is possible, keep in mind that a stack of products can fall over and cause injury.

If you mount products in a rack, ensure that the rack has sufficient load capacity and stability. Observe the specifications of the rack manufacturer. Always install the products from the bottom shelf to the top shelf so that the rack stands securely. Secure the product so that it cannot fall off the rack.

### Connecting the product

Before connecting the interfaces and measuring inputs of the product to other products or electrical circuits, make sure that the other products or electrical circuits provide special protection against electric shock. This protection principle is referred to as SELV (safety extra-low voltage) and is based on a low voltage level and increased insulation. Exceptions are indicated by a measurement category on the product and given in the specifications document.

### Connecting to power

The product is an overvoltage category II product. Connect the product to a fixed installation used to supply energy-consuming equipment such as household appliances and similar loads. Keep in mind that electrically powered products have risks, such as electric shock, fire, personal injury or even death. Replace parts that are relevant to safety only by original parts, e.g. power cables or fuses.

Take the following measures for your safety:



- Before switching on the product, ensure that the voltage and frequency indicated on the product match the available power source. If the power adapter does not adjust automatically, set the correct value and check the rating of the fuse.
- Only use the power cable delivered with the product. It complies with country-specific safety requirements. Only insert the plug into an outlet with protective conductor terminal.
- Only use intact cables and route them carefully so that they cannot be damaged. Check the power cables regularly to ensure that they are undamaged. Also ensure that nobody can trip over loose cables.
- Only connect the product to a power source with a fuse protection of maximum 20 A.
- Ensure that you can disconnect the product from the power source at any time. Pull the power plug to disconnect the product. The power plug must be easily accessible. If the product is integrated into a system that does not meet these requirements, provide an easily accessible circuit breaker at the system level.



### Cleaning the product

Use a dry, lint-free cloth to clean the product. When cleaning, keep in mind that the casing is not waterproof. Do not use liquid cleaning agents.

### Meaning of safety labels

Safety labels on the product warn against potential hazards.

	<p>Potential hazard Read the product documentation to avoid personal injury or product damage.</p>
	<p>Electrical hazard Indicates live parts. Risk of electric shock, fire, personal injury or even death.</p>


	<p>Hot surface</p> <p>Do not touch. Risk of skin burns. Risk of fire.</p>
	<p>Protective conductor terminal</p> <p>Connect this terminal to a grounded external conductor or to protective ground. This connection protects you against electric shock if an electric problem occurs.</p>

## 1.2 Labels on the product

Labels on the casing inform about:

- Personal safety, see ["Meaning of safety labels"](#) on page 13
- Environment safety, see [Table 1-1](#)
- Identification of the product, see [Chapter 3.2.2.7, "Name plate"](#), on page 34.

**Table 1-1: Labels regarding environment safety**

	<p>Labeling in line with EN 50419 for disposal of electrical and electronic equipment after the product has come to the end of its service life.</p> <p>For more information, see <a href="#">"Disposing of electrical and electronic equipment"</a> on page 512.</p>
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## 1.3 Warning messages in the documentation

A warning message points out a risk or danger that you need to be aware of. The signal word indicates the severity of the safety hazard and how likely it will occur if you do not follow the safety precautions.

### WARNING

Potentially hazardous situation. Could result in death or serious injury if not avoided.

### CAUTION

Potentially hazardous situation. Could result in minor or moderate injury if not avoided.

### NOTICE

Potential risks of damage. Could result in damage to the supported product or to other property.

## 1.4 Korea certification class B



이 기기는 가정용(B급) 전자파 적합기기로서 주로 가정에서 사용하는 것을 목적으로 하며, 모든 지역에서 사용할 수 있습니다.

## 2 Welcome

This section provides an overview of the user documentation and an introduction to the R&S NRX.

### 2.1 Documentation overview

This section provides an overview of the R&S NRX user documentation. Unless specified otherwise, you find the documents at:

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

Further documents are available at:

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

#### 2.1.1 Getting started manual

Introduces the R&S NRX and describes how to set up and start working with the product. A printed version is delivered with the instrument.

#### 2.1.2 User manual

Contains the description of all instrument modes and functions. It also provides an introduction to remote control, a complete description of the remote control commands with programming examples, and information on maintenance, instrument interfaces and error messages. Includes the contents of the getting started manual.

The user manual is provided on the R&S NRX for download under:

[System] > "Instrument Info" > "Help & Copyrights"

For further details, see [Chapter 10.2.2, "Help & copyrights"](#), on page 165.

#### 2.1.3 Instrument security procedures

Deals with security issues when working with the R&S NRX in secure areas. It is available for download on the internet.

#### 2.1.4 Printed safety instructions

Provides safety information in many languages. The printed document is delivered with the product.



### 2.1.5 Specifications and product brochures

The specifications document, also known as the data sheet, contains the technical specifications of the R&S NRX. It also lists the firmware applications and their order numbers, and optional accessories.

The brochure provides an overview of the instrument and deals with the specific characteristics.

See [www.rohde-schwarz.com/brochure-datasheet/NRX](http://www.rohde-schwarz.com/brochure-datasheet/NRX)

### 2.1.6 Release notes and open source acknowledgment (OSA)

The release notes list new features, improvements and known issues of the current software version, and describe the software installation.

The software uses several valuable open source software packages. An open source acknowledgment document provides verbatim license texts of the used open source software.

On the instrument, the open source acknowledgment document is provided under:

[System] > "Instrument Info" > "Help & Copyrights"

For further details, see [Chapter 10.2.2, "Help & copyrights"](#), on page 165.

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

## 2.2 Key features

The R&S NRX supports:

- Easy RF power measurements
- Multichannel measurements
- RF pulse analysis
- System integration

The R&S NRX is a versatile, user-friendly base unit.

- Straightforward numerical and graphical display of measured values, plus intuitive operation with touchscreen-based graphical user interface
- Supports up to four R&S NRP and R&S NRQ6 sensors.
- Supports all sensor-dependent measurement functions
- Hardware interfaces for remote control and triggering
- Code emulation of the R&S NRP2
- Optional high-precision CW and pulse mode reference source module
- Optional power reflection measurements with R&S NRT-Zxx directional power sensors

See also the R&S NRX fact sheet at [www.rohde-schwarz.com](http://www.rohde-schwarz.com).

## 2.3 What's new?

Compared to the previous version, the documentation of firmware version FW 02.60 provides the new features listed below:

- Firmware packages with an invalid signature or no signature are installed only, if you permit it. See [Chapter 10.3.4, "Securing the firmware update"](#), on page 171.
- Pulse analysis measures the droop of the pulse, see ["Droop"](#) on page 92.
- Sensor tests with applied RF are supported, see ["Sensor Test at Check Source"](#) on page 161 and ["... with Attenuator"](#) on page 161.

## 3 Getting started

### 3.1 Preparing for use

Here, you can find basic information about setting up the product for the first time.

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#### 3.1.1 Lifting and carrying

For safety information, see "[Lifting and carrying the product](#)" on page 12.

The R&S NRX weighs below 3 kg, details are provided in the specifications document. Due to the low weight, you can move the R&S NRX easily.

#### 3.1.2 Unpacking and checking

1. Unpack the product carefully.
2. Retain the original packing material. Use it when transporting or shipping the product later.
3. Using the delivery notes, check the equipment for completeness.
4. Check the equipment for damage.

If the delivery is incomplete or equipment is damaged, contact Rohde & Schwarz.

#### 3.1.3 Choosing the operating site

Specific operating conditions ensure proper operation and avoid damage to the product and connected devices. For information on environmental conditions such as ambient temperature and humidity, see the specifications document.

For safety information, see "[Choosing the operating site](#)" on page 12.

### Electromagnetic compatibility classes

The electromagnetic compatibility (EMC) class indicates where you can operate the product. The EMC class of the product is given in the specifications document.

- Class B equipment is suitable for use in:
  - Residential environments
  - Environments that are directly connected to a low-voltage supply network that supplies residential buildings
- Class A equipment is intended for use in industrial environments. It can cause radio disturbances in residential environments due to possible conducted and radiated disturbances. It is therefore not suitable for class B environments. If class A equipment causes radio disturbances, take appropriate measures to eliminate them.

## 3.1.4 Setting up the product

For safety information, see:

- ["Setting up the product"](#) on page 12
- ["Intended use"](#) on page 11

### 3.1.4.1 Placing the product on a bench top

The R&S NRX is a small and lightweight product. You can stack the R&S NRX with other products, but place the R&S NRX on top. In the following procedure, the weight indication for stacking refers to the most common design of larger Rohde & Schwarz instruments. Verify the load suitable for your product before stacking.

#### To place the product on a bench top

1. Place the product on a stable, flat and level surface. Ensure that the surface can support the weight of the product. For information on the weight, see the specifications document.

2. **CAUTION!** Foldable feet can collapse. For safety information, see ["Setting up the product"](#) on page 12.

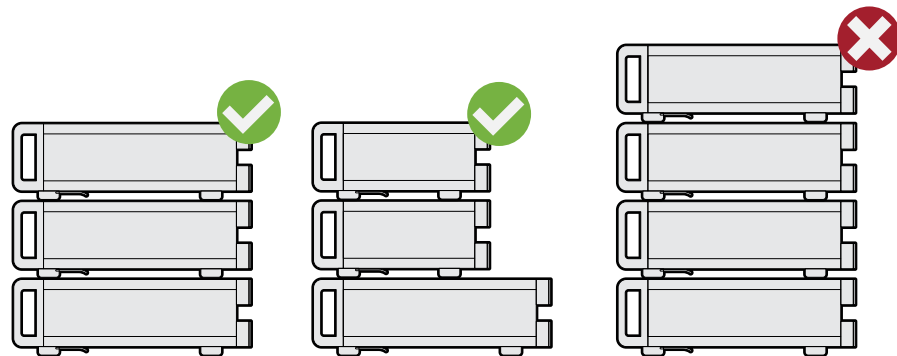
Always fold the feet completely in or out. With folded-out feet, do not place anything on top or underneath the product.

3. **WARNING!** A stack of products can fall over and cause injury. Never stack more than three products on top of each other. Instead, mount them in a rack.

Stack as follows:

- If the products have foldable feet, fold them in completely.
- It is best if all products have the same dimensions (width and length). If the products have different dimensions, stack according to size and place the smallest product on top.
- Do not exceed the permissible total load placed on the product at the bottom of the stack:

- 50 kg when stacking products of identical dimensions (left figure).
- 25 kg when stacking smaller products on top (middle figure).



Left = Stacked correctly, same dimensions  
 Middle = Stacked correctly, different dimensions  
 Right = Stacked incorrectly, too many products

#### 4. **NOTICE!** Overheating can damage the product.

Prevent overheating as follows:

- Keep a minimum distance of 10 cm between the fan openings of the product and any object in the vicinity to provide sufficient airflow and ventilation.
- Do not place the product next to heat-generating equipment such as radiators or other products.

#### 3.1.4.2 Mounting the product in a rack

##### To prepare the rack

1. Observe the requirements and instructions in "[Setting up the product](#)" on page 12.
2. **NOTICE!** Insufficient airflow can cause overheating and damage the product.  
Design and implement an efficient ventilation concept for the rack.

##### To mount the product in a rack

1. Use an adapter kit to prepare the product for rack mounting.
  - a) Order the rack adapter kit designed for the product. For the order number, see data sheet.
  - b) Mount the adapter kit. Follow the assembly instructions provided with the adapter kit.
2. Lift the product to shelf height. If the rack is high, use a safe climbing aid when placing on upper shelves.
3. Grip the product by the handles. Slide the product onto the shelf until the rack brackets fit closely to the rack.
4. Tighten all screws on the rack brackets to secure the product in the rack.

**To unmount the product from a rack**

1. Loosen the screws at the rack brackets.
2. Remove the product from the rack.
3. If placing the product on a bench top again, unmount the adapter kit from the product. Follow the instructions provided with the adapter kit.

**3.1.5 Considerations for test setup****Cable selection and electromagnetic interference (EMI)**

Electromagnetic interference (EMI) can affect the measurement results.

To suppress electromagnetic radiation during operation:

- Use high-quality shielded cables, for example, double-shielded RF and LAN cables.
- Always terminate open cable ends.
- Ensure that connected external devices comply with EMC regulations.
- Do not use USB connecting cables exceeding 5 m.

**Preventing electrostatic discharge (ESD)**

Electrostatic discharge is most likely to occur when you connect or disconnect a DUT.

- ▶ **NOTICE!** Electrostatic discharge can damage the electronic components of the product and the device under test (DUT).

Ground yourself to prevent electrostatic discharge damage:

- a) Use a wrist strap and cord to connect yourself to ground.
- b) Use a conductive floor mat and heel strap combination.

**3.1.6 Connecting to power**

The R&S NRX can be used with different AC power voltages and adapts itself automatically to them. Adjusting the R&S NRX to a particular AC supply voltage is therefore not required. Refer to the specifications document for the requirements of voltage and frequency.

For safety information, see "[Connecting to power](#)" on page 13.

1. Plug the AC power cable into the AC power connector on the rear panel of the product. Only use the AC power cable delivered with the product.
2. Plug the AC power cable into a power outlet with ground contact.

The required ratings are listed next to the AC power connector and in the data sheet.

Further information:

- [Chapter 3.2.2.5, "AC supply and power switch"](#), on page 33

### 3.1.7 Connecting to LAN

See [Chapter 10.1.1, "Network settings"](#), on page 143.

### 3.1.8 Connecting sensors

The R&S NRX supports a wide range of Rohde & Schwarz power sensors. See the specifications document for detailed information.

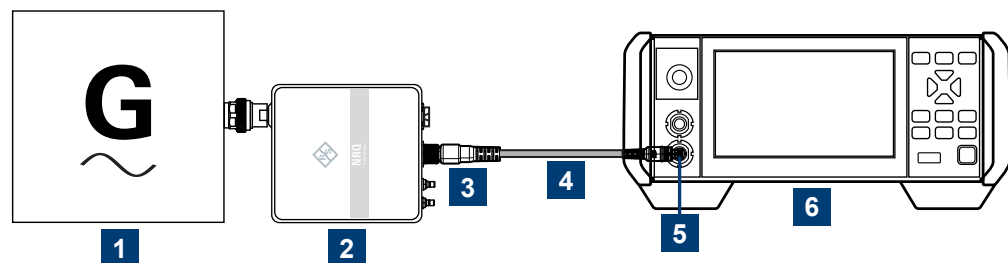
Depending on the sensor, you have different choices for connecting sensors.

#### 3.1.8.1 Sensor connectors A to D

See [Chapter 3.2.1.1, "Sensor connectors A and B"](#), on page 27 and [Chapter 3.2.2.1, "Sensor connectors C and D"](#), on page 32.

Suitable for:

- NRP USB and LAN sensor models
- R&S NRQ6
- R&S NRP-Zxx sensors



**Figure 3-1: Setup with R&S NRQ6 (example)**

- 1 = Signal source
- 2 = Sensor
- 3 = Host interface
- 4 = R&S NRP-ZK8 cable
- 5 = Sensor connector of the R&S NRX
- 6 = R&S NRX

Use an R&S NRP-ZK8 cable to connect a sensor to the R&S NRX. If you use an R&S NRP-ZK6 cable, the reference clock and trigger are not supported.

- 8-pin female connector of the R&S NRP-ZK8 cable:
  - Insert the screw-lock cable connector into the host interface of the sensor.
  - Tighten the union nut manually.
- 8-pin male connector of the R&S NRP-ZK8 cable:

- a) Insert this connector into one of the sensor ports of the R&S NRX.
3. Connect the RF connector of the sensor to the signal source. For details, see the user manual of the sensor.

**Note:** Incorrectly connecting/disconnecting a sensor can damage the sensor or lead to erroneous results.

### 3.1.8.2 Optional sensor interface for R&S NRT

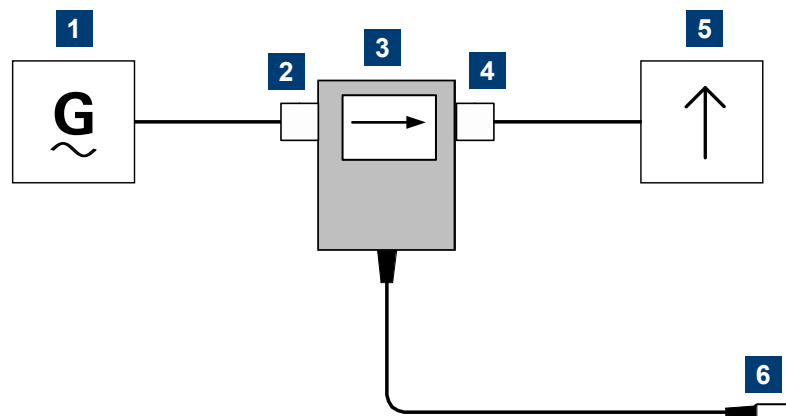
See [Chapter 3.2.1.2, "Module bay"](#), on page 28.

Suitable for R&S NRT-Zxx sensors.

Communication between the R&S NRT-Zxx sensor and a base unit is only possible with a baud rate setting of 38400 Bd. This setting is the factory default that needs to be restored if the setting was changed. If the R&S NRT-Zxx sensor is not recognized by the base unit, check that the baud rate setting of the R&S NRT-Zxx sensor is 38400 Bd.

See the manual of the R&S NRT-Zxx sensor for details.

The arrow on the sensor front side shows the forward power flow.



**Figure 3-2: Connecting to source and load**

- 1 = Source
- 2 = Port 1 (RF connector)
- 3 = R&S NRT-Zxx sensor
- 4 = Port 2 (RF connector)
- 5 = Load
- 6 = Host interface connector

#### To connect the R&S NRT-Zxx sensor

Connect the R&S NRT-Zxx sensor between the source and load of your test setup as follows.

1. Connect RF connector (2, port 1) to the source.



- a) Insert RF connector (2) straight into the RF connector of the source. Take care not to tilt the R&S NRT-Zxx sensor.
  - b) Tighten the RF connector securely by hand.
2. Connect RF connector (4, port 2) to the load.
    - a) Insert RF connector (4) straight into the RF connector of the load. Take care not to tilt the R&S NRT-Zxx sensor.
    - b) Tighten the RF connector tightly by hand.

During the measurement, the RF power flow can be high. Power leakage has the risk of electric shock and severe skin burns.
  3. Connect the host interface connector of the R&S NRT-Zxx sensor (6) to the R&S NRX-B9 sensor interface for R&S NRT.

#### To disconnect the R&S NRT-Zxx sensor

1. **CAUTION!** Risk of electric shock and severe skin burns. During the measurement, the RF power flow can be high.

Switch off the RF power before touching the RF connectors.
2. Unscrew the RF connectors by hand.
3. Disconnect the cable of the R&S NRT-Zxx sensor (6) from the R&S NRX-B9 sensor interface for R&S NRT.

#### 3.1.8.3 LAN interface

See [Chapter 3.2.2.3, "Ethernet interface"](#), on page 33.

Suitable for LAN sensors.

Sensors that are connected to the LAN interface are not recognized automatically. Add them, see ["To add a LAN sensor"](#) on page 156.

#### 3.1.8.4 USB 2.0 host interfaces

See [Chapter 3.2.1.6, "USB host interface"](#), on page 31.

Suitable for USB power sensors. You can increase the number of connected power sensors by using USB hubs.

### 3.1.9 Connecting USB and external devices

Use the USB interfaces to connect USB devices. You can increase the number of connected devices by using USB hubs.



Due to the large number of available USB devices, there is almost no limit to the possible expansions. In the following, useful USB devices are listed exemplarily:

- Memory stick for easy transfer of data to/from a computer (e.g. firmware updates).

- Mouse if you prefer this way of operation over a touchscreen.

### 3.1.10 Switching on or off

*Table 3-1: Overview of power states*

Status	LED	Position of power switch
Off	Off	[0]
Standby	 orange	[1]
Ready	 green	[1]

#### To switch on the product

The product is off but connected to power.

1. Set the switch on the power supply to position [1]. See [Chapter 3.2.2.5, "AC supply and power switch"](#), on page 33.

The LED of the [standby] key is orange. See [Chapter 3.2.1.5, "On/standby key"](#), on page 31.

2. Press the [standby] key.

The LED changes to green. The product boots.

If the previous session ended regularly, the product uses the settings from the last session.

3. If you want to return to a defined initial state, perform a preset.  
See ["Preset"](#) on page 139.

#### To shut down the product

The product is in the ready state.

- ▶ Press the [standby] key.

The operating system shuts down. The LED changes to orange.

#### To disconnect from power

The product is in the standby state.

1. **NOTICE!** Risk of data loss. If you disconnect the product from power when it is in the ready state, you can lose settings and data. Shut it down first.

Set the switch on the power supply to position [0].

The LED of the standby key is switched off.

2. Disconnect the product from the power source.

Further information:

- [Chapter 8, "Saving and recalling settings"](#), on page 138

- Chapter 3.2.1.5, "On/standby key", on page 31

## 3.2 Instrument tour

The meanings of the labels on the product are described in [Chapter 1.2, "Labels on the product"](#), on page 14.

- [Front panel tour](#).....27
- [Rear panel tour](#)..... 32

### 3.2.1 Front panel tour

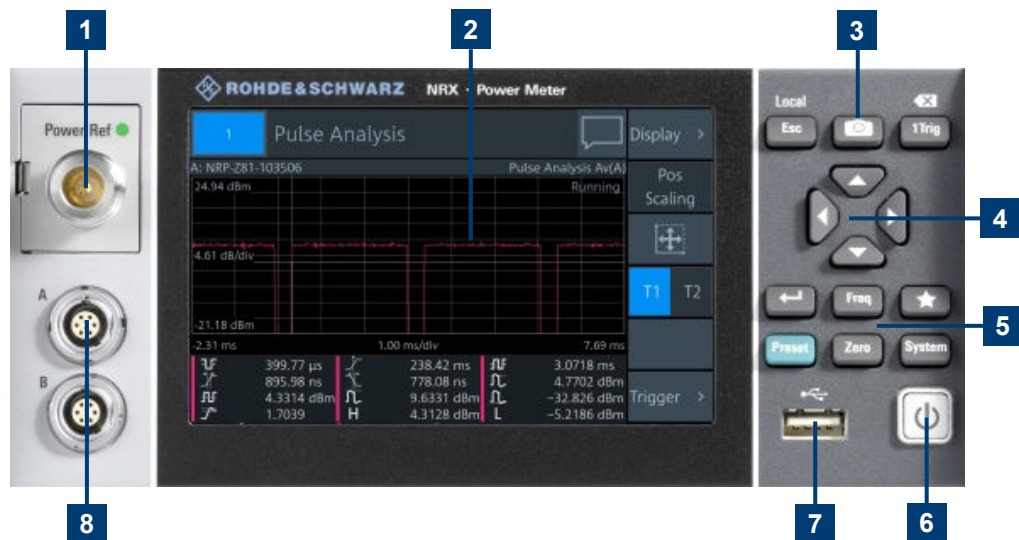


Figure 3-3: Front panel of the R&S NRX

- 1 = Module bay for optional connectors, see [Chapter 3.2.1.2, "Module bay"](#), on page 28.
- 2 = Touchscreen, see [Chapter 3.2.1.3, "Touchscreen"](#), on page 29.
- 3, 5 = Keys, see [Chapter 3.2.1.4, "Keys"](#), on page 29.
- 4 = Cursor keys, see ["Cursor keys"](#) on page 30.
- 6 = On/standby key, see [Chapter 3.2.1.5, "On/standby key"](#), on page 31.
- 7 = USB host interface, see [Chapter 3.2.1.6, "USB host interface"](#), on page 31.
- 8 = Sensor connectors A and B, see [Chapter 3.2.1.1, "Sensor connectors A and B"](#), on page 27.

#### 3.2.1.1 Sensor connectors A and B

See (8) in [Figure 3-3](#).

Sensor connectors A and B are used to connect the R&S NRP power sensors and the R&S NRQ6. For details on the supported power sensors, see the specifications document.

The complete functional range, including external trigger and reference clock for the synchronization of connected sensors, is provided by these connectors.

Further information:

- [Chapter 3.1.8, "Connecting sensors"](#), on page 23

### 3.2.1.2 Module bay

See (1) in [Figure 3-3](#).

Two options fit in this bay. If you have both options, you can exchange them, see ["To exchange the option"](#) on page 28.

If no option is installed, the module bay is closed by a cover.

#### R&S NRX-B1 sensor check source

Used as a power reference for testing the connected sensors and the cabling. The LED of the R&S NRX-B1 sensor check source shows the state, see [Table 3-2](#).

You can remove the option and send it to Rohde & Schwarz for calibration. Contact the Rohde & Schwarz customer support, see [Chapter 14.5, "Contacting customer support"](#), on page 509.

**Table 3-2: Possible states**

Illumination	State	Signal Output setting
Off	No signal is generated.	"Off"
Steady green	Continuous wave is output.	"CW"
Blinking green	Pulse signal is output.	"Pulse"
Blinking red	Settings conflict exists. For example if "Pulse" is set and the power level is set to 20 dBm.	"CW" or "Pulse"

#### R&S NRX-B9 sensor interface for R&S NRT

Provides an optional power sensor interface to connect an R&S NRT-Zxx sensor. For supported sensors, see the specifications document.

#### To exchange the option

1. Press the latch to the right, using your thumbnail or a small pen.



2. Pull the option from its casing.
3. Insert the other option.
4. Press until you hear a click when the latch locks.

Further information:

- [Chapter 3.1.8, "Connecting sensors"](#), on page 23
- ["Sensor Check Source tab"](#) on page 150
- [Chapter 12.9, "Configuring the test generator"](#), on page 394
- [Chapter 3.1.8.2, "Optional sensor interface for R&S NRT"](#), on page 24

### 3.2.1.3 Touchscreen

See (2) in [Figure 3-3](#).

The R&S NRX displays results in panes. Depending on the measurement mode, values are displayed digitally or graphically.



#### False triggers can occur

If an object (e.g. a human finger) that is charged with static electricity is brought near the touch panel, false triggers can occur.

This behavior is caused by the principle of operation of a PCAP (projected capacitive) touch panel.

Further information:

- ["Using the touchscreen"](#) on page 35

### 3.2.1.4 Keys

See (3, 5) in [Figure 3-3](#).

#### [Esc] / Local

If you press shortly:

- Changes to the next-higher hierarchy level.
- Escapes from the entry mode in text boxes and lists.
- Closes dialogs without losing any entries that have been made.
- Switches from remote control mode (all controls disabled) to manual operation.

If you press and hold:

- Goes to the start dialog that shows an overview of the active measurements.  
See [Chapter 4.1.1, "Start dialog"](#), on page 35.

Further information:

- ["Going back to a higher hierarchy level"](#) on page 35
- [Chapter 4.3.2, "Returning to manual operation \(LOCAL\)"](#), on page 47



#### Screenshot

Creates a screenshot of the current display.

See [Chapter 4.1.8, "Creating and saving screenshots"](#), on page 44.

Remote command:

[SYSTem:HCOPY](#) on page 241

**[1Trig] / Delete**

- Controls the measurements depending on the trigger mode:
  - For all trigger modes except "Single", starts and stops the measurement.
  - For the "Single" trigger mode, enables and triggers the measurement.

Changes of the trigger state apply to all measurements.

See also ["Trigger Mode"](#) on page 68.

- Resets the auxiliary values that provide additional information about the measured values.
 

See also ["Auxiliary Values"](#) on page 56.
- Deletes numbers or text in a field so that you can enter a new value.

**Enter**

- Confirms entries in text fields, dialogs and selections in lists.
- Shows a frame around the control in focus. You can change the focus using the [Cursor keys](#).

**[Freq]**

Sets the carrier frequency of the applied signal. This value is used for frequency response correction of the measurement result.

Remote command:

[\[SENSe<Sensor>:\] FREQuency \[:CW\]](#) on page 346

**Favorites**

Reserved for future use.

**[Preset]**

Opens the "Save / Recall / Preset" dialog.

See [Chapter 8, "Saving and recalling settings"](#), on page 138.

If you press [Preset] again, the preset function starts.

See ["Preset"](#) on page 139.

If you press the [Preset] key during booting, the R&S NRX starts with the factory default state.

**[Zero]**

Pressing [Zero] opens the "Zeroing Sensors" dialog.

If you press [Zero] again, "Zero All Sensors" starts.

Also displays status information:

- Zeroing status
- Sensor status

**[System]**

Opens the "System Overview" dialog.

See [Chapter 10, "System settings"](#), on page 142.

**Cursor keys**

See (4) in [Figure 3-3](#).

The cursor keys are context-sensitive. The control in focus is indicated by a focus frame. Use the cursor keys as follows:

- Selecting an element in the navigation pane.
- Selecting the active pane.
- Selecting an element from a list.
- Moving the cursor in text boxes.
- Changing the value of an entry in a text box.

#### 3.2.1.5 On/standby key

See (6) in [Figure 3-3](#).

The on/standby key switches between standby and ready state, if the power switch is set to [I].

Further information:

- [Chapter 3.2.2.5, "AC supply and power switch"](#), on page 33
- [Chapter 3.1.10, "Switching on or off"](#), on page 26

#### 3.2.1.6 USB host interface

See (7) in [Figure 3-3](#).

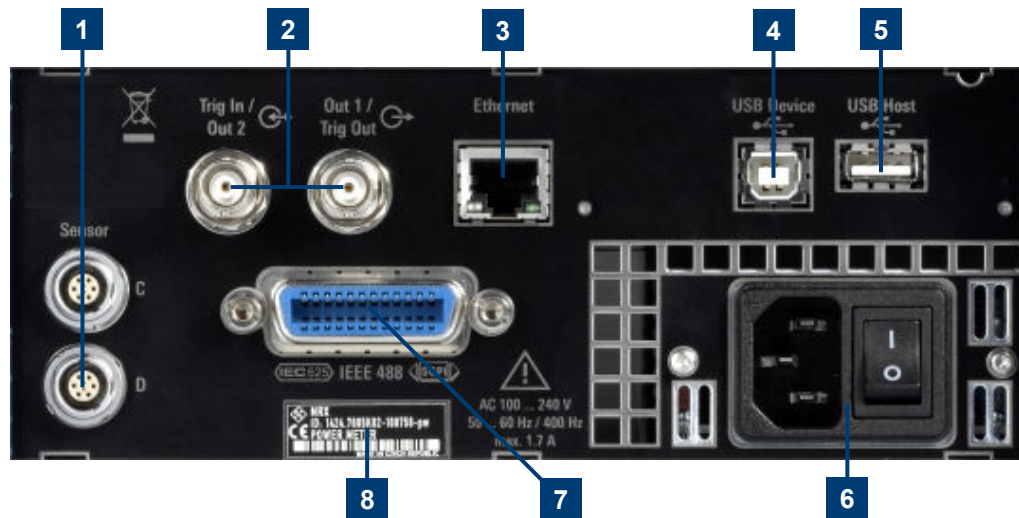
USB 2.0 (universal serial bus) interface of the type A (host USB). Used to connect:

- USB sensors
- External devices like a keyboard, mouse, or memory stick

Further information:

- [Chapter 3.1.8.4, "USB 2.0 host interfaces"](#), on page 25
- [Chapter 3.1.9, "Connecting USB and external devices"](#), on page 25

### 3.2.2 Rear panel tour



**Figure 3-4: Rear panel of the R&S NRX**

- 1 = Sensor connectors C and D (optional), used to connect R&S power sensors, see [Chapter 3.2.2.1, "Sensor connectors C and D"](#), on page 32.
- 2 = Trig In / Out 2 and Out 1 / Trig Out connectors, see [Chapter 3.2.2.2, "Trig In / Out 2 and Out 1 / Trig Out connectors"](#), on page 32.
- 3 = Ethernet interface, see [Chapter 3.2.2.3, "Ethernet interface"](#), on page 33.
- 4 = USB device interface, see [Chapter 3.2.2.4, "USB device interface"](#), on page 33.
- 5 = USB host interface, see [Chapter 3.2.1.6, "USB host interface"](#), on page 31.
- 6 = AC supply and power switch, see [Chapter 3.2.2.5, "AC supply and power switch"](#), on page 33.
- 7 = IEC 625/IEEE 488 interface, optional, see [Chapter 3.2.2.6, "IEC 625/IEEE 488 interface"](#), on page 33.
- 8 = Name plate, see [Chapter 3.2.2.7, "Name plate"](#), on page 34

#### 3.2.2.1 Sensor connectors C and D

See (8) in [Figure 3-4](#).

Requires R&S NRX-B4 third and fourth sensor connector.

For more details, see [Chapter 3.2.1.1, "Sensor connectors A and B"](#), on page 27.

#### 3.2.2.2 Trig In / Out 2 and Out 1 / Trig Out connectors

See (2) in [Figure 3-4](#).

The Out 1 / Trig Out BNC connectors supply an analog signal with a voltage between 0 V and 2.5 V. It can be used to output a voltage that is proportional to the measured value (e.g. for level regulation) or a digital signal for limit monitoring.

The Trig In / Out 2 BNC connectors can be used either as an external trigger input with a switchable impedance (10 k $\Omega$  or 50  $\Omega$ ) or as a second analog output.

By default, both connectors are disabled.



Further information:

- ["I/O 1, I/O 2 tabs"](#) on page 152

### 3.2.2.3 Ethernet interface

See (3) in [Figure 3-4](#).

The Ethernet connector is an RJ-45 socket for remote controlling the R&S NRX via a network.

### 3.2.2.4 USB device interface

See (4) in [Figure 3-4](#).

USB 2.0 (universal serial bus) interface of the type B (receptacle). Used to connect the R&S NRX to a computer for USB remote control.

### 3.2.2.5 AC supply and power switch

See (6) in [Figure 3-4](#).

Observe the safety instructions in ["Connecting to power"](#) on page 13.

When the R&S NRX is connected to the AC supply, it automatically sets itself to the correct range for the applied voltage. The range is printed on the casing. There is no need to set the voltage manually.

The power supply does not have a replaceable fuse. If the product is connected to the mains but cannot be started, contact Rohde & Schwarz customer support for troubleshooting help.

Further information:

- [Chapter 3.1.6, "Connecting to power"](#), on page 22

### 3.2.2.6 IEC 625/IEEE 488 interface

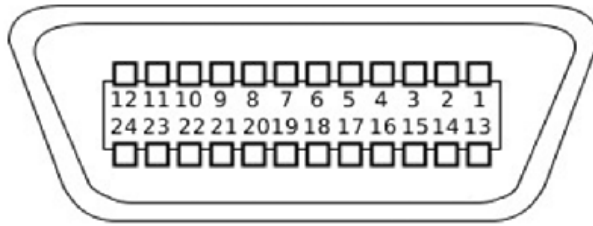
See (7) in [Figure 3-4](#).

Requires the R&S NRX-B8 GPIB/IEEE488 interface.

IEC bus (IEEE-488) interface for remote control of the R&S NRX. Used to connect a controller to the remote control the R&S NRX. Use a shielded cable for the connection.

Characteristics of the IEC bus (IEEE-488) interface:

- 8-bit parallel data transfer
- Bidirectional data transfer
- Three-wire handshake
- High data transfer rate
- Maximum length of connecting cables 15 m (single connection 2 m)



### 3.2.2.7 Name plate

See (8) in [Figure 3-4](#).

Shows the type, identification and name of the R&S NRX. The device ID consists of:

<stock number> - <serial number> - <checksum>

The framed 6 digits in [Figure 3-5](#) are the individual serial number.



*Figure 3-5: Name plate*

The name plate also shows the parts of the default hostname. The default hostname consists of <type>-<serial number>.

For the R&S NRX with the name plate shown in [Figure 3-5](#), the default hostname is:

NRX-100758

Further information:

- ["System Info"](#) on page 163
- ["Host Name"](#) on page 144

## 4 Operating concepts

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• <a href="#">Remote operation</a> .....	45
• <a href="#">Remote control</a> .....	46

### 4.1 Manual operation

Using the graphical user interface of the R&S NRX and the keys on the front panel, you can easily configure the settings and measure in the provided measurement modes.

#### Using the touchscreen

A touchscreen allows you to interact with the software using various finger gestures on the screen. The basic gestures supported by the software and most applications are described here. Further actions using the same gestures may be possible.

*Select* = touch the screen quickly, usually on a specific element. You can select most elements on the screen to access the settings belonging to that element (topic).

In graphs, use the following gestures:

- *Pan* = put your fingers on the touchscreen and move them while keeping contact. Thus, you can bring offscreen extensions of the graph into view.
- *Pinch* = move two fingers toward each other to change the zoom.

#### Going back to a higher hierarchy level

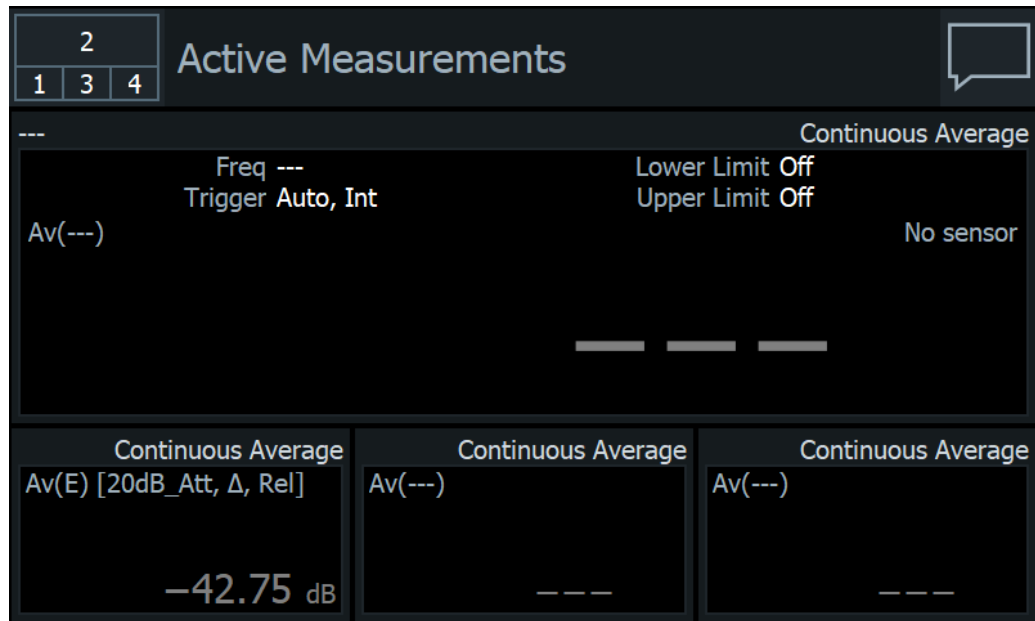
**Esc**

The [Esc] key is the essential control element to navigate back, for example after you have opened a dialog by selecting an element.

- ▶ Press [Esc] shortly to change to the next-higher hierarchy level.
- ▶ Keep [Esc] pressed to go to the highest hierarchy level, the start dialog.

#### 4.1.1 Start dialog

1. Connect a sensor to the R&S NRX.  
See [Chapter 3.1.8, "Connecting sensors"](#), on page 23.
2. Boot the R&S NRX.  
After successful booting, the R&S NRX displays the start dialog.



The start dialog shows the settings, results and status of the active measurements. The layout depends on the selected display layout. See [Chapter 4.1.5, "Selecting the display layout"](#), on page 40.

#### 4.1.2 Main measurement dialog

From the start dialog, you can access the measurements.

##### To access a measurement

- ▶ In the start dialog, select the pane of the measurement you want to access. The selected measurement is displayed in full screen. Its number is highlighted in the miniature display layout in the upper left corner.

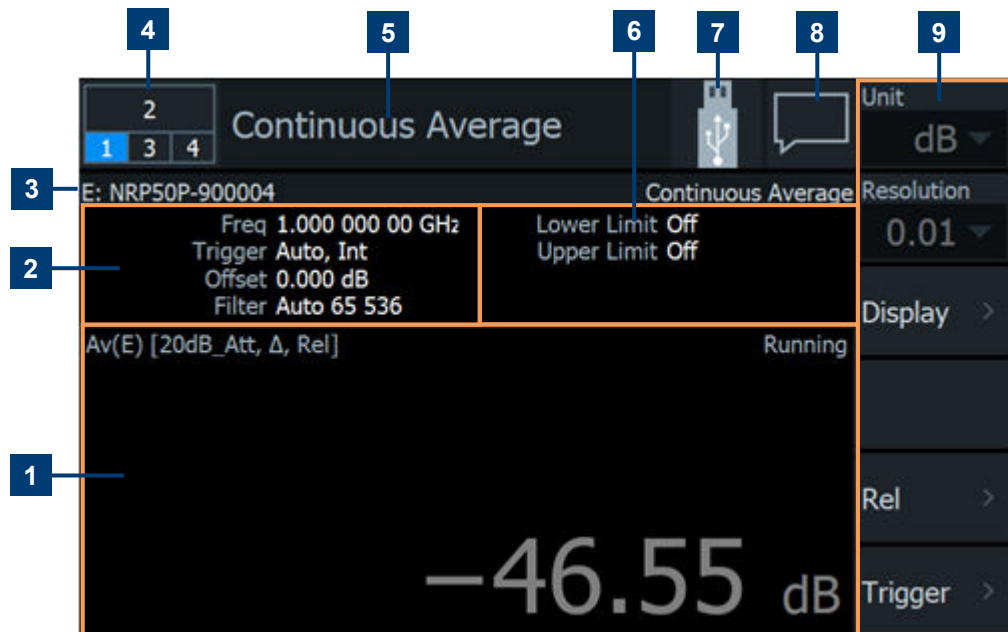


Figure 4-1: Main measurement dialog

- 1 = Measurement pane
- 2 = Measurement settings overview
- 3 = Sensor that is used for the measurement and to which port it is connected.
- 4 = Miniature display layout; see also [Chapter 4.1.5, "Selecting the display layout"](#), on page 40.
- 5 = Measurement type
- 6 = Selected limit values
- 7 = Status information
- 8 = Notification center
- 9 = Navigation pane

The main measurement dialog is divided into the following four touch areas, indicated by orange frames, that lead to different settings.

### Measurement pane

Displays the measurement value or graph.

In the upper left corner, information on the measurement is given. In [Figure 4-1](#), the information is "Av(E) [20dB\_Att, Δ, Rel]", meaning:

- "Av(E)" = short form for the continuous average measurement type. The letter in brackets indicates the port to which the sensor is connected.
- "20dB\_Att" = an S-parameter set of the sensor is active that influences the displayed level value.
- "Δ" = constant offset is set.
- "Rel" = frequency-dependant offset is set.

- ▶ Select the area **1** in [Figure 4-1](#).

The "Measurement Settings" dialog is displayed. There, you can change the measurement type, assign a sensor, access the sensor settings, ...

See [Chapter 6.1.4, "Measurement settings dialog"](#), on page 71.

Selecting other areas in the measurement pane can open further dialogs, but these dialogs are measurement-specific, and there is no general rule that applies to all measurements.

### Measurement settings overview

- ▶ Select the area **2** in [Figure 4-1](#).

The "Primary Sensor" dialog is displayed. There, you can configure the sensor settings.

See [Chapter 7, "Sensor configuration"](#), on page 118.

### Selected limit values

- ▶ Select the area **6** in [Figure 4-1](#).

The "Limit Monitor" dialog is displayed. There, you can change limit values.

See ["Limit Monitor"](#) on page 61.

### Navigation pane

- ▶ Select an element in the area **9** in [Figure 4-1](#).

You can configure either the trigger or the presentation of the measurement result or further measurement-specific settings.




See [Chapter 6.1, "Configuration for all measurement types"](#), on page 54.



## 4.1.3 Status information

The status information is displayed in the upper right corner, left from the notification center.

See [Figure 4-1](#).

**Table 4-1: Status symbols**

Symbol	Description	Further information
	Memory stick is connected and ready for operation.	<a href="#">Chapter 3.1.9, "Connecting USB and external devices"</a> , on page 25
	Memory stick is connected and initialization is in progress. When the moving green dot vanishes, the memory stick is ready for operation.	
	R&S NRX is in remote control.	<a href="#">Chapter 4.3.2, "Returning to manual operation (LOCAL)"</a> , on page 47

Symbol	Description	Further information
	LLO means local lockout. R&S NRX is in remote control. Manual operation is disabled.	
	Identification and initialization of a connected sensor is in progress.	

#### 4.1.4 Notification center

The notification center collects all information during the operation of the R&S NRX:





- Notices
- Warning messages
- Error messages

The notification status is displayed in the upper right corner:

- The displayed symbol belongs to the most severe message. For example, if 1 error and 5 notices are present, the symbol of the error message is displayed.  
The symbols used are explained in [Table 4-2](#).
- The number of all messages is displayed in the color of the most severe message.

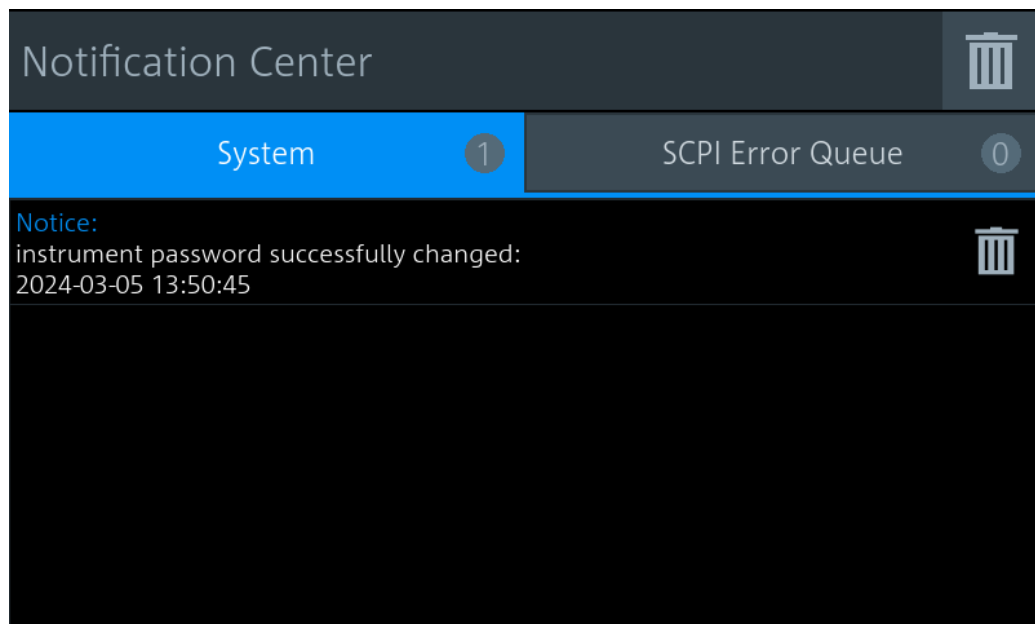
See [Figure 4-1](#).

**Table 4-2: Notification symbols**

Symbol	Description
	No message is available.
	Only one or more notices are present.
	At least one warning message is present. Yellow is the assigned color.
	At least one error message is present. Red is the assigned color.

#### To display the messages

- ▶ Select the notification symbol in the upper left corner.



The "Notification Center" dialog has two tabs:

- "System"  
All messages concerning the instrument are listed.
- "SCPI Error Queue"  
Messages related to the remote command functionality are displayed.

#### To delete notices that are no longer needed

- ▶ If you want to delete a specific notice, select the bin symbol next to the notice.
- ▶ If you want to delete all notices, select the bin symbol in the right corner.

Further information:

- [Chapter 14.2, "Notifications"](#), on page 504

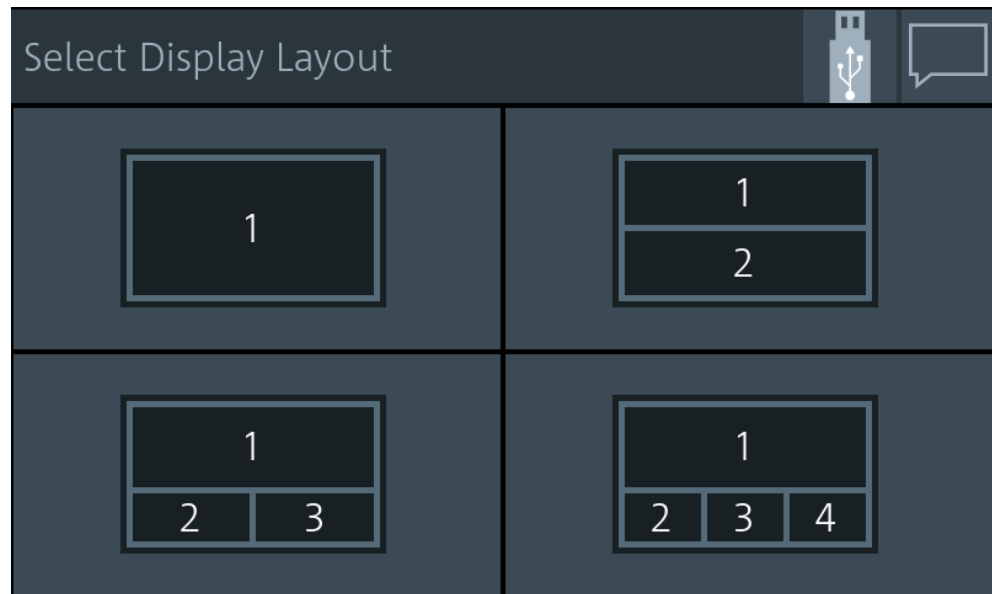
### 4.1.5 Selecting the display layout

You can split the measurement display into panes. A maximum number of 4 panes is possible, one for each measurement.

#### To change the display layout

1. Press and hold [Esc] until the start dialog is displayed.
2. Select the miniature display layout in the upper left corner.





3. Select how many measurement panes that you want to display.  
For example, if you select 2 panes, the measurement display looks as follows:



Figure 4-2: Two measurement panes

Remote command:

`DISPlay:LAYout` on page 213

`DISPlay[:WINDow<Window>][:STATe]` on page 215

### 4.1.6 Swapping measurement panes

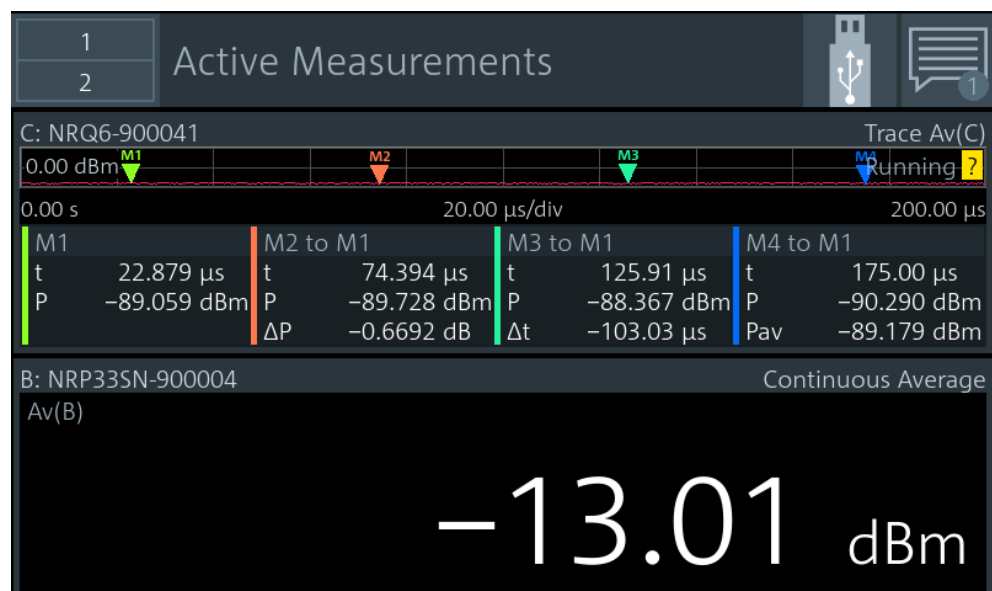
You can swap the position of measurement panes using drag and drop. The numbering of the panes is not changed.

#### To change the position of a measurement pane

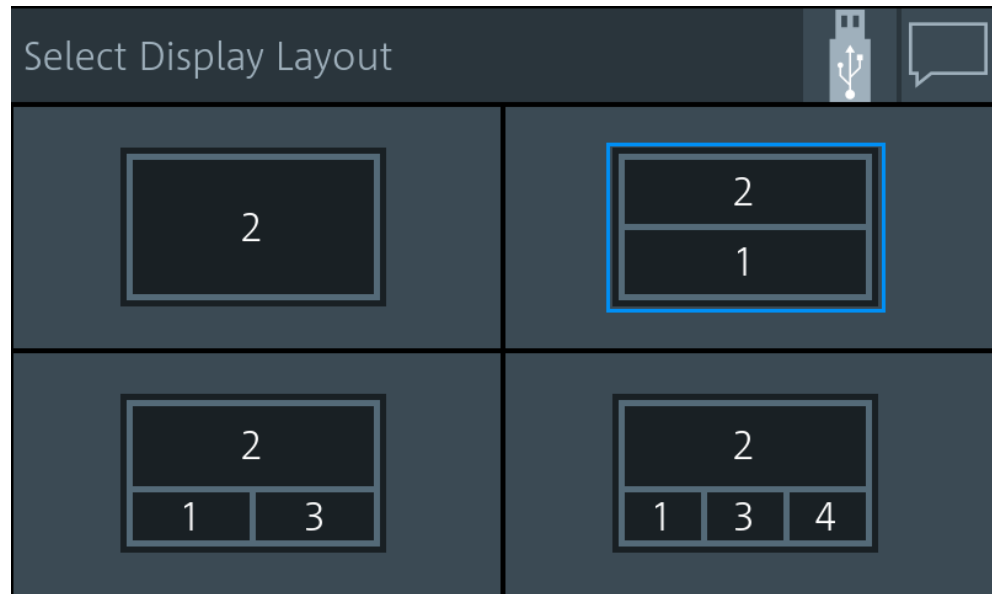
- ▶ Drag the measurement pane into the new position.



The two panes have changed position:




In the "Select Display Layout" dialog, you can see that the positions of pane 1 and pane 2 are exchanged, but the numbering of the panes is unchanged.



Remote command:

`DISPlay[:WINDow<Window>]:POSition` on page 215

#### 4.1.7 Editing parameters

 You can make settings visible that differ from the preset value. See "[Visualize Non-Preset State](#)" on page 182.

##### To change a numeric or alphanumeric value

1. Select a parameter to change its value.  
Depending on the selected parameter, a numeric or an alphanumeric editor is displayed.
2. Select **+ -** to display the value range of the parameter ("Min", "Max").
3. If "More x/x" is displayed, more units are available than displayed. Select "More x/x" to scroll through the units.

Example: "More 2/4" means, page 2 is displayed, 4 pages are available in total.

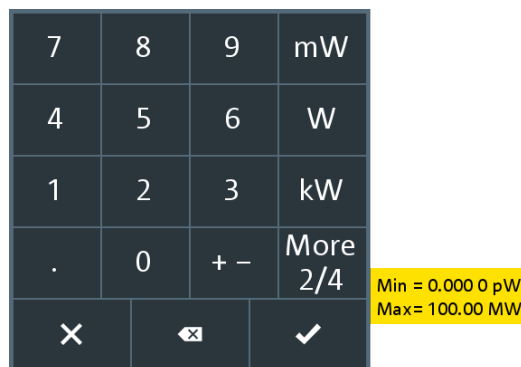


Figure 4-3: Numeric editor (example)

Use the alphanumeric editor as a standard keyboard.



Figure 4-4: Alphanumeric editor

#### 4.1.8 Creating and saving screenshots

You can create a screenshot of the current display, for example to save graphical measurement results.

- ▶ Press the [Screenshot] key on the front panel.

The R&S NRX saves the screenshot in PNG format.

If a memory stick is connected, the PNG is saved on the memory stick.

Otherwise, the PNG is saved in the `volatile` directory of the FTP directory. You can download the PNG using FTP. See [Chapter 10.3.3.1, "Data exchange using FTP"](#), on page 170.

In the "Notification Center", a "Notice" message shows the file path and name.

Remote control:

[SYSTem:HCOPY](#) on page 241

Further information:

- [Chapter 10.3.3.1, "Data exchange using FTP"](#), on page 170

- [Chapter 3.1.9, "Connecting USB and external devices"](#), on page 25
- [Chapter 3.2.1.6, "USB host interface"](#), on page 31

## 4.2 Remote operation

VNC (virtual network computing) simulates the user interface of the R&S NRX. Thus, you can operate the R&S NRX manually from an external computer in the same way as operating the R&S NRX itself. During VNC operation, local operation (manual operation, see [Chapter 4.1, "Manual operation"](#), on page 35) and remote operation have equal access rights. Both users see the same screen contents of the R&S NRX and can operate the R&S NRX simultaneously.



By default, VNC access is enabled. Any user in the network who knows the instrument password and IP address of the R&S NRX can access the R&S NRX. To prevent access, disable the VNC server service, see [Chapter 10.3.3, "Configuring LAN services"](#), on page 170.

### 4.2.1 Setting up remote operation

Prerequisites:

- LAN interface of the external computer is configured for the network.
- R&S NRX and the computer are connected using a LAN network.

#### To set up a connection using a VNC viewer

1. On the external computer, install the VNC viewer if it is not installed already.
2. Open the VNC viewer.
3. Enter the host name or the IP address of the R&S NRX.  
See also ["Overview tab"](#) on page 144.
4. Click "Connect".
5. Enter the instrument password.

#### To set up a connection using a browser

1. Open the browser.
2. Enter as web address: *http://<hostname>* or *http://<IP address>*. For example, *http://nrx-104711*.  
See also ["Overview tab"](#) on page 144.
3. Enter the instrument password.

Further information:









- [Chapter 10.3.2.1, "Setting the instrument password"](#), on page 168

## 4.2.2 Operating the front panel keys

You can operate the front panel keys using shortcuts, see also [Chapter 3.2.1.4, "Keys"](#), on page 29.

In the browser, you can also use the buttons below the measurement dialog that visualize the front panel keys.

**Table 4-3: Shortcuts for the front panel keys**

Front panel key	Remote operation replacement
	Backspace
	ESC
	Ctrl + C
	Ctrl + F
	Ctrl + Y
	Ctrl + P
	Ctrl + E
	Ctrl + N

## 4.3 Remote control

The R&S NRX is equipped with various interfaces for connecting it to a controller for remote control:

- IEC/IEEE bus interface (standard equipment) in line with the standards IEC 60625.1 (IEEE 488.1) and IEC 60625.2 (IEEE 488.2)
- Gigabit Ethernet interface
- USB 2.0 interface for remote control and firmware update

Connectors are installed at the rear of the R&S NRX. See [Chapter 3.2, "Instrument tour"](#), on page 27.

The interfaces support the SCPI (standard commands for programmable instruments) standard, version 1999.0 of May 1999. The SCPI standard is based on the IEEE 488.2 standard. It defines a standardized command language for controlling measuring and instruments with functions beyond the scope of the IEEE 488.2 standard.

For a detailed description of the remote commands, see [Chapter 12, "Remote control commands"](#), on page 190.

### 4.3.1 Switching to remote control (REMOTE)

Prerequisites

- A link is established between the controller and the R&S NRX.

- The R&S NRX is configured correctly.

After power-up, the R&S NRX is always in manual control mode "LOCAL". When the R&S NRX receives a SCPI command, it switches to remote control irrespective of the selected interface.

### 4.3.2 Returning to manual operation (LOCAL)



If the R&S NRX is in remote control, you can display settings using the front panel keys and the touchscreen, but you cannot change settings. To do that, you have to return to manual operation.

The R&S NRX remains in remote control until you perform one of the following actions. Make sure that the R&S NRX is free for you to use.



- ▶ Press the [Esc/Local] key. See "[Esc] / Local" on page 29.  
If the manual operation was disabled by the &LLO command (local lockout) and the [Esc/Local] key does not work, switch the R&S NRX off and on again.
- ▶ Send the &GTL command (go to local).
- ▶ Select the symbol on the touchscreen.  
See [Chapter 4.1.3, "Status information"](#), on page 38.

## 5 Measurement basics

In a measurement, the R&S NRX uses all sensor-dependent measurement functions and displays the results. Thus, you can configure both the measurement and the sensor. The R&S NRX saves all settings.

- [Parallel measurements](#)..... 48
- [Sensor assignment and memory](#)..... 48
- [Measuring](#)..... 50
- [Limit violation](#)..... 51
- [Settings conflict](#)..... 52

### 5.1 Parallel measurements

An R&S NRX without enhancements supports the configuration of one sensor for one measurement type. If you want to use more than one sensor simultaneously, you can extend both to a maximum of four with the following options:

- R&S NRX-K2 second measurement channel
- R&S NRX-K4 third and fourth measurement channel

For details on ordering information, refer to the brochure of the R&S NRP power meter family.

You can configure the display to accommodate the number of measurements you want to watch simultaneously, see [Chapter 4.1.5, "Selecting the display layout"](#), on page 40.

If you connect more than four sensors simultaneously, the R&S NRX notifies you. Use the sensor manager to handle more than four sensors, see [Chapter 10.1.4, "Sensor management"](#), on page 155.

### 5.2 Sensor assignment and memory

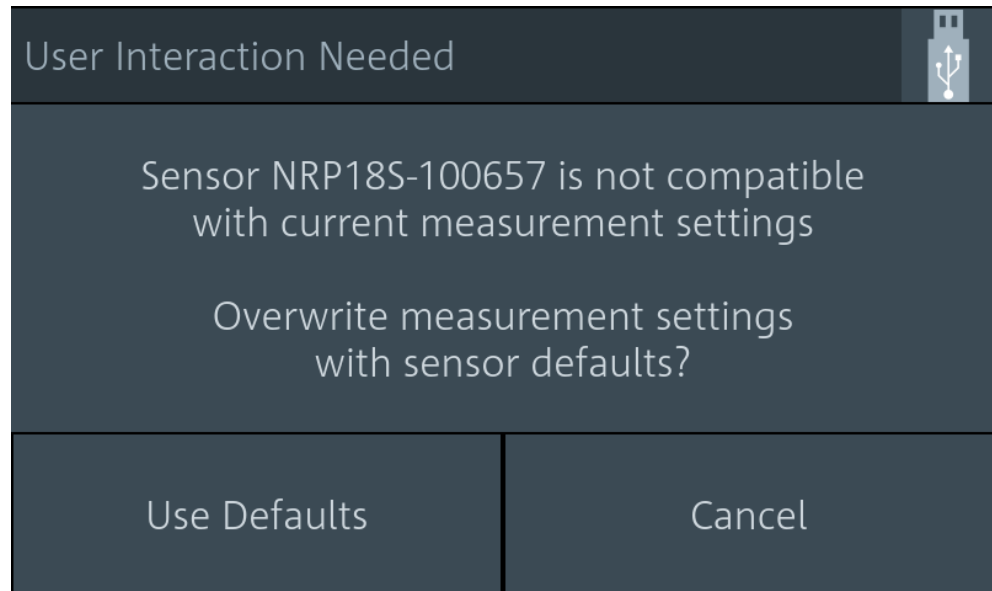
When you connect an R&S power sensor to the R&S NRX, the R&S NRX tries to recognize the sensor. The sensor recognition is based on the sensor type and the serial number of the sensor.

The following scenarios are possible:

- Sensor type has never been connected before.  
The R&S NRX uses its settings for the measurement.
- Sensor type has been connected before.  
The R&S NRX assigns the sensor to the measurement type that it was assigned before. The port where the sensor is connected is of no concern. You do not have to use the same port for the same sensor type.  
See ["Example: Using different ports for the same sensor type"](#) on page 49.
- Sensor type is different to the sensor type that was previously assigned to the measurement. Decide whether you want to use the settings of the sensor.



- "Use Default"  
Uses the sensor settings. For details, see the user manual of the sensor.
- "Cancel"  
Keeps the measurement settings and does not assign the sensor to the measurement.



If conflicting settings occur when connecting a sensor, the R&S NRX shows where the problematic setting is located. See [Chapter 5.5, "Settings conflict"](#), on page 52.

**Example: Using different ports for the same sensor type**

1. Connect an R&S NRQ6 to port A.
2. Perform a trace measurement.
3. Remove the R&S NRQ6 and connect it to port B.

The R&S NRX recognizes the sensor type and assigns the R&S NRQ6 to the same measurement.

**Example: Using two sensors of the same type**

1. Connect the first R&S NRP-Z81 to port A.
2. Connect the second R&S NRP-Z81 to port B.
3. Swap ports.

The R&S NRX distinguishes sensors of the same type due to their unique serial number and assigns them to the same measurement as before.

The sensor assignment is deleted by a preset, reset or sanitization. If the sensor has no memory of a previous sensor assignment, the sensor assigns the measurements according to the port to which the sensors are connected. The number of measurement panes is adapted automatically.

**Example: Connecting sensors after a preset**

1. Connect an R&S NRQ6 to port A.

The measurement results are displayed in measurement pane 1.

2. Connect an R&S NRP33SN to port C.

The display layout is extended to 3 measurement panes. The measurement results of the R&S NRP33SN are displayed in measurement pane 3. Measurement pane 2 is unused.

3. Disconnect the R&S NRP33SN from port C and connect it to port B.

4. Press [Preset].

The display layout is reduced to two measurement panes. The sensors are assigned according to their port. The assignment of the R&S NRQ6 is unchanged, but the R&S NRP33SN is assigned to measurement pane 2.

Further information:

- [Chapter 12.3, "Addressing measurements and sensors"](#), on page 199  
Suffix usage in remote control

## 5.3 Measuring

This measurement description is designed to give you a first impression. For further information, see the description of the measurements, their results and their settings:

- [Chapter 6.1, "Configuration for all measurement types"](#), on page 54
- [Chapter 6, "Measurement and display configuration"](#), on page 54
- [Chapter 7, "Sensor configuration"](#), on page 118

**Setup**

1. Connect one or more R&S power sensors to the R&S NRX. See [Chapter 3.1.8, "Connecting sensors"](#), on page 23.

How many sensors you can connect depends on the options of your R&S NRX. See [Chapter 5.1, "Parallel measurements"](#), on page 48.

2. Connect each sensor to a DUT (signal source). See the user manual of the sensor for information on topics that need your special attention.

**Starting a measurement**

1. Preset the R&S NRX and the connected sensors.

- a) Press the [Preset] key.
- b) Select "Preset".

See also [Chapter 8, "Saving and recalling settings"](#), on page 138.

2. Depending on the sensor and the measurement conditions, consider to zero the sensor:

Execute zeroing:

**Note:** Turn off all measurement signals before zeroing. An active measurement signal during zeroing causes an error.

- a) Switch off the power of the signal source.
- b) Press the [Zero] key.
- c) Select "Zero All Sensors".

See also [Chapter 9, "Zeroing sensors"](#), on page 140.

3. Configure the measurement.
  - a) Open the "Measurement Settings" dialog, as described in [Chapter 4.1.2, "Main measurement dialog"](#), on page 36.
  - b) Select the "Measurement Type", for example "Continuous Average".
  - c) Select "Quick Setup" > "Auto Set".

4. Switch on the signal source.

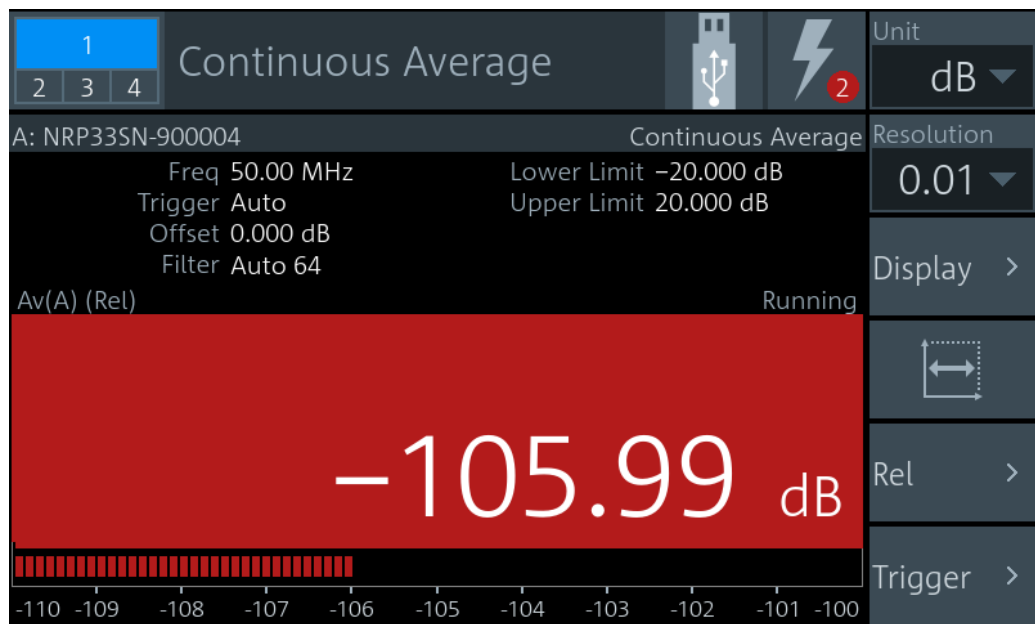
The measurement starts, and the result is displayed in dBm.

5. If necessary, perform further settings.

## 5.4 Limit violation

If a measured value violates the set limits, it is highlighted in red.

- ▶ To change the limit settings, select the displayed limit values. See also [Figure 4-1](#).



## 5.5 Settings conflict

A setting conflict can occur for the following reasons:

- The sensor assigned to the measurement does not support a set value. If it is a numeric value, the suitable range for the sensor is given in the tooltip.
- The sensor assigned to the measurement does not support the measurement type.
- Other contradictory settings, for example, the lower limit value is higher than the upper limit value.

Contradictory settings are allowed so that you are not hampered in your workflow. But they cause an error message in the notification center. Furthermore, the contradictory setting is highlighted and the control elements in the hierarchies above that are leading to this setting are highlighted, too. Thus, you can follow the problem across the hierarchies to solve the setting conflict. The only control element that is not highlighted due to a settings conflict is the measurement value. The measurement value is only highlighted in red when it is violating the set limits, as shown in [Chapter 5.4, "Limit violation"](#), on page 51.

### Example: The sensor does not support the measurement type

The notification center indicates an error, but the no control element is highlighted. The error message reports a settings conflict.

### Solving the error

1. Select the measurement pane. See also [Figure 4-1](#).  
The "Measurement Settings" dialog is displayed.  
The "Measurement Type" is highlighted.



2. Select another measurement type that the sensor supports, or assign another sensor.



A setting that differs from the preset value is also indicated across the hierarchies by a pencil symbol, if the visualization is enabled. See "[Visualize Non-Preset State](#)" on page 182.



## 6 Measurement and display configuration

The different measurement types and their specific configuration settings are described in the following. Settings available for all measurements are described in [Chapter 6.1, "Configuration for all measurement types"](#), on page 54.

• <a href="#">Configuration for all measurement types</a> .....	54
• <a href="#">Continuous average</a> .....	74
• <a href="#">Burst average</a> .....	76
• <a href="#">Trace</a> .....	78
• <a href="#">Pulse analysis</a> .....	84
• <a href="#">Time gate</a> .....	93
• <a href="#">Timeslot</a> .....	98
• <a href="#">Statistics</a> .....	104
• <a href="#">NRT</a> .....	111

### 6.1 Configuration for all measurement types

The main measurement dialog offers access to all measurement settings. The layout of the dialog and how to open it are described in [Chapter 4.1.2, "Main measurement dialog"](#), on page 36.

In the navigation pane, you can directly set the unit and the resolution for numeric results. These settings are also available under "Display".

The settings available for all measurements are described in the following, while measurement-specific settings are described separately for each measurement.

#### 6.1.1 Display settings

Access: Main measurement dialog > "Display"

The available display settings depend on the measurement type and whether the result display is numeric or graphical:

- Resolution and unit of a measurement
- Graphical or numerical display of measured values
- Scaling parameters for graphical display

The statistics measurement has no "Display" settings, but you can scale the display.

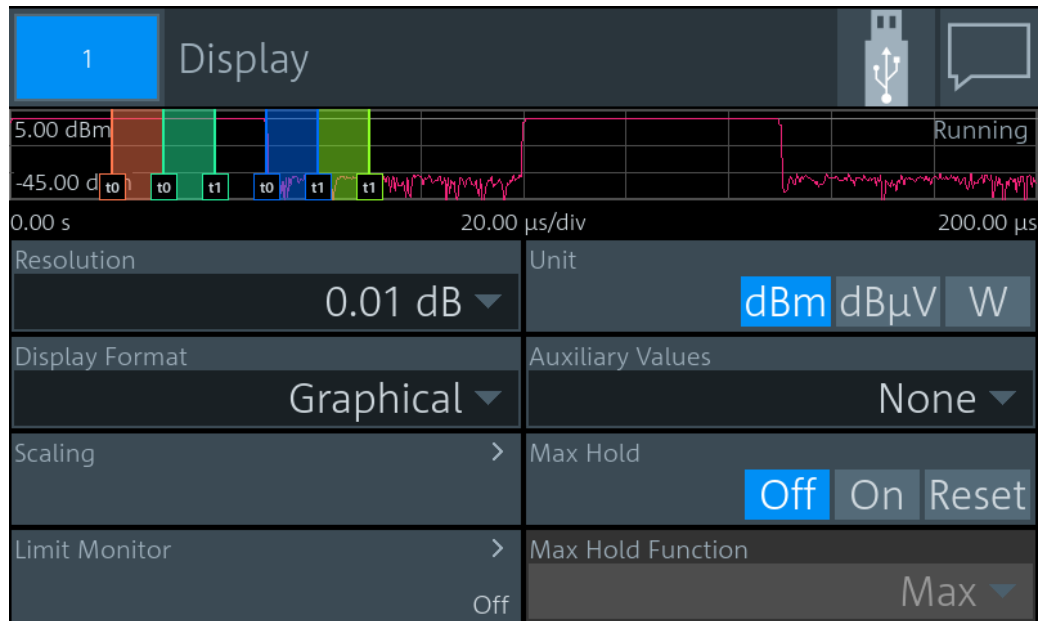


Figure 6-1: Display dialog, example for time gate measurement

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### Resolution

Configures the resolution of the measurement. For logarithmic power values (dB, dBm or dB $\mu$ V), the number of decimal places is set directly. For linear power values (W,  $\Delta\%$ , 1), the number of decimal places depends on the selected resolution and the magnitude of the result.

"1 dB | 0.1 dB | 0.01 dB | 0.001 dB"

Sets the resolution to the specified value.

Remote command:

CALCulate<Measurement>:RESolution

[SENSe<Sensor>:]RRESolution

### Unit

Sets the unit of the display. The available units depend on the [Channel Calculation Function](#).

"dBm"	Power in dBm
"dB $\mu$ V"	Power in dB $\mu$ V
"W"	Power in W
"dB"	Quotient of the power values as dB
" $\Delta\%$ "	Difference between the power values in W, given in %. 0 % means that the powers in both channels are equal.
"x1"	Quotient of the power values (non-logarithmic)

Remote command:

UNIT<Measurement>:POWer[:VALue] on page 231

UNIT<Measurement>:POWer:RATio on page 230

### Display Format

Available for continuous average, burst average, time gate, timeslot, NRT measurements.

Sets the display format of the measured values.

"Scalar Digital"	Numeric format
"Scalar Analog"	Numeric format with bar chart
"Graphical"	Available for time gate, timeslot measurements. Measured values are plotted over time.

Remote command:

CALCulate<Measurement>:DMODE on page 210

### Auxiliary Values

Available for the graphic display of continuous average, burst average measurements. Only displayed if the measurement result display is shown in full screen.



Determines which additional information about the measured values is shown in the display. If you press [1 Trig / Delete], you reset the auxiliary values.

"None"	No additional values are measured.
"Extremes"	Displays the maximum, the minimum and the max-min values since the search for extreme values has been started. With logarithmic units, the peak-to-peak value equals the quotient of the measured values converted into linear units.
"Statistics"	Displays the long-term mean, the standard deviation and the total number of measurement results that have been evaluated since the search for statistic values has been started.

Remote command:

[CALCulate<Measurement>:AVALue](#) on page 210

### Scaling

Opens the "Scaling" dialog to configure the display scaling. The available parameters depend on the following settings:

- ["Measurement Type"](#) on page 72
- ["Display Format"](#) on page 56

#### Scale Lower Limit ← Scaling

If [Display Format](#) is set to "Scalar Analog", available for continuous average, burst average, time gate, timeslot measurements.

Defines the lower limit of the bargraph display.

Remote command:

[CALCulate<Measurement>:METer<DirectionalChannel>:LOWer\[:DATA\]:RATio:RCOefficient](#) on page 217

[CALCulate<Measurement>:METer<DirectionalChannel>:LOWer\[:DATA\]:RATio:RFRatio](#) on page 217

[CALCulate<Measurement>:METer<DirectionalChannel>:LOWer\[:DATA\]:RATio:RLOSs](#) on page 218

[CALCulate<Measurement>:METer<DirectionalChannel>:LOWer\[:DATA\]:RATio:SWR](#) on page 218

[CALCulate<Measurement>:METer<DirectionalChannel>:LOWer\[:DATA\]:RATio\[:VALue\]](#) on page 219

[CALCulate<Measurement>:METer<DirectionalChannel>:LOWer\[:DATA\]\[:POWER\]](#) on page 219

#### Scale Upper Limit ← Scaling

If [Display Format](#) is set to "Scalar Analog", available for continuous average, burst average, time gate, timeslot measurements.

Defines the upper limit of the bargraph display.

Remote command:

[CALCulate<Measurement>:METer<DirectionalChannel>:UPPer\[:DATA\]:RATio:RCOefficient](#) on page 220

[CALCulate<Measurement>:METer<DirectionalChannel>:UPPer\[:DATA\]:RATio:RFRatio](#) on page 220

CALCulate<Measurement>:METer<DirectionalChannel>:UPPer[:DATA]:  
RATio:RLOSs on page 221

CALCulate<Measurement>:METer<DirectionalChannel>:UPPer[:DATA]:  
RATio:SWR on page 221

CALCulate<Measurement>:METer<DirectionalChannel>:UPPer[:DATA]:  
RATio[:VALue] on page 222

CALCulate<Measurement>:METer<DirectionalChannel>:UPPer[:DATA][:  
POWer] on page 222

### **Forward Scale Lower Limit, Reflection Scale Lower Limit ← Scaling**

Available for NRT measurements.

Defines the lower limit of the bargraph display.

Remote command:

CALCulate<Measurement>:METer<DirectionalChannel>:LOWer[:DATA]:  
CCDF

CALCulate<Measurement>:METer<DirectionalChannel>:LOWer[:DATA]:  
RATio:RCoefficient

CALCulate<Measurement>:METer<DirectionalChannel>:LOWer[:DATA]:  
RATio:RFRatio

CALCulate<Measurement>:METer<DirectionalChannel>:LOWer[:DATA]:  
RATio:RLOSs

CALCulate<Measurement>:METer<DirectionalChannel>:LOWer[:DATA]:  
RATio:SWR

CALCulate<Measurement>:METer<DirectionalChannel>:LOWer[:DATA]:  
RATio[:VALue]

CALCulate<Measurement>:METer<DirectionalChannel>:LOWer[:DATA][:  
POWer]

### **Forward Scale Upper Limit, Reflection Scale Upper Limit ← Scaling**

Available for NRT measurements.

Defines the upper limit of the bargraph display.

Remote command:

CALCulate<Measurement>:METer<DirectionalChannel>:UPPer[:DATA]:  
CCDF

CALCulate<Measurement>:METer<DirectionalChannel>:UPPer[:DATA]:  
RATio:RCoefficient

CALCulate<Measurement>:METer<DirectionalChannel>:UPPer[:DATA]:  
RATio:RFRatio

CALCulate<Measurement>:METer<DirectionalChannel>:UPPer[:DATA]:  
RATio:RLOSs

CALCulate<Measurement>:METer<DirectionalChannel>:UPPer[:DATA]:  
RATio:SWR

CALCulate<Measurement>:METer<DirectionalChannel>:UPPer[:DATA]:  
RATio[:VALue]

CALCulate<Measurement>:METer<DirectionalChannel>:UPPer[:DATA][:  
POWer]

**Start Time ← Scaling**

Available for trace, pulse analysis measurements. If [Display Format](#) is set to "Graphical", available for time gate, timeslot measurements.

Defines the position of the left screen edge relative to the delayed trigger. The value can be negative so that signal components are displayed before the trigger event.

Remote command:

[CALCulate<Measurement>:TRACe:X\[:SCALe\]:LEFT](#) on page 223

**Time / Div ← Scaling**

Available for trace, pulse analysis measurements. If [Display Format](#) is set to "Graphical", available for time gate, timeslot measurements.

Sets the time resolution of the results window. The time per division is one-tenth of the [Trace Length](#).

**Trace Length ← Scaling**

Available for trace, pulse analysis measurements. If [Display Format](#) is set to "Graphical", available for time gate, timeslot measurements.

Sets the duration of the trace.

Remote command:

[CALCulate<Measurement>:TRACe:X\[:SCALe\]:LENGth](#) on page 223

**Power Reference ← Scaling**

Available for trace, pulse analysis, time gate, timeslot measurements.

Sets the power reference value. The reference value is assigned to the top line of the grid.

Remote command:

[CALCulate<Measurement>:TRACe:Y\[:SCALe\]:TOP:DB](#) on page 225

[CALCulate<Measurement>:TRACe:Y\[:SCALe\]:TOP:DBM](#) on page 225

[CALCulate<Measurement>:TRACe:Y\[:SCALe\]:TOP:DBUV](#) on page 226

[CALCulate<Measurement>:TRACe:Y\[:SCALe\]:TOP:DPCT](#) on page 226

[CALCulate<Measurement>:TRACe:Y\[:SCALe\]:TOP:ONE](#) on page 226

[CALCulate<Measurement>:TRACe:Y\[:SCALe\]:TOP:WATT](#) on page 227

**Power / Div ← Scaling**

Available for trace, pulse analysis, time gate, timeslot, statistics measurements.

Sets the vertical scaling. The power per division is one-tenth of the [Power Span](#).

The combination of [Power Reference](#) and this parameter define the vertical orientation of the trace.

Remote command:

[\[SENSe<Sensor>:\]TRACe:TIME](#) on page 228

**Power Span ← Scaling**

Available for trace, pulse analysis, time gate, timeslot measurements.

Sets the power level range.

Remote command:

`CALCulate<Measurement>:TRACe:Y[:SCALE]:SPAN:DB` on page 223

`CALCulate<Measurement>:TRACe:Y[:SCALE]:SPAN:DBM` on page 224

`CALCulate<Measurement>:TRACe:Y[:SCALE]:SPAN:DBUV` on page 224

`CALCulate<Measurement>:TRACe:Y[:SCALE]:SPAN:DPCT` on page 224

`CALCulate<Measurement>:TRACe:Y[:SCALE]:SPAN:ONE` on page 224

`CALCulate<Measurement>:TRACe:Y[:SCALE]:SPAN:WATT` on page 225

### Unit ← Scaling

Sets the unit of the power axis.

### Relative Measurements

Available for NRT measurements.

Opens the dialog that groups the settings for relative measurements.

### Forward Reference Value, Reflection Reference Value ← Relative Measurements

Available for NRT measurements.

Available if [Forward Relative State](#), [Reflection Relative State](#) is set to "On" or "Set".

Sets the reference value.

Remote command:

`CALCulate<Measurement>:RELative<DirectionalChannel>[:MAGNitude]`  
on page 255

`CALCulate<Measurement>:RELative<DirectionalChannel>:CCDF`

`CALCulate<Measurement>:RELative<DirectionalChannel>:POWer[:MAGNitude]`

`CALCulate<Measurement>:RELative<DirectionalChannel>:RATio:RCoefficient`

`CALCulate<Measurement>:RELative<DirectionalChannel>:RATio:RFRatio`

`CALCulate<Measurement>:RELative<DirectionalChannel>:RATio:RLOSS`

`CALCulate<Measurement>:RELative<DirectionalChannel>:RATio:SWR`

`CALCulate<Measurement>:RELative<DirectionalChannel>:RATio[:MAGNitude]`

`[SENSe<Sensor>:]POWer:REFerence`

### Forward Relative State, Reflection Relative State ← Relative Measurements

Available for NRT measurements.

Allows you to relate measured power to a reference value.

Off	Displays the absolute power or power ratio.
On	Displays the relative power or power ratio. As a reference value, the value specified under <a href="#">Relative Measurements</a> is used.
Set	Assigns the current measurement result as a reference value and displays the relative power.

Remote command:

```
CALCulate<Measurement>:RELative<DirectionalChannel>:STATE
CALCulate<Measurement>:RELative<DirectionalChannel>[:MAGNitude]:
AUTO on page 255
```

### Forward Unit

Available for NRT measurements.

Sets the unit of the forward power measurement.

"dBm"	Power in dBm
"dBμV"	Power in dBμV
"W"	Power in W

Remote command:

```
UNIT<Measurement>:POWER[:VALue]
UNIT<Measurement>:POWER:RATio
```

### Limit Monitor

Opens the "Limit Monitor" dialog that groups the limit settings.

Available for continuous average, burst average, time gate, timeslot, NRT measurements.

For each window with digital or digital/analog result display, you can set an upper and a lower limit.

### Lower Limit State ← Limit Monitor

Available for continuous average, burst average, time gate, timeslot measurements.

Enables or disables the monitoring function for the lower limit.

Remote command:

```
CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer:STATE
```

### Lower Limit ← Limit Monitor

Available for continuous average, burst average, time gate, timeslot measurements.

Available if [Lower Limit State](#) is set to "On".

Defines a lower limit.

Remote command:

```
CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer[:DATA]
CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer[:DATA]:
POWER
CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer[:DATA]:
RATio:RCOefficient
CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer[:DATA]:
RATio:RFRatio
CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer[:DATA]:
RATio:RLOSs
```

```
CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer[:DATA]:
RATio:SWR
CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer[:DATA]:
RATio[:VALue]
```

#### Upper Limit State ← Limit Monitor

Available for continuous average, burst average, time gate, timeslot measurements.

Enables or disables the monitoring function for the upper limit.

Remote command:

```
CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer:STATe
```

#### Upper Limit ← Limit Monitor

Available for continuous average, burst average, time gate, timeslot measurements.

Available if [Upper Limit State](#) is set to "On".

Defines an upper limit.

Remote command:

```
CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer[:DATA]
CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer[:DATA]:
POWer
CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer[:DATA]:
RATio:RCOefficient
CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer[:DATA]:
RATio:RFRatio
CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer[:DATA]:
RATio:RLOSs
CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer[:DATA]:
RATio:SWR
CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer[:DATA]:
RATio[:VALue]
```

#### Forward Lower Limit State, Reflection Lower Limit State ← Limit Monitor

Available for NRT measurements.

Enables or disables the monitoring function for the lower limit.

Remote command:

```
CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer:STATe
```

#### Forward Lower Limit, Reflection Lower Limit ← Limit Monitor

Available for NRT measurements.

Defines a lower limit.

Remote command:

```
CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer[:DATA]
on page 233
CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer[:DATA]:
CCDF
CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer[:DATA]:
POWer
```

```

CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer[:DATA]:
RATio:RCoefficient
CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer[:DATA]:
RATio:RFRatio
CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer[:DATA]:
RATio:RLOSS
CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer[:DATA]:
RATio:SWR
CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer[:DATA]:
RATio[:VALue]

```

#### **Forward Upper Limit State, Reflection Upper Limit State ← Limit Monitor**

Available for NRT measurements.

Enables or disables the monitoring function for the upper limit.

Remote command:

```
CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer:STATe
```

#### **Forward Upper Limit, Reflection Upper Limit ← Limit Monitor**

Available for NRT measurements.

Defines an upper limit.

Remote command:

```

CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer[:DATA]
on page 236
CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer[:DATA]:
CCDF
CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer[:DATA]:
POWer
CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer[:DATA]:
RATio:RCoefficient
CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer[:DATA]:
RATio:RFRatio
CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer[:DATA]:
RATio:RLOSS
CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer[:DATA]:
RATio:SWR
CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer[:DATA]:
RATio[:VALue]

```

#### **Max Hold**

If enabled, displays the highest value measured for each point (pixel) of the selected display type.

Remote command:

```
CALCulate<Measurement>:HOLD[:STATe]
```

#### **Max Hold Function**

For all measurement functions, the R&S NRX stores the maximum and minimum values and the calculated differences between these values.

The selected setting applies to both power and reflection indication. You can change at any time.

"Max"	Maximum value
"Min"	Minimum value
"Max – Min"	Difference between maximum and minimum value

Remote command:

`CALCulate<Measurement>:HOLD:FUNCTION`

## 6.1.2 Controlling the measurement

The sensor offers a bunch of possibilities to control the measurement:

- Do you want to start the measurement immediately after the initiate command or do you want to wait for a trigger event?
- Do you want to start a single measurement cycle or a sequence of measurement cycles?
- Do you want to output each new average value as a measurement result or do you want to bundle more measured values into one result?

Further information:

- [Chapter 6.1.3, "Triggering"](#), on page 65
- See the sensor user manual for examples on the interplay of the controlling mechanisms.

### 6.1.2.1 Controlling the measurement results

The sensor can cope with the wide range of measurement scenarios with the help of the so-called "termination control". Depending on how fast your measurement results change, you can define how the measurement results are output.

#### Repeating termination control

Outputs a measurement result when the entire measurement has been completed. This means that the number of measurement cycle repetitions is equal to the set average count. If the average count is large, the measurement time can be long.

Useful if you expect slow changes in the results, and you want to avoid outputting redundant data.

#### Moving termination control

Outputs intermediate values to facilitate early detection of changes in the measured quantity. This means that for each partial measurement, a new average value is output as a measurement result. Thus, the measurement result is a moving average of the last partial measurements. How many of the partial measurements are averaged is defined by the average count.

Useful if you want to detect trends in the result during the measurement.



### 6.1.3 Triggering

In a basic continuous measurement, the measurement is started immediately after the initiate command. However, sometimes you want that the measurement starts only if a specific condition is fulfilled. For example, if a signal level is exceeded, or in certain time intervals. For these cases, you can define a trigger for the measurement.

#### 6.1.3.1 Trigger states

The sensor has trigger states to define the exact start and stop time of a measurement and the sequence of a measurement cycle. The following states are defined:

- **Idle**  
The sensor performs no measurement. After powering on, the sensor is in the idle state.
- **Waiting for trigger**  
The sensor waits for a trigger event that is defined by the trigger source. When the trigger event occurs, the sensor enters the measuring state.
- **Measuring**  
The sensor is measuring data. It remains in this state during the measurement. When the measurement is completed, it exits this state immediately.

#### 6.1.3.2 Trigger sources

The possible trigger conditions and the execution of a trigger depend on the selected trigger mode and trigger source.

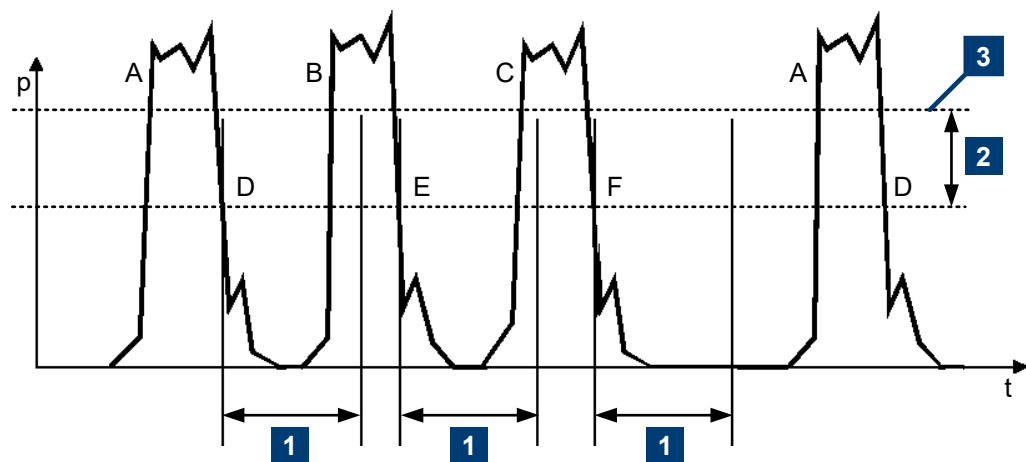
If the signal power exceeds or falls below a reference level set by the trigger level, the measurement is started after the defined delay time. Waiting for a trigger event can be skipped.

Trigger source	Description	Remote commands to initiate the measurement
"Hold"	Waits for a trigger event. Press [1Trig] to trigger the measurement. Depending on the sensor type, the trigger is executed by the trigger bus or by remote command. See the user manual of the sensor for details.	TRIGger<Measurement>[:IMMediate]
"Immediate"	Measures immediately, does not wait for a trigger condition.	-
"Internal"	Uses the input signal as the trigger signal.	TRIGger<Measurement>[:IMMediate]
"Internal A", "Internal B", "Internal C", "Internal D"	Receives the trigger signal from the trigger sender. The trigger sender is the sensor connected to port A, B, C, or D. See <a href="#">"Trigger Sender State"</a> on page 70.	TRIGger<Measurement>[:IMMediate]
"External"	Uses the external trigger signal that is supplied at the Trig In / Out 2 connector. See <a href="#">Chapter 3.2.2.2, "Trig In / Out 2 and Out 1 / Trig Out connectors"</a> , on page 32.	TRIGger<Measurement>[:IMMediate]

Trigger source	Description	Remote commands to initiate the measurement
"External 2"	Requires a sensor with a trigger input/output. Uses the external trigger signal that is supplied at the trigger input/output of the sensor.	TRIGger<Measurement>[:IMMediate]
"Sensor Check Source"	Requires the R&S NRX-B1 sensor check source option. If enabled, the R&S NRX-B1 sensor check source sends trigger signals using the internal trigger bus. See "Sensor Check Source tab" on page 150.	*TRG TRIGger<Measurement>[:IMMediate]
"Bus (*TRG)"	Waits for a trigger event. Press [1Trig] to trigger the measurement. Depending on the sensor type, the trigger is executed by the trigger bus or by remote command. See the user manual of the sensor for details.	*TRG TRIGger<Measurement>[:IMMediate]

### 6.1.3.3 Dropout time

The dropout time is useful when dealing with signals with several active slots, for example GSM signals, see [Figure 6-2](#). When measuring in sync with the signal, a trigger event is to be produced at A, but not at B or C.



**Figure 6-2: Significance of the dropout time**

- 1 = Dropout time
- 2 = Trigger hysteresis
- 3 = Trigger level

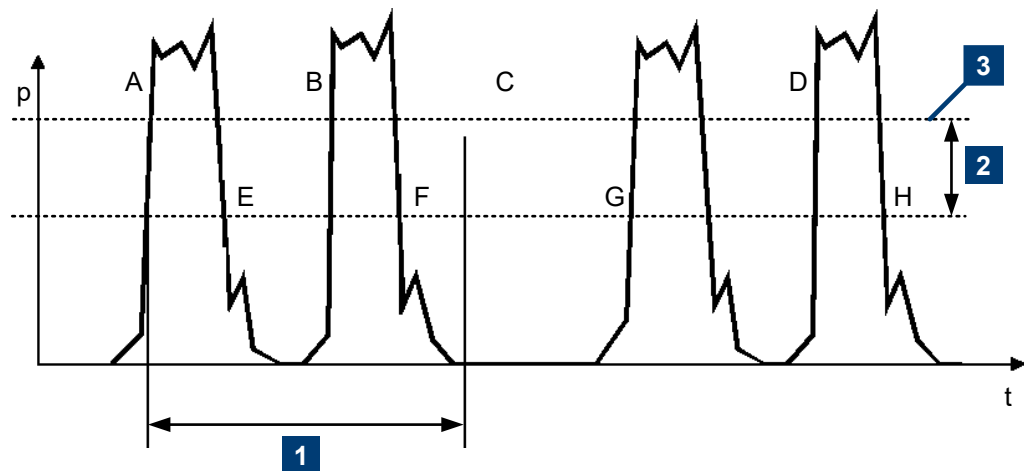
The RF power between the slots is below the threshold defined by the trigger level and the trigger hysteresis. Therefore, the trigger hysteresis alone cannot prevent triggering at B or at C. Therefore, set the dropout time greater than the time elapsed between points D and B and between E and C, but smaller than the time elapsed between F and A. Thus, you ensure that triggering takes place at A.

Because the mechanism associated with the dropout time is reactivated whenever the trigger threshold is crossed, you can also obtain unambiguous triggering for many complex signals.

If you use a holdoff time instead of a dropout time, you can obtain stable triggering conditions, regular triggering at the same point. But you cannot achieve exclusive triggering at A.

#### 6.1.3.4 Holdoff time

During the holdoff time, a period after a trigger event, all trigger events are ignored.



- 1 = Holdoff time
- 2 = Trigger hysteresis
- 3 = Trigger level

#### 6.1.3.5 Trigger settings

Access: Main measurement dialog > "Trigger"

For trace or pulse analysis measurements, the access is: Main measurement dialog > "Trigger" > "Sensor Trigger"



Figure 6-3: Display dialog, example for continuous average measurement

Trigger Mode.....	68
Trigger Source.....	69
Trigger Level.....	69
Trigger Advanced.....	69
L Source.....	69
L Slope.....	69
L Level.....	69
L Delay.....	69
L Dropout.....	70
L Holdoff.....	70
L Hysteresis.....	70
Specific Trigger.....	70
L Jitter Suppression.....	70
L Trigger Sender State.....	70
L Trigger Sender Port.....	71
L Trigger Synchronize State.....	71
L Trigger Synchronize Port.....	71
L Trigger 2 Input Impedance.....	71

### Trigger Mode

Controls the trigger execution depending on the settings under "Trigger Source" on page 69.

"Normal"	Continuous triggering with regular trigger events.
"Freerun"	Enables a continuous measurement. The sensor executes one measurement cycle after the other.
"Single"	Disables continuous triggering so that only one trigger event at a time is executed. To enable triggering again, press [1Trig].

"Auto" Automatically starts a measurement if no trigger event has occurred after 300 ms.

Remote command:

`TRIGger<undef>:ALL:MODE`

`TRIGger<Measurement>:MODE`

### Trigger Source

For primary and secondary sensors.

Sets the source for the trigger event. See [Chapter 6.1.3.2, "Trigger sources"](#), on page 65.

Remote command:

`TRIGger<undef>:ALL:SOURce`

`TRIGger<Measurement>[:CHANnel<Channel>]:SOURce`

### Trigger Level

For primary and secondary sensors.

Sets the trigger threshold for internal triggering derived from the test signal.

The trigger level is displayed as a dotted red line. The trigger time is displayed as a small rhomb on the trigger level line.

Remote command:

`TRIGger<undef>:ALL:LEVel`

`TRIGger<Measurement>[:CHANnel<Channel>]:LEVel`

### Trigger Advanced

For primary and secondary sensors.

Groups further trigger settings.

#### Source ← Trigger Advanced

See ["Trigger Source"](#) on page 69.

#### Slope ← Trigger Advanced

Determines which edge of the envelope power (internal triggering) or increasing voltage (external triggering) is used for triggering.

"Positive" Rising edge

"Negative" Falling edge

Remote command:

`TRIGger<undef>:ALL:SLOPe`

`TRIGger<Measurement>[:CHANnel<Channel>]:SLOPe`

#### Level ← Trigger Advanced

See ["Trigger Level"](#) on page 69-

#### Delay ← Trigger Advanced

Sets the delay between the trigger event and the beginning of the actual measurement.

Remote command:

```
TRIGger<undef>:ALL:DELay[:VALue]
TRIGger<Measurement>[:CHANnel<Channel>]:DELay[:VALue]
```

### Dropout ← Trigger Advanced

If the trigger level has been underrun with internal triggering, it is sometimes useful to wait some time (dropout time) before retriggering. The measurement of unwanted signal components can thus be suppressed. See [Chapter 6.1.3.3, "Dropout time"](#), on page 66.

Remote command:

```
TRIGger<undef>:ALL:DTIME
TRIGger<Measurement>[:CHANnel<Channel>]:DTIME
```

### Holdoff ← Trigger Advanced

Sets the holdoff time, see [Chapter 6.1.3.4, "Holdoff time"](#), on page 67.

Remote command:

```
TRIGger<undef>:ALL:HOLDoff
TRIGger<Measurement>[:CHANnel<Channel>]:HOLDoff
```

### Hysteresis ← Trigger Advanced

Sets the hysteresis. A trigger event occurs, if the trigger level:

- Falls below the set value on a rising slope.
- Rises above the set value on a falling slope.

Thus, you can use this setting to eliminate the effects of noise in the signal for the edge detector of the trigger system.

Remote command:

```
TRIGger<undef>:ALL:HYSTeresis
TRIGger<Measurement>[:CHANnel<Channel>]:HYSTeresis
```

### Specific Trigger

Not available for each sensor type. Groups the specific trigger settings.

### Jitter Suppression ← Specific Trigger

Defines the method how to cope with the misalignment between the trigger event and the sample point.

"Compensate" Compensation means a resampling of the trace result.

"Measure" Does not perform resampling, but stores the measured trigger jitter.

Remote command:

```
TRIGger<Measurement>[:CHANnel<Channel>]:JITTer:METHOD
```

### Trigger Sender State ← Specific Trigger

Enables or disables the sensor as trigger sender. If enabled, the sensor outputs a digital trigger signal in sync with its own trigger event. The trigger signal is output at the port selected under ["Trigger Sender Port"](#) on page 71.

The trigger sender has to use its internal trigger source. Set the trigger source for the trigger receivers to "Internal [A to D]", where [A to D] is the port to which the trigger sender is connected. The trigger signal generated by the trigger sender is routed to the R&S NRX and from there it is distributed to the trigger receivers and, if [Trigger Source for Trigger Output](#) is set to "Sensor [A to D]", also to the trigger output.

Remote command:

```
TRIGger<Measurement>[:CHANnel<Channel>]:SENDer[:STATe]
```

#### **Trigger Sender Port ← Specific Trigger**

Sets the port where the trigger sender sensor outputs a digital trigger signal.

Remote command:

```
TRIGger<Measurement>[:CHANnel<Channel>]:SENDer:PORT
```

#### **Trigger Synchronize State ← Specific Trigger**

Usually used if "On" is set under "[Trigger Sender State](#)" on page 70.

If enabled, blocks the external trigger bus as long as the sensor remains in the measurement state. Thus, ensures that a new measurement is only started after all sensors have completed their measurements.

Make sure that the number of repetitions is the same for all sensors involved in the measurement. Otherwise, the trigger bus is blocked by any sensor that has completed its measurements before the others and has returned to the idle state.

Remote command:

```
TRIGger<undef>:ALL:SYNChronize[:STATe]
```

```
TRIGger<Measurement>[:CHANnel<Channel>]:SYNChronize[:STATe]
```

#### **Trigger Synchronize Port ← Specific Trigger**

Sets the internal or external connection for the sync output of the sensor. For more information, see "[Trigger Synchronize State](#)" on page 71.

Remote command:

```
TRIGger<Measurement>[:CHANnel<Channel>]:SYNChronize:PORT
```

#### **Trigger 2 Input Impedance ← Specific Trigger**

Requires a sensor with a trigger input.

Sets the termination resistance of the external trigger signal that is supplied at the trigger input/output of the sensor. Choose a setting that fits the impedance of the trigger source to minimize reflections on the trigger signals.

Remote command:

```
TRIGger<Measurement>[:CHANnel<Channel>]:EXTernal<Port>:IMPedance
```

### **6.1.4 Measurement settings dialog**

Access: In the main measurement dialog, select the measurement pane. See also [Figure 4-1](#).

In this dialog, you select the measurement type and the channel calculation function. Based on the selected measurement and function, you can assign one or two sensors. The assigned sensors are called primary sensor and secondary sensor.

The functions described here apply to the continuous average, burst average, trace, pulse analysis, time gate, timeslot. For the other measurements, see:

- Statistics: [Chapter 6.8.3, "Measurement Settings dialog"](#), on page 107
- NRT: [Chapter 6.9.3, "Measurement Main Configuration dialog"](#), on page 116

For configuring the assigned sensors, see:

- [Quick Setup](#)
- [Chapter 7, "Sensor configuration"](#), on page 118

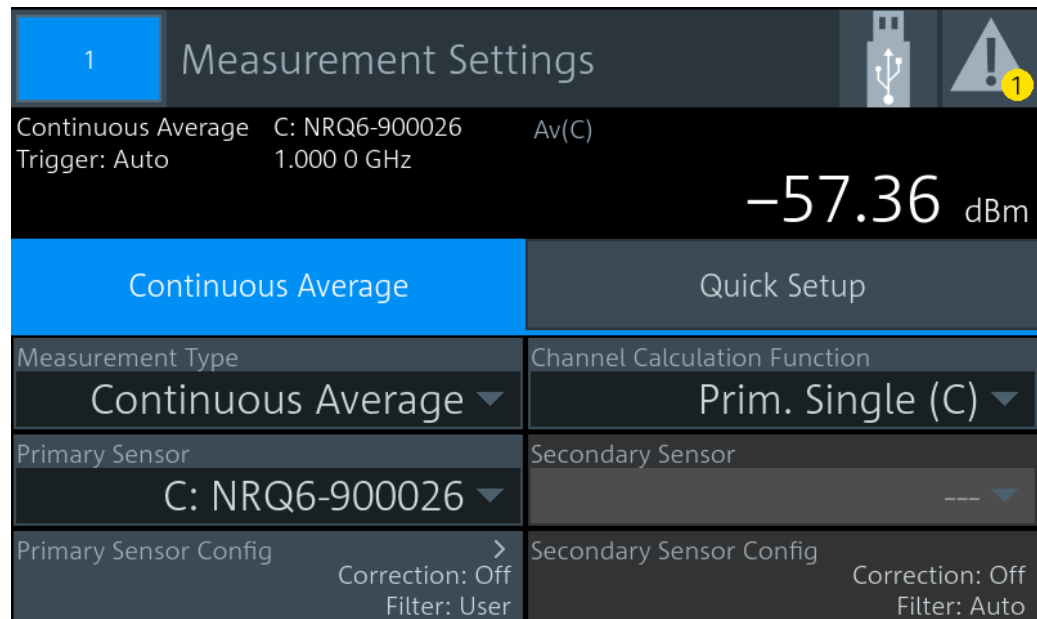


Figure 6-4: Example: continuous average

Measurement Type.....	72
Primary Sensor, Secondary Sensor.....	72
Primary Sensor Config, Secondary Sensor Config.....	73
Channel Calculation Function.....	73
Quick Setup.....	74
L Parameter Set.....	74
L Auto Set.....	74
L Preserve Window Settings.....	74
L Recall Parameter Set.....	74

### Measurement Type

Sets the measurement type.

Remote command:

`CALCulate<Measurement>:TYPE` on page 253

### Primary Sensor, Secondary Sensor

Available for continuous average, burst average, trace, pulse analysis, time gate, time-slot measurements.



Assigns the primary or secondary sensor. You can choose any of the sensors that are connected to a sensor port of the R&S NRX. The port letter, to which the sensor is connected, is displayed in front of the hostname of the sensor.

Example: C: NRP33SN-104711; C is the port, NRP33SN-104711 is the sensor name.

If "Prim. Single" is set under [Channel Calculation Function](#), the secondary sensor is disabled.

If a sensor does not support the selected [Measurement Type](#), a settings conflict is displayed. See also [Chapter 5.5, "Settings conflict"](#), on page 52.

Remote command:

`CALCulate<Measurement>[:CHANnel<Channel>]:SENSe:INDEX` on page 254  
`[SENSe<Sensor>:]CATalog?` on page 254

### Primary Sensor Config, Secondary Sensor Config

Available for continuous average, burst average, trace, pulse analysis, time gate, time-slot measurements.

For configuring the primary and secondary sensors, assigned under [Primary Sensor](#), [Secondary Sensor](#).

See [Chapter 7, "Sensor configuration"](#), on page 118.

### Channel Calculation Function

Available for continuous average, burst average, trace, pulse analysis, time gate, time-slot measurements.

You can combine the measured values from the primary and secondary sensor using a mathematical function. The primary and secondary sensors are assigned under [Primary Sensor](#), [Secondary Sensor](#).

Apart from the "Prim. Single" function, all functions require values measured by two sensors.

Channel Calculation Function	
Prim. Single (C)	Ratio (C / A)
<input checked="" type="checkbox"/> SWR (C,A)	Refl. Coefficient (C,A)
Return Loss (C,A)	Refl. Ratio (C,A)
Sum (C + A)	Diff (C - A)
Off	

The letters in brackets indicate the port to which the primary or secondary sensor is connected. In this example, the primary sensor is connected to port C, and the secondary sensor is connected to port A.

Remote command:

`CALCulate<Measurement>:MATH[:EXPRession]` on page 344

`CALCulate<Measurement>:MATH[:EXPRession]:CATalog?` on page 345

### Quick Setup

Available for continuous average, burst average, trace, pulse analysis, time gate, time-slot measurements.

Groups the settings for quick sensor configuration. Alternatively, you can use [Primary Sensor Config](#), [Secondary Sensor Config](#).

### Parameter Set ← Quick Setup

Selects a parameter set to preconfigure the sensor. Select [Recall Parameter Set](#) to load the selected set.

See [Chapter 12.8.6.2, "Preconfigured settings"](#), on page 370.

Remote command:

`SYSTem:STANdard:PRESet` on page 368

### Auto Set ← Quick Setup

Configures the sensor automatically.

### Preserve Window Settings ← Quick Setup

Specifies whether the display settings are kept unchanged when selecting [Recall Parameter Set](#).

Off                      Configures the sensor and the display settings of the R&S NRX. See [Chapter 12.8.6.3, "Display configuration"](#), on page 379.

On                        Only configures the sensor.

Remote command:

`SYSTem:STANdard:PWSettings` on page 369

### Recall Parameter Set ← Quick Setup

Loads the parameters set selected under [Parameter Set](#).

Remote command:

`SYSTem:STANdard:PRESet` on page 368

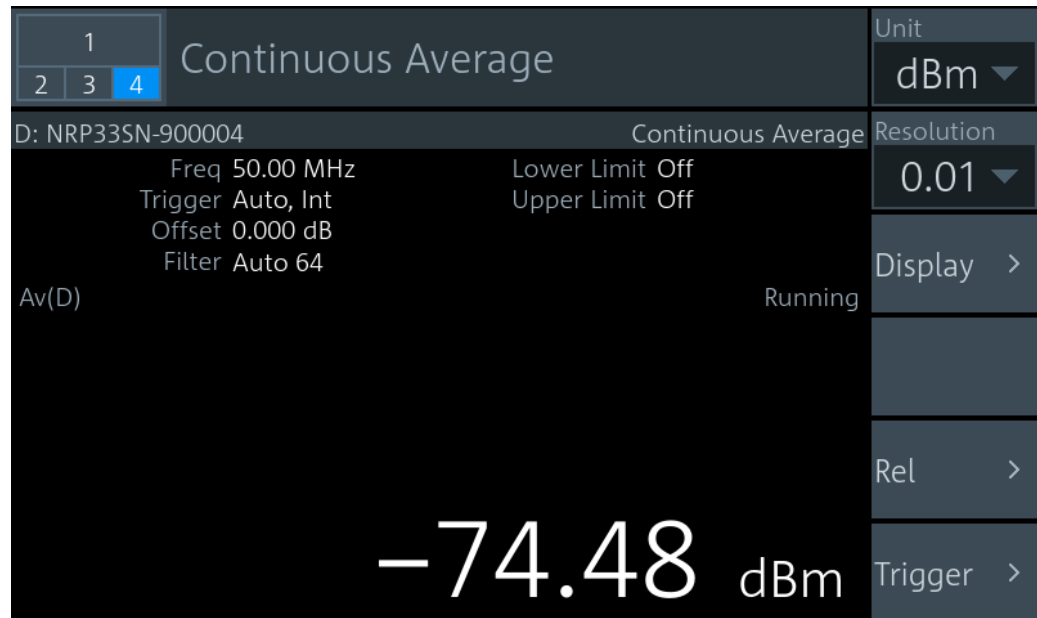
## 6.2 Continuous average

The R&S NRX measures the signal average power asynchronously within a defined time interval, the so-called aperture or sampling window. After a trigger event, the power is integrated over the time interval.

The continuous average measurement type is the preferred measurement method if the measurement is not to be, or cannot be, synchronized with a specific signal event.

It is the only available measurement type for thermal power sensors because they are too slow for the other measurement types.

### 6.2.1 Continuous average result display



The measurement result is a single scalar value, either an absolute value or related to a reference value.

### 6.2.2 Continuous average settings

Access: "Measurement Settings" > "Measurement Type" > "Continuous Average"

Unit.....	75
Resolution.....	75
Display.....	75
Rel.....	76
L Reference Value.....	76
L Relative Measurements.....	76
Trigger.....	76

#### Unit

See "Unit" on page 56.

#### Resolution

See "Resolution" on page 56.

#### Display

See Chapter 6.1.1, "Display settings", on page 54.

**Rel**

Groups the settings for relative measurements.

**Reference Value ← Rel**

Available if [Relative Measurements](#) is set to "On" or "Set".

Sets the reference value.

Remote command:

`CALCulate<Measurement>:RELative<DirectionalChannel>[:MAGNitude]`

on page 255

`[SENSe<Sensor>:]POWer:REFerence` on page 257

**Relative Measurements ← Rel**

Allows you to relate a measured power or a power ratio to a reference value. Whether the power is measured by one sensor or whether it is a combined value measured by two sensors, is set by "[Channel Calculation Function](#)" on page 73.

Off	Absolute power or power ratio
On	Relative power or power ratio. As a reference value, the value specified under <a href="#">Reference Value</a> is used.
Set	Uses the current measurement result as a reference value and enables the relative measurement.

Remote command:

`CALCulate<Measurement>:RELative<DirectionalChannel>:STATe`

on page 256

`CALCulate<Measurement>:RELative<DirectionalChannel>[:MAGNitude]:`

`AUTO` on page 255

**Trigger**

See [Chapter 6.1.3, "Triggering"](#), on page 65.

## 6.3 Burst average

Supported by multipath and wideband sensors. The sensor measures the average burst power of pulsed signals.

No external trigger signal is required, because the R&S NRX detects the start and end of the burst itself. The time interval in which the average power is measured starts when the power exceeds the trigger level and ends when the trigger logic detects the end of the pulse.

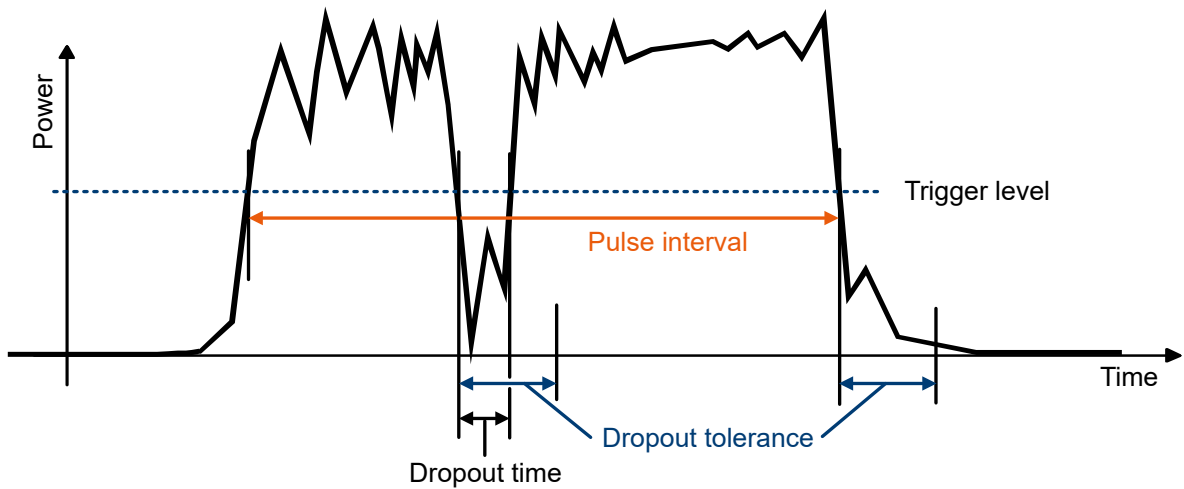


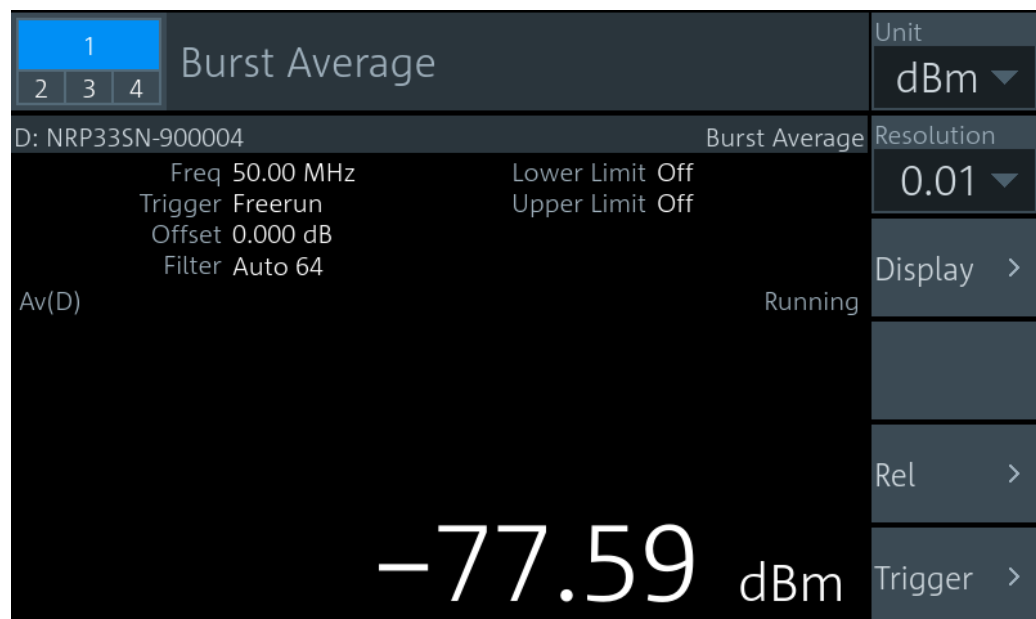
Figure 6-5: Burst average measurement parameters

To prevent power drops due to modulation from being erroneously interpreted as the end of a pulse, you must define the dropout tolerance. The dropout tolerance is a time interval in which the pulse end is only recognized if the signal level no longer exceeds the trigger level.

Useful parameters:

- "Trigger Level" on page 69
- "Dropout" on page 70
- "Dropout Tolerance" on page 121
- "Exclude from Start, Exclude from End" on page 122

### 6.3.1 Burst average result display



The measurement result is a single scalar value, either an absolute value or related to a reference value.

### 6.3.2 Burst average settings

Access: "Measurement Settings" > "Measurement Type" > "Burst Average"

Unit.....	78
Resolution.....	78
Display.....	78
Rel.....	78
Trigger.....	78

#### Unit

See "Unit" on page 56.

#### Resolution

See "Resolution" on page 56.

#### Display

See Chapter 6.1.1, "Display settings", on page 54.

#### Rel

See "Rel" on page 76.

#### Trigger

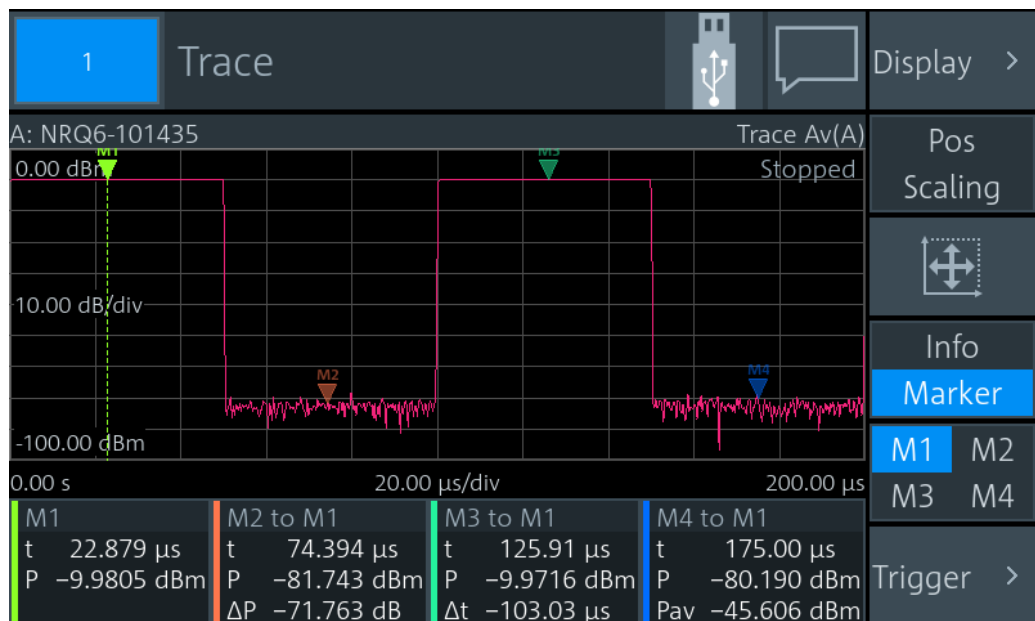
See Chapter 6.1.3, "Triggering", on page 65.

## 6.4 Trace

The sensor measures power over time. Define the number of measurement points and the measurement time. The length of an individual measurement is determined from the ratio of total time and the defined number of measurement points. The entire result is called a "trace". Each trace is triggered separately.

• Trace result display.....	79
• Trace settings.....	79
• Trace Marker dialog.....	81

### 6.4.1 Trace result display



Displays the waveform. Use the markers to determine exact x- and y-values. In sum, 4 markers are provided for the 2 traces. See also "Info / Marker" on page 80.

### 6.4.2 Trace settings

Access: "Measurement Settings" > "Measurement Type" > "Trace"

Display.....	79
Pos / Scaling.....	79
Autoscale.....	80
Info / Marker.....	80
M1 / M2 / M3 / M4.....	80
Trigger.....	80
L Display.....	81
L Trig Mode.....	81
L Trig Source.....	81
L Trig Slope.....	81
L Level.....	81
L Sensor Trigger.....	81

#### Display

See Chapter 6.1.1, "Display settings", on page 54.

#### Pos / Scaling

Defines the effect of the cursor keys on the displayed trace.

"Pos" Shifts the position. Press one of the cursor keys to shift the trace in x- and y-direction.

"Scaling" Changes the scaling. Press one of the cursor keys to expand or compress the trace.



### Autoscale

Adapts the scaling of the power axis to the trace. The scaling of the time axis is adapted only if the sensor supports it.

### Info / Marker

Shows or hides additional information below the graph.

"Info" Displays measurement settings.

"Marker" Displays the marker results according to the set measurement, see ["Measurement Mode"](#) on page 83. If you select here, the "Trace Marker" dialog opens, see [Chapter 6.4.3, "Trace Marker dialog"](#), on page 81.

Shows buttons to select a marker, see ["M1 / M2 / M3 / M4"](#) on page 80.

Remote command:

[CALCulate<Measurement>:DMODE](#) on page 210

### M1 / M2 / M3 / M4

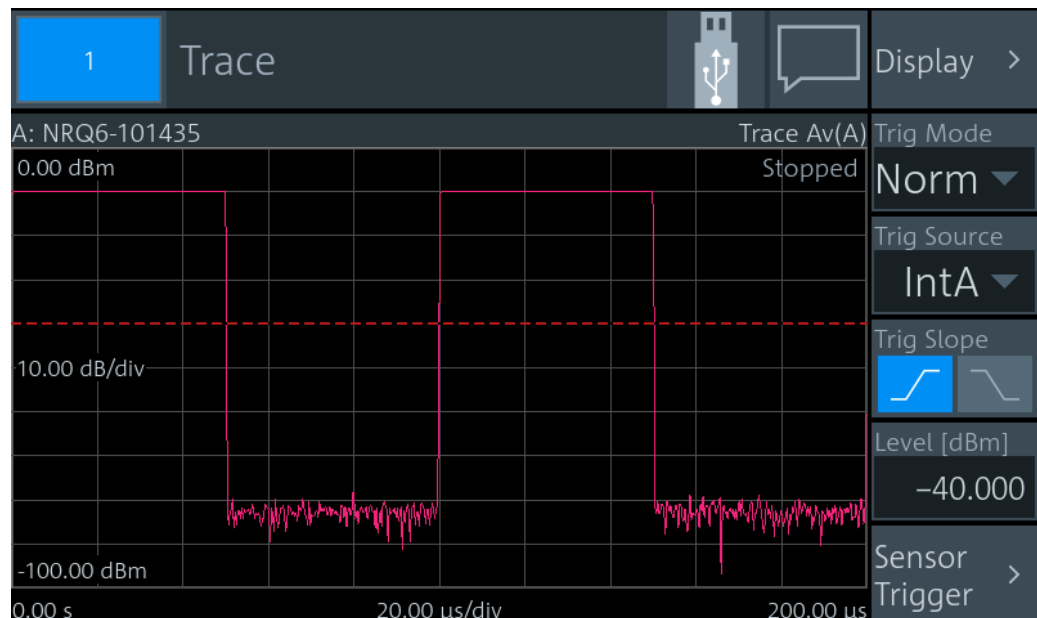
Shows the selected marker in the trace.

Remote command:

[DISPlay\[:WINDow<Window>\]:TRACe:MARKer:SElection](#) on page 293

### Trigger

Gives quick access to selected trigger settings.



Shows the trace. The trigger level is indicated as a dotted red line.



**Display ← Trigger**

See [Chapter 6.1.1, "Display settings"](#), on page 54.

**Trig Mode ← Trigger**

See ["Trigger Mode"](#) on page 68.

**Trig Source ← Trigger**

See ["Trigger Source"](#) on page 69.

**Trig Slope ← Trigger**

See ["Slope"](#) on page 69.

**Level ← Trigger**

See ["Trigger Level"](#) on page 69.

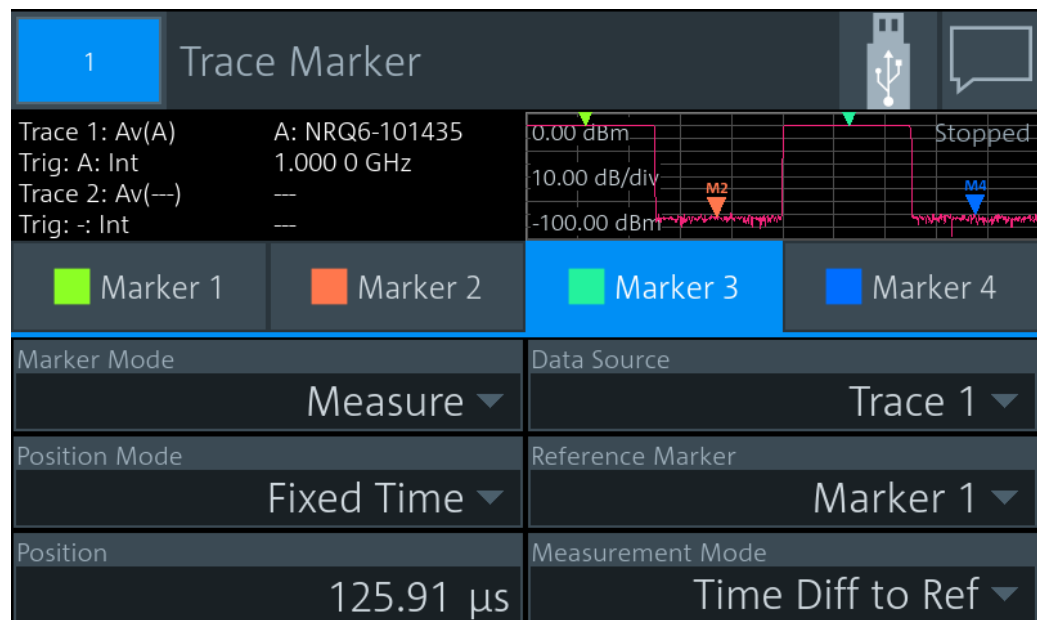
**Sensor Trigger ← Trigger**

See [Chapter 6.1.3, "Triggering"](#), on page 65.

### 6.4.3 Trace Marker dialog

Access: Select [Marker](#) and select the marker results that are displayed below the trace.

Used for configuring markers. Each marker is configured individually. Select the marker that you want to configure.



<a href="#">Marker Mode</a> .....	82
<a href="#">Position Mode</a> .....	82
<a href="#">Position</a> .....	82

Data Source.....	83
Reference Marker.....	83
Measurement Mode.....	83

### Marker Mode

Enables or disables the marker. Also defines the appearance of the marker.

- "Off" Disables the marker.
- "Ruler" Shows a line at the marker position. Useful if you use the marker as [Reference Marker](#).
- "Measure" Shows a triangle at the marker position.

Remote command:

`DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:MODE` on page 288

### Position Mode

Defines where the marker is placed.

- "Fixed Time" At a fixed time, set by [Position](#).
- "Fixed Power" At a fixed power value, set by [Position](#).
- "Relative to Ref Position"
  - At a time difference of [Position](#) to the x-position of the [Reference Marker](#).
- "Relative to Ref Power"
  - At a power difference of [Position](#) to the y-position of the [Reference Marker](#).
- "From Ref Power <-"
  - Starting from the right border, at a power difference of [Position](#) to the y-position of the [Reference Marker](#).
- "From Ref Power ->"
  - Starting from the left border, at a power difference of [Position](#) to the y-position of the [Reference Marker](#).
- "Peak Search" Measured maximum power
- "Min Search" Measured minimum power
- "Peak Search from Ref <-", "Min Search from Ref <-"
  - Maximum or minimum power measured left from the [Reference Marker](#).
- "Peak Search from Ref ->", "Min Search from Ref ->"
  - Maximum or minimum power measured right from the [Reference Marker](#).

Remote command:

`DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:MODE` on page 288

### Position

Sets an absolute or relative time or power value for the marker position defined under [Position Mode](#).

Remote command:

`DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:TIME`

on page 292

`DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:RELative:TIME` on page 292

`DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:POWer:DBM` on page 289

`DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:POWer:DBUV` on page 290

`DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:POWer:WATT` on page 292

`DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:RELative:POWer:DB` on page 290

`DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:RELative:POWer:DPCT` on page 291

`DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:RELative:POWer:O` on page 291

`DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:RELative:POWer:WATT` on page 292

`DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:POWer:RATio:DB` on page 290

`DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:POWer:RATio:DPCT` on page 291

`DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:POWer:RATio:O` on page 291

### Data Source

Available if "Measure" is set under [Marker Mode](#).

Selects the trace.

Remote command:

`DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:FEED:INDEX`

on page 287

### Reference Marker

Defines a marker as a reference marker.

Remote command:

`DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:REFerence`

on page 292

### Measurement Mode

Available if "Measure" is set under [Marker Mode](#).

Defines the measurement. The marker result is displayed under [Info / Marker](#).

"Trace Value" Measures the power of the trace.  
Marker result is "p".

"Power Ratio to Ref" Measures the power ratio in relation to the reference marker.  
Marker result is " $\Delta p$ ".

**"Time Diff to Ref"**

Measures the time difference in relation to the reference marker.  
Marker result is " $\Delta t$ ".

**"Average Power to Ref"**

Measures the average power between time positions of the marker  
and its reference marker.  
Marker result is " $P_{av}$ ".

Remote command:

`DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:FUNction` on page 287

## 6.5 Pulse analysis

Supported by pulse power sensors. Use this measurement type for automatic analysis of pulsed signals. You can measure either power over time over the whole trace, or restrict the measurement to a defined portion of the pulse signal. Trigger each trace separately.

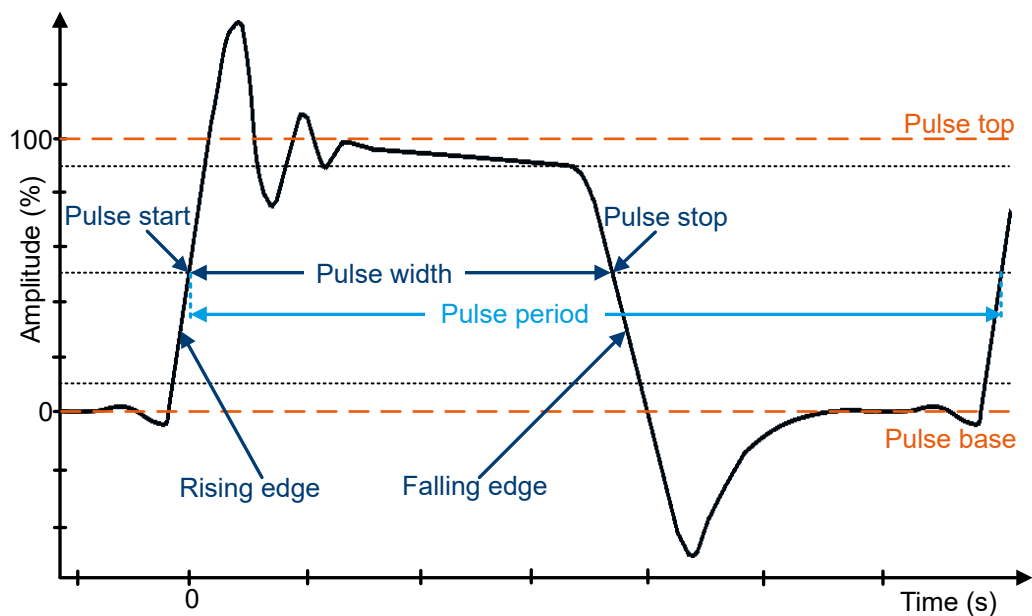
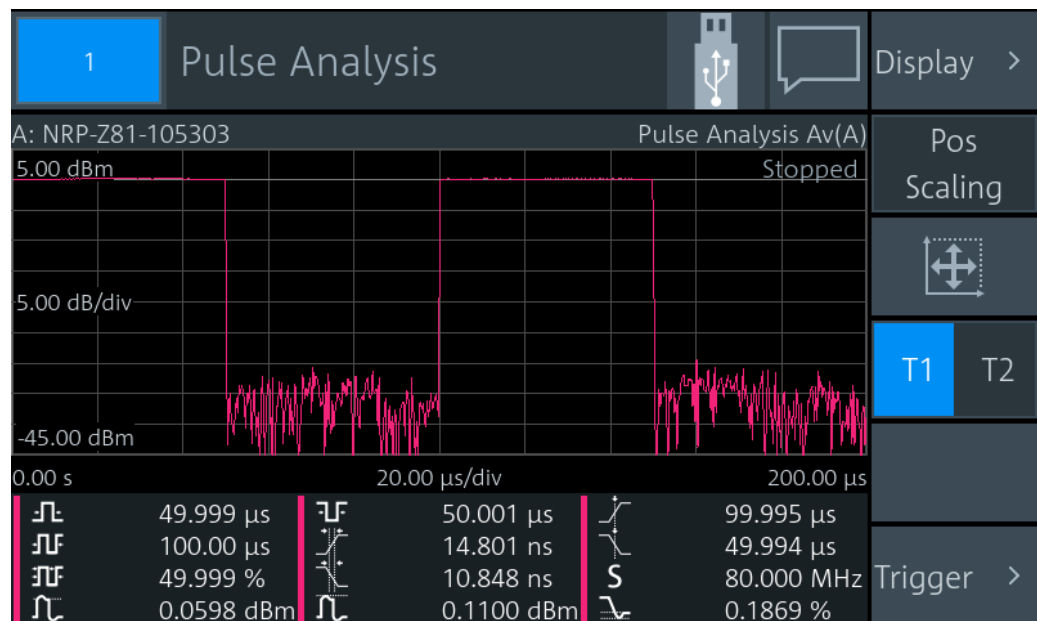


Figure 6-6: Pulse characteristics

- [Pulse analysis result display](#)..... 85
- [Pulse analysis settings](#)..... 85
- [Pulse Analysis dialog](#)..... 86

### 6.5.1 Pulse analysis result display



Shows a pulse signal in trace presentation. 2 traces are available. The measurement results are displayed below the trace. Each measurement result is represented by a symbol that is also used to select the result. You can choose which results you want to display; see [Chapter 6.5.3, "Pulse Analysis dialog"](#), on page 86.

### 6.5.2 Pulse analysis settings

Access: "Measurement Settings" > "Measurement Type" > "Pulse Analysis"

Display.....	85
Pos / Scaling.....	85
Autoscale.....	85
T1 / T2.....	85
Trigger.....	86

#### Display

See [Chapter 6.1.1, "Display settings"](#), on page 54.

#### Pos / Scaling

See ["Pos / Scaling"](#) on page 79.



#### Autoscale

See ["Autoscale"](#) on page 80.

#### T1 / T2

Selects the displayed trace.

Remote command:

`DISPlay[:WINDow<Window>]:TRACe:MEASurement:SELECTION` on page 308

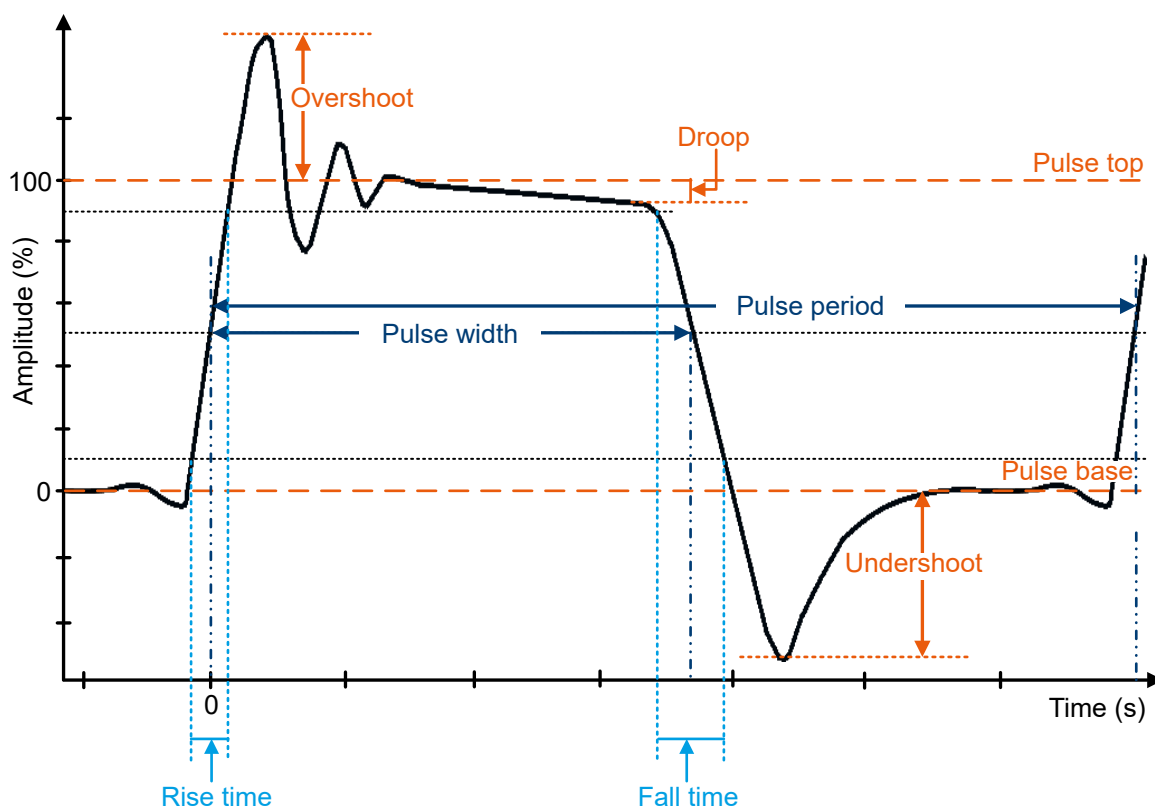
**Trigger**

Gives quick access to selected trigger settings. See ["Trigger"](#) on page 80.

**6.5.3 Pulse Analysis dialog**

Access: Select the measurement results that are displayed below the trace.

On the "Time" and "Power" tabs, select the measurement results that are displayed below the trace. The R&S NRX can display a maximum of 12 measurement results. If you select more, a warning is displayed.



**Figure 6-7: Pulse analysis parameters**

Time tab.....	87
L Pulse Width.....	87
L Pulse Period.....	88
L Duty Cycle.....	88
L Pulse Off Time.....	88
L Rise Time.....	88
L Fall Time.....	88
L Start Time.....	89
L Stop Time.....	89
L Sampling Rate.....	89
Power tab.....	89
L Pulse Top.....	90

L Pulse Base.....	90
L Trace Avg.....	90
L Trace Peak.....	91
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L Pos. Overshoot.....	91
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L High Ref.....	91
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L Reference Levels relate to.....	92
L Algorithm.....	93
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L Reference Level.....	93
L Low Reference Level.....	93
L Reset to Defaults.....	93

### Time tab

Selects the time-related measurement results that are displayed below the trace. The selections on this tab apply to all traces.

The screenshot shows the 'Pulse Analysis (all Traces)' window. At the top, there's a title bar with a '1' in a blue box and a USB icon. Below the title bar, there's a table of measurement parameters:

Pulse 1: Av(A)	A: NRP-Z81-105303	5.00 dBm	Stopped
Trig: A: Int	1.000 0 GHz	5.00 dB/div	
Pulse 2: Av(---)	---	-45.00 dBm	
Trig: -: Int	---		

Below the parameters is a waveform plot showing a pulse. Underneath the plot is a grid of measurement options, each with a small icon:

Pulse Width	Pulse Off Time	Start Time
Pulse Period	Rise Time	Stop Time
Duty Cycle	Fall Time	Sampling Rate

At the bottom, there are three tabs: 'Time' (selected), 'Power', and 'Configuration'.



### Pulse Width ← Time tab

Time between the first positive edge and the subsequent negative edge of the pulse, where the edges occur at crossings of the mid threshold.

Remote command:

`DISPlay[:WINDow<Window>]:TRACe:MEASurement:PULSe:DURation[:STATE]` on page 306

`CALCulate<Measurement>:TRACe:MEASurement:PULSe:DURation?` on page 300

**Pulse Period ← Time tab**

Time between two consecutive edges of the same polarity in seconds. During this time, the pulse signal completes one cycle.

Remote command:

`DISPlay[:WINDow<Window>]:TRACe:MEASurement:PULSe:PERiod[:STATe]`  
on page 307

`CALCulate<Measurement>:TRACe:MEASurement:PULSe:PERiod?` on page 300

**Duty Cycle ← Time tab**

$$\text{Duty cycle} = \frac{\text{Pulse width}}{\text{Pulse period}}$$

The ratio is expressed as a value between 0 and 1.

Remote command:

`DISPlay[:WINDow<Window>]:TRACe:MEASurement:PULSe:DCYClE[:STATe]`  
on page 306

`CALCulate<Measurement>:TRACe:MEASurement:PULSe:DCYClE?` on page 300

**Pulse Off Time ← Time tab**

Time between the first negative edge and the subsequent positive edge of the pulse in seconds, where the edges occur at crossings of the mid threshold. During this time, the pulse remains at the pulse base level.

Remote command:

`DISPlay[:WINDow<Window>]:TRACe:MEASurement:PULSe:SEParation[:STATe]`  
on page 307

`CALCulate<Measurement>:TRACe:MEASurement:PULSe:SEParation?`  
on page 300

**Rise Time ← Time tab**

Time the pulse requires to transition from the pulse base level to the pulse top level.

Remote command:

`DISPlay[:WINDow<Window>]:TRACe:MEASurement:TRANSition:POSitive:DUration[:STATe]`  
on page 309

`CALCulate<Measurement>:TRACe:MEASurement:TRANSition:POSitive:DUration?`  
on page 302

**Fall Time ← Time tab**

Time the pulse requires to transition from the pulse top level to the pulse base level.

Remote command:

`DISPlay[:WINDow<Window>]:TRACe:MEASurement:TRANSition:NEGative:DUration[:STATe]`  
on page 308

`CALCulate<Measurement>:TRACe:MEASurement:TRANSition:NEGative:DUration?`  
on page 301



**Start Time ← Time tab**

Time when the signal passes through the medial reference power level with rising edge, referenced to the delayed trigger event. Indicates the start point of the first power pulse within the analysis window.

Remote command:

`DISPlay[:WINDow<Window>]:TRACe:MEASurement:TRANSition:POSitive:OCCurrence[:STATe]` on page 310

`CALCulate<Measurement>:TRACe:MEASurement:TRANSition:POSitive:OCCurrence?` on page 302

**Stop Time ← Time tab**

Time when the signal passes through the medial reference power level with falling edge, referenced to the delayed trigger event. Indicates the stop point of the first power pulse within the analysis window.

Remote command:

`DISPlay[:WINDow<Window>]:TRACe:MEASurement:TRANSition:NEGative:OCCurrence[:STATe]` on page 309

`CALCulate<Measurement>:TRACe:MEASurement:TRANSition:NEGative:OCCurrence?` on page 301

**S****Sampling Rate ← Time tab**

Number of samples per second.

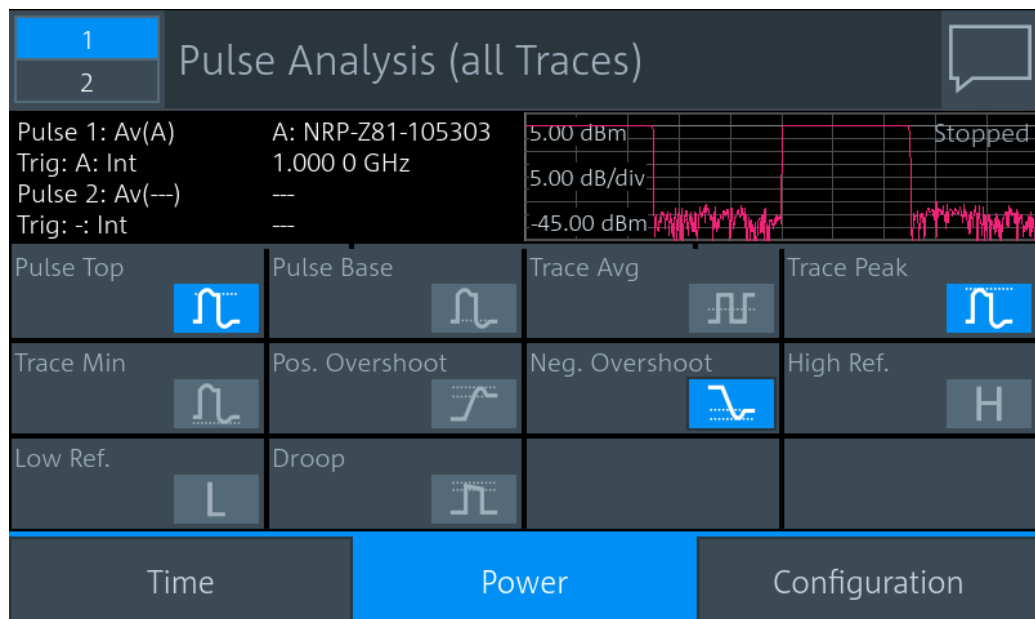
Remote command:

`DISPlay[:WINDow<Window>]:TRACe:MEASurement:PULSe:RESolution[:STATe]` on page 307

`CALCulate<Measurement>:TRACe:MEASurement:TRANSition:SPERiod?` on page 303

**Power tab**

Selects the power-related measurement results that are displayed below the trace. The selections on this tab apply to all traces.



#### Pulse Top ← Power tab

Pulse-top power level detected by the selected [Algorithm](#). This value is used as a reference (100 %) to determine other parameter values such as the rising or falling thresholds.

Remote command:

`DISPlay[:WINDow<Window>]:TRACe:MEASurement:POWer:PULSe:TOP[:STATE]` on page 305

`CALCulate<Measurement>:TRACe:MEASurement:POWer:PULSe:TOP?` on page 299



#### Pulse Base ← Power tab

Pulse base power level detected by the selected [Algorithm](#). This value is used as a reference (0 %) to determine other parameter values such as the rising or falling thresholds.

Remote command:

`DISPlay[:WINDow<Window>]:TRACe:MEASurement:POWer:PULSe:BASE[:STATE]` on page 304

`CALCulate<Measurement>:TRACe:MEASurement:POWer:PULSe:BASE?` on page 298



#### Trace Avg ← Power tab

Average power during the time the pulse is active.

Remote command:

`DISPlay[:WINDow<Window>]:TRACe:MEASurement:POWer:AVG[:STATE]` on page 303

`CALCulate<Measurement>:TRACe:MEASurement:POWer:AVG?` on page 297

**Trace Peak ← Power tab**

Maximum power that is measured within the analysis window.

Remote command:

`DISPlay[:WINDow<Window>]:TRACe:MEASurement:POWer:MAXimum[:STATe]`  
on page 303

`CALCulate<Measurement>:TRACe:MEASurement:POWer:MAX?` on page 298

**Trace Min ← Power tab**

Minimum power measured within the analysis window.

Remote command:

`DISPlay[:WINDow<Window>]:TRACe:MEASurement:POWer:MINimum[:STATe]`  
on page 304

`CALCulate<Measurement>:TRACe:MEASurement:POWer:MIN?` on page 298

**Pos. Overshoot ← Power tab**

Height of the local maximum before a falling edge, divided by the pulse amplitude:

$$\text{Positive overshoot} = 100 \% \times \frac{\text{Max. power} - \text{pulse top power}}{\text{Pulse amplitude}}$$

Depends on the setting under [Reference Levels relate to](#).

Remote command:

`DISPlay[:WINDow<Window>]:TRACe:MEASurement:TRANSition:POSitive:OVERshoot[:STATe]` on page 310

`CALCulate<Measurement>:TRACe:MEASurement:TRANSition:POSitive:OVERshoot?` on page 302

**Neg. Overshoot ← Power tab**

Height of the local minimum before a rising edge, divided by the pulse amplitude:

$$\text{Negative overshoot} = 100 \% \times \frac{\text{Pulse base power} - \text{minimum power}}{\text{Pulse amplitude}}$$

Depends on the setting under [Reference Levels relate to](#).

Remote command:

`DISPlay[:WINDow<Window>]:TRACe:MEASurement:TRANSition:NEGative:OVERshoot[:STATe]` on page 309

`CALCulate<Measurement>:TRACe:MEASurement:TRANSition:NEGative:OVERshoot?` on page 301

**High Ref. ← Power tab**

Power level at [High Reference Level](#).

Remote command:

`DISPlay[:WINDow<Window>]:TRACe:MEASurement:POWer:PULSe:HREFerence[:STATe]` on page 305

`CALCulate<Measurement>:TRACe:MEASurement:POWer:HREFerence?`  
on page 297

**Low Ref.** ← Power tab

Power level at [Low Reference Level](#).

Remote command:

`DISPlay[:WINDow<Window>]:TRACe:MEASurement:POWer:PULSe:`

`LREFerence[:STATe]` on page 305

`CALCulate<Measurement>:TRACe:MEASurement:POWer:LREFerence?`

on page 298

**Droop** ← Power tab

Droop of the pulse. The droop is the difference between leading edge amplitude, pulse top, and falling-edge amplitude, as shown in [Figure 6-7](#). The droop is expressed in percentage of the pulse top amplitude.

The pulse droop measurement is used to test the stability of the output power of a device, e.g. an amplifier or a transmitter.

Remote command:

`DISPlay[:WINDow<Window>]:TRACe:MEASurement:POWer:PULSe:DRooP[:`

`STATe]` on page 304

`CALCulate<Measurement>:TRACe:MEASurement:POWer:PULSe:DRooP?`

on page 299

**Configuration tab**

Defines the reference levels for the pulse timing. All values are specified in percent of the pulse amplitude. The settings on this tab are trace-specific.

Pulse Analysis (Trace 1)	
Pulse 1: Av(A)	A: NRP-Z81-105303
Trig: A: Int	1.000 0 GHz
Pulse 2: Av(---)	---
Trig: -: Int	---
Reference Levels relate to	High Reference Level
Power ▼	90.000 %
Algorithm	Reference Level
Histogram ▼	50.000 %
Reset to Defaults	Low Reference Level
	10.000 %

**Reference Levels relate to** ← Configuration tab

Selects whether the reference levels are voltage-related or power-related.

Remote command:

`DISPlay[:WINDow<Window>]:TRACe:MEASurement:RRELation` on page 308

**Algorithm ← Configuration tab**

Selects the analysis algorithm for detecting the pulse top and the pulse base power of a pulsed signal. From these power levels, the reference levels are derived.

"Histogram" Analyzes the histogram of the trace data. The average of all points representing the pulse-top is taken as pulse-top power. Similarly, the pulse base is determined.  
This algorithm is suitable for most pulse signals.

"Integration" Fits a rectangle pulse of the same energy into the pulse signal as a reference and thus determines the pulse-top power.

This algorithm is recommended for:

- Pulse signals with modulation
- If the pulse energy is considered

For example, if you compare the measurement result to a measurement result of a thermal sensor.

"Peak" Assigns the pulse peak power to the pulse-top power.

Remote command:

[CALCulate<Measurement>:TRACe:MEASurement:ALGorithm](#) on page 296

**High Reference Level ← Configuration tab**

Defines the end of the rising edge and the start of the falling edge of the pulse. Used for the measurement of the rise or fall time.

Remote command:

[CALCulate<Measurement>:TRACe:MEASurement:DEFine:TRANSition: HREFerence](#) on page 296

**Reference Level ← Configuration tab**

Defines the pulse duration, pulse start time and pulse stop time.

Remote command:

[CALCulate<Measurement>:TRACe:MEASurement:DEFine:DURation: REFerence](#) on page 296

**Low Reference Level ← Configuration tab**

Defines the start of the rising edge and the end of the falling edge of the pulse. Used for the measurement of the rise or fall time.

Remote command:

[CALCulate<Measurement>:TRACe:MEASurement:DEFine:TRANSition: LREFerence](#) on page 297

**Reset to Defaults ← Configuration tab**

Resets all parameters on the [Configuration tab](#)

## 6.6 Time gate

In combination with the R&S NRX, all sensors that support the timeslot measurement can also use this measurement type. The sensor measures the average power in time

intervals chosen by you. These time intervals are called time gates. You can configure up to 4 different gates, but use only one at a time for measuring. The time resolution is determined by the sampling rate of the sensor. An external trigger signal or internal signal triggering is required for synchronization.

- [Time gate result display](#)..... 94
- [Time gate settings](#)..... 95
- [Gate Configuration dialog](#)..... 97

### 6.6.1 Time gate result display

You can choose between a scalar or graphical result display.

#### To change the display format

1. Select the time gate measurement type:  
"Measurement Settings" > "Measurement Type" > "Time Gate"
2. Select the display format:  
"Display" > "Display Format"

#### Scalar display

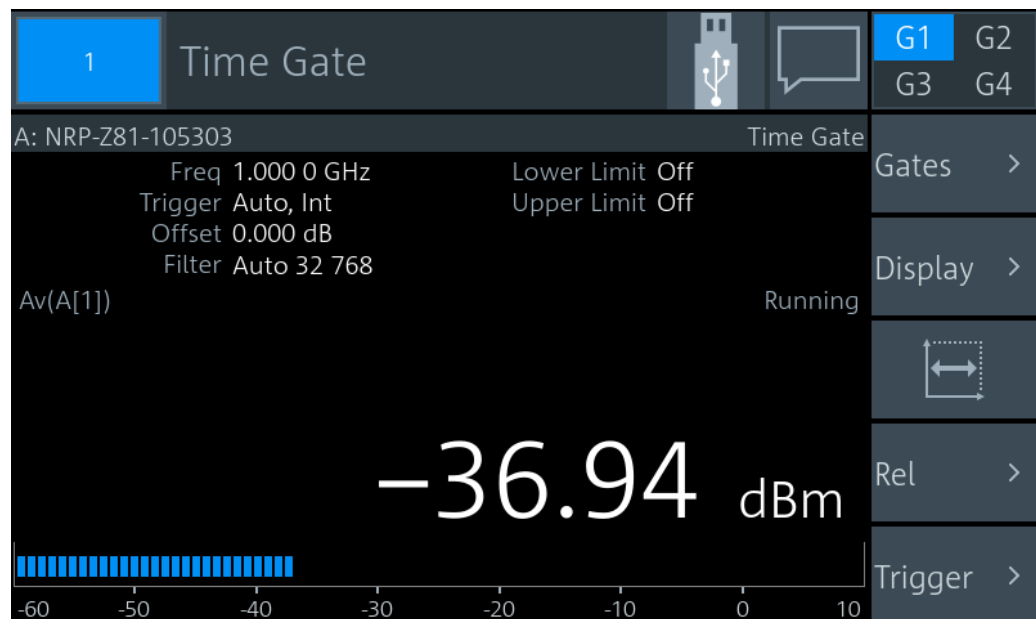


Figure 6-8: Time gate, scalar digital display

The measurement result is a single scalar value. It refers to the selected time gate. If "Scalar Analog" is set as [Display Format](#), a bar chart visualizes the measurement result.

## Graphical display

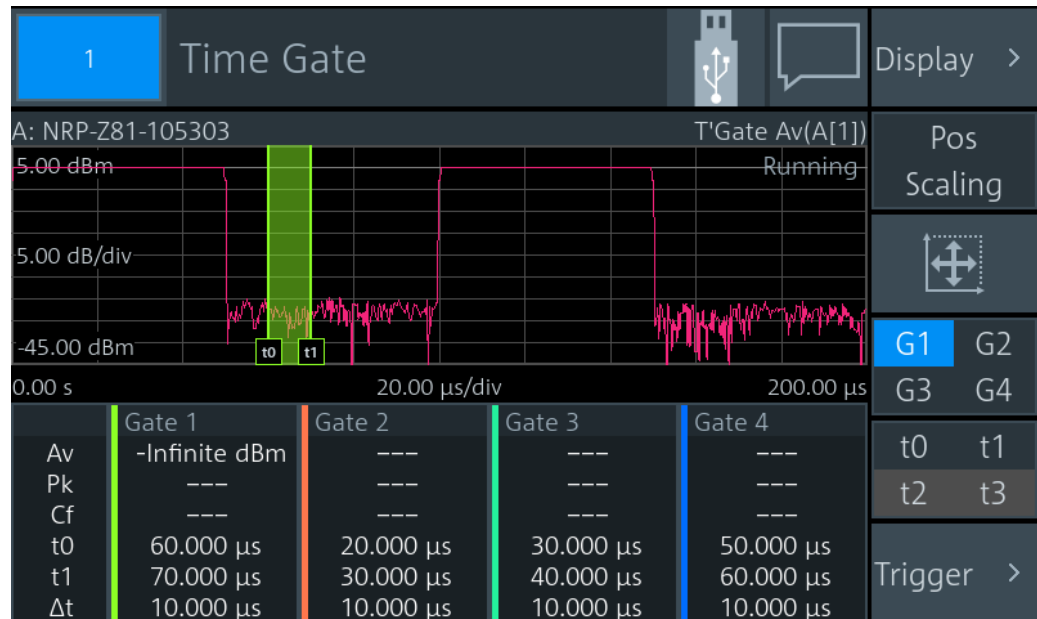


Figure 6-9: Time gate, graphical display

In the upper pane, the measurement result is shown as a single trace measurement of the primary sensor. The active gate is indicated as a colored area. The color is matching the color assigned to the gate. You can change the gate configuration directly by using gestures. If you have a channel calculation running that involves two sensors, a legend in the upper right corner shows the assignment of the curve to the measurement channel.

In the lower pane, the 4 gates are displayed with:

- Assigned color
- Measurement values:
  - "Av"  
Average power within gate
  - "Pk"  
Peak power within gate
  - "Cf"  
Crest factor
- Borders, see [t0 / t1 / t2 / t3](#).
- Length  $\Delta$ t

If you tap the lower pane, the [Gate Configuration dialog](#) opens.

### 6.6.2 Time gate settings

Access: "Measurement Settings" > "Measurement Type" > "Time Gate"

The available settings depend on the selected result display.

G1 / G2 / G3 / G4.....	96
Gates.....	96
Display.....	96
Resolution.....	96
Pos / Scaling.....	96
Autoscale.....	96
t0 / t1 / t2 / t3.....	96
Rel.....	97
Trigger.....	97

### G1 / G2 / G3 / G4

Selects the active gate for the measurement.

Remote command:

`CALCulate<Measurement>[:POWER]:TGATE[:AVG]:SELECTION` on page 312

### Gates

Available for the scalar displays.

Opens the "Gate Configuration" dialog, see [Chapter 6.6.3, "Gate Configuration dialog"](#), on page 97.

### Display

See [Chapter 6.1.1, "Display settings"](#), on page 54.

### Resolution

Available for the scalar displays.

See ["Resolution"](#) on page 56.

### Pos / Scaling

Available for the graphical display.

Defines the effect of the cursor keys on the displayed trace.

"Pos"                      Shifts the position. Press one of the cursor keys to shift the trace in x- and y-direction.

"Scaling"                Changes the scaling. Press one of the cursor keys to expand or compress the trace.



### Autoscale

Available for the graphical display.

Adapts the scaling of the power axis to the trace. The scaling of the time axis is adapted only if the sensor supports it.

### t0 / t1 / t2 / t3

Available if:

- Graphical display is enabled.
- [Pos / Scaling](#) is disabled.

Selects a gate or fence border so that you can change the start time or length. The selected border is displayed as a dashed line.

"t0"                      [Start of Gate](#)



"t1"	Length of Gate
"t2"	Start of Fence. Only available if Fence is enabled.
"t3"	Length of Fence. Only available if Fence is enabled.

**Rel**

Available for the scalar displays.

See "Rel" on page 76.

**Trigger**

See Chapter 6.1.3, "Triggering", on page 65.

### 6.6.3 Gate Configuration dialog

Access depends on the selected measurement type and display format:

- Time gate, scalar display: "Time Gate" > "Gates"
- Time gate, graphical display: Select the lower pane where the gate information is displayed.
- Statistics: "Statistics" > "Evaluate" > "Statistics Timing", select the lower pane where the gate information is displayed.

Used for configuring gates. The gates are used in the time gate and statistics measurements. Each gate is configured individually. Select the gate that you want to configure.

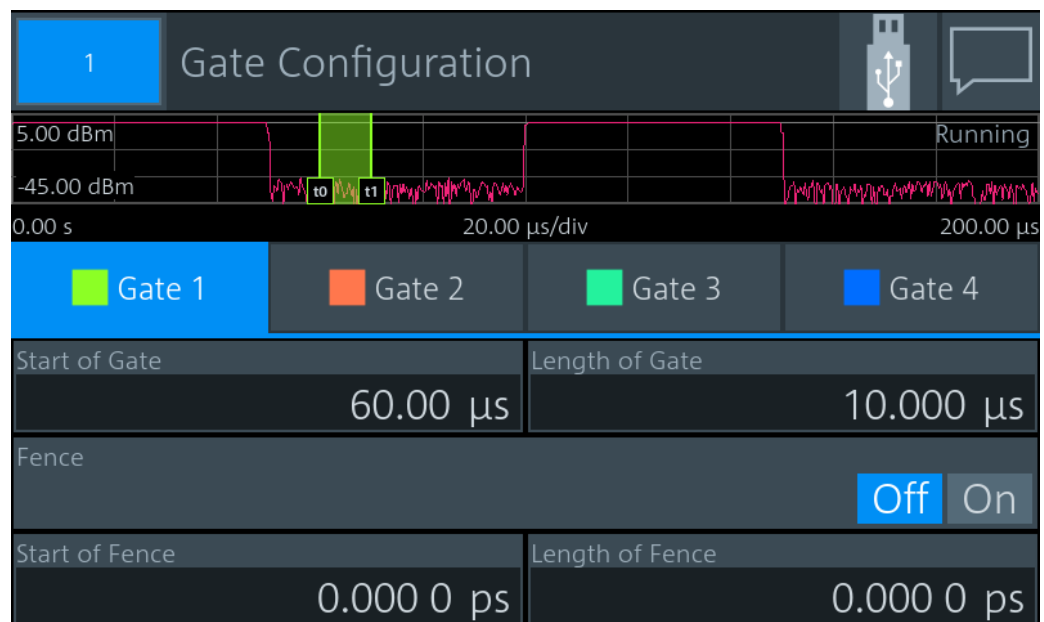


Figure 6-10: Example for time gate measurement type

Start of Gate.....	98
Length of Gate.....	98
Fence.....	98
Start of Fence.....	98
Length of Fence.....	98

**Start of Gate**

Sets the start time of the gate.

Remote command:

`CALCulate<Measurement>[:POWer]:TGATe<Gate>[:AVG]:OFFSet[:TIME]`

on page 310

**Length of Gate**

Sets the length of the gate.

Remote command:

`CALCulate<Measurement>[:POWer]:TGATe<Gate>[:AVG]:TIME` on page 311

**Fence**

Enables or disables an exclusion interval for the selected gate. This exclusion interval is called a fence. The interval where the fence overlaps with the gate is excluded from the measurement.

Like a gate, a fence is defined by its start time and its length.

Remote command:

`CALCulate<Measurement>[:POWer]:TGATe<Gate>[:AVG][:EXCLude]:MID[:STATe]` on page 312

**Start of Fence**

Sets the start time of the fence. The start time refers to the start of the gate.

Remote command:

`CALCulate<Measurement>[:POWer]:TGATe<Gate>[:AVG][:EXCLude]:MID:OFFSet[:TIME]` on page 311

**Length of Fence**

Sets the length of the fence.

Remote command:

`CALCulate<Measurement>[:POWer]:TGATe<Gate>[:AVG][:EXCLude]:MID:TIME` on page 312

## 6.7 Timeslot

Supported by multipath and wideband sensors. The sensor measures the average power in successive timeslots. You can define the number and characteristics of the timeslots. But different to time gate measurements, where each gate is defined individually, the timeslots all share the characteristics. Thus, the timeslots are arranged in a frame structure with equal spacing and are suitable for periodic signals. The time reso-

lution is determined by the sampling rate of the sensor. An external trigger signal or internal signal triggering is required for synchronization.

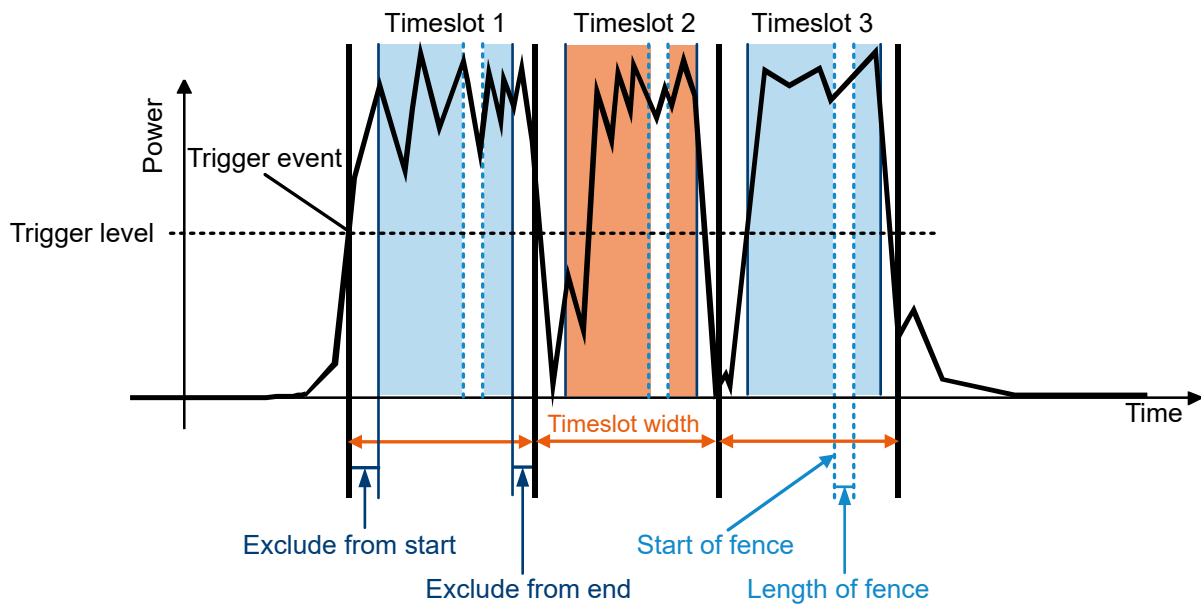


Figure 6-11: Timeslot measurement parameters

Adopt the timeslot width to the test signal. You can restrict the measurement to the relevant part of a timeslot by excluding intervals at the start and the end of the timeslot. Also, you can define an exclusion interval, a so-called fence, within the timeslot.

- [Timeslot result display](#).....99
- [Timeslot settings](#)..... 101
- [Timeslot Configuration dialog](#).....102

### 6.7.1 Timeslot result display

You can choose between a scalar or graphical result display.

#### To change the display format

1. Select the timeslot measurement type:  
"Measurement Settings" > "Measurement Type" > "Timeslot"
2. Select the display format:  
"Display" > "Display Format"

### Scalar display

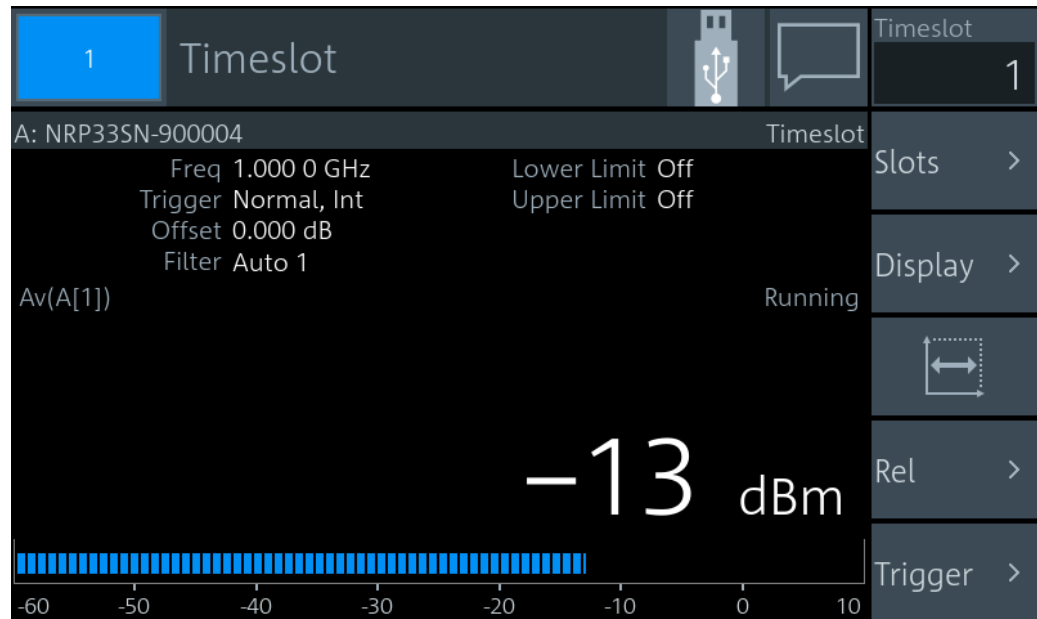


Figure 6-12: Timeslot, scalar digital display

The measurement result is a single scalar value. It refers to the selected timeslot. If "Scalar Analog" is set as [Display Format](#), a bar chart visualizes the measurement result.

### Graphical display

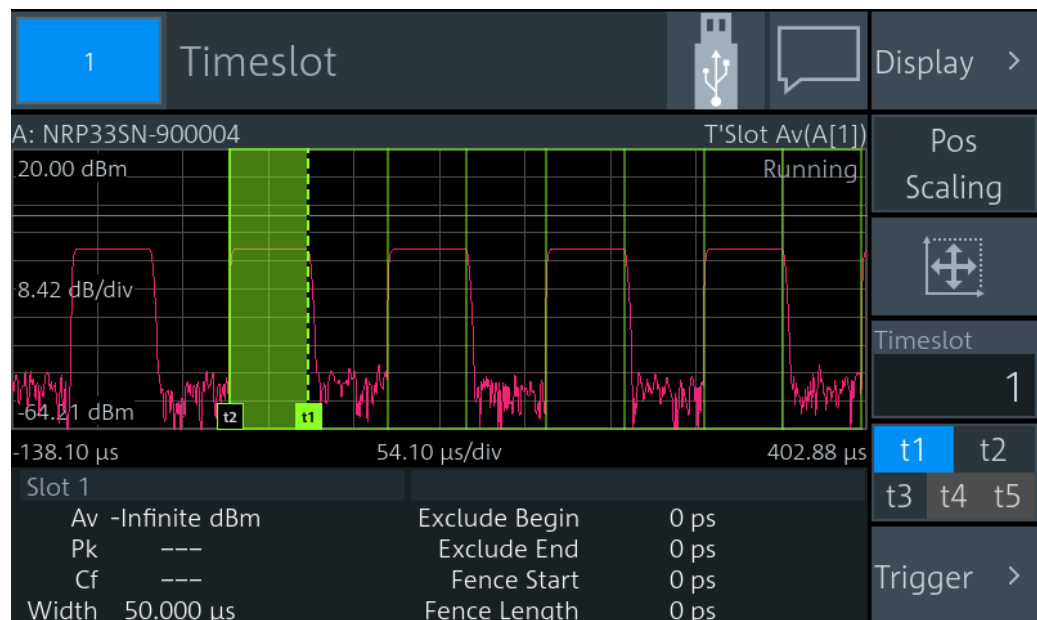


Figure 6-13: Timeslot, graphical display

In the upper pane, the measurement result is shown as a single trace measurement of the primary sensor. The timeslots are indicated as rectangles. The selected timeslot is indicated as the colored area. You can change the timeslot configuration directly by using gestures. If you have a channel calculation function running that involves two sensors, a legend in the upper right corner shows the assignment of the curve to the measurement channel.

In the lower pane, the selected timeslot is displayed with:

- Measurement values:
  - "Av"  
Average power within gate
  - "Pk"  
Peak power within gate
  - "Cf"
- Width
- Borders, see [t1](#), [t2](#), [t3](#), [t4](#), [t5](#).

If you select the lower pane, the [Timeslot Configuration dialog](#) opens.

## 6.7.2 Timeslot settings

Access: "Measurement Settings" > "Measurement Type" > "Timeslot"

The available settings depend on the selected result display.

<a href="#">Timeslot</a> .....	101
<a href="#">Slots</a> .....	101
<a href="#">Display</a> .....	101
<a href="#">Resolution</a> .....	102
<a href="#">Pos / Scaling</a> .....	102
<a href="#">Autoscale</a> .....	102
<a href="#">t1, t2, t3, t4, t5</a> .....	102
<a href="#">Rel</a> .....	102
<a href="#">Trigger</a> .....	102

### Timeslot

Selects a timeslot for the measurement.

Remote command:

[CALCulate<Measurement>\[:POWER\]:TSlot\[:AVG\]:SElection](#) on page 323

### Slots

Available for the scalar displays.

Opens the "Timeslot Configuration" dialog, see [Chapter 6.7.3, "Timeslot Configuration dialog"](#), on page 102.

### Display

See [Chapter 6.1.1, "Display settings"](#), on page 54.

**Resolution**

Available for the scalar displays.

See ["Resolution"](#) on page 56.

**Pos / Scaling**

Available if:

- Graphical display is enabled.
- [t1, t2, t3, t4, t5](#) is disabled.

Scales or moves the graph.

**Autoscale**

Available for the graphical display.

Adapts the scaling of the power axis to the trace. The scaling of the time axis is adapted only if the sensor supports it.

**t1, t2, t3, t4, t5**

Available if:

- Graphical display is selected.
- [Pos / Scaling](#) is disabled.

Selects a border so that you can change the timeslot length and included/excluded intervals. The selected border is displayed as a dashed line.

"t1"	<a href="#">Nominal Width</a>
"t2"	<a href="#">Exclude from Start</a>
"t3"	<a href="#">Exclude from End</a>
"t4"	<a href="#">Start of Fence</a> . Only available if <a href="#">Fence</a> is enabled.
"t5"	<a href="#">Length of Fence</a> . Only available if <a href="#">Fence</a> is enabled.

**Rel**

Available for the scalar displays.

See ["Rel"](#) on page 76.

**Trigger**

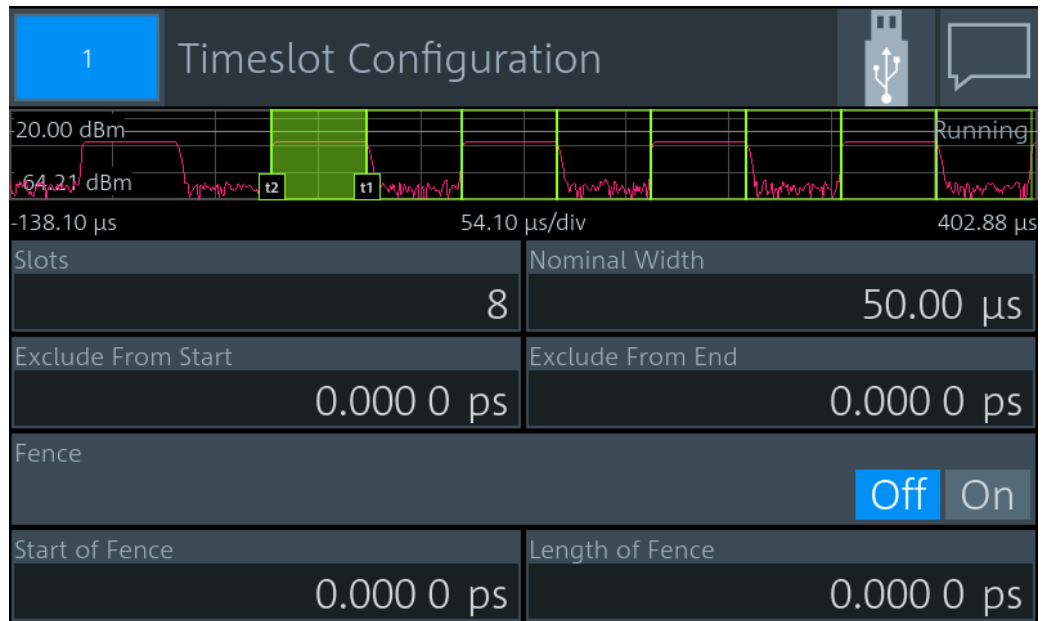
See [Chapter 6.1.3, "Triggering"](#), on page 65.

**6.7.3 Timeslot Configuration dialog**

Access depends on the selected display format:

- Scalar display: "Timeslot" > "Slots"
- Graphical display: Select the lower pane where the gate information is displayed.

Used for configuring the characteristics of the timeslots.



Slots.....	103
Nominal Width.....	103
Exclude from Start.....	103
Exclude from End.....	103
Fence.....	104
Start of Fence.....	104
Length of Fence.....	104

### Slots

Sets the number of simultaneously measured timeslots.

Remote command:

[CALCulate<Measurement>\[:POWER\]:TSLot\[:AVG\]:COUNT](#) on page 323

### Nominal Width

Sets the length of the timeslot.

Remote command:

[CALCulate<Measurement>\[:POWER\]:TSLot\[:AVG\]:WIDTH](#) on page 324

### Exclude from Start

Defines an interval at the start of the timeslot that is excluded from the measurement.

Remote command:

[CALCulate<Measurement>:TSLot:TIMing:EXCLude:START](#) on page 322

### Exclude from End

Defines an interval at the end of the timeslot that is excluded from the measurement.

Remote command:

[CALCulate<Measurement>:TSLot:TIMing:EXCLude:STOP](#) on page 323

**Fence**

Enables or disables an exclusion interval in the timeslots. This exclusion interval is called a fence. The fence is defined by its start time and its length.

Remote command:

`CALCulate<Measurement>[:POWER]:TSLot[:AVG][:EXCLude]:MID[:STATe]`  
on page 324

**Start of Fence**

Sets the start time of the fence. The start time refers to the start of the timeslots.

Remote command:

`CALCulate<Measurement>[:POWER]:TSLot[:AVG][:EXCLude]:MID:OFFSet[:TIME]` on page 324

**Length of Fence**

Sets the length of the fence.

Remote command:

`CALCulate<Measurement>[:POWER]:TSLot[:AVG][:EXCLude]:MID:TIME`  
on page 324

## 6.8 Statistics

Supported by wideband sensors. The sensor measures power over time. Using the statistics measurement type, you can analyze the statistical distribution of the envelope power. The duration of the sampling window is either defined by the chosen gate or a set aperture time. The measurement is repeated until the minimum number of samples is collected.

- [Statistics result display](#)..... 104
- [Statistics settings](#)..... 106
- [Measurement Settings dialog](#).....107
- [Scale Configuration dialog](#)..... 108
- [Statistics Timing dialog](#)..... 110

### 6.8.1 Statistics result display

You can choose between a tabular or graphical result display.

In the lower pane, the following measurement results are provided for the 2 traces:

- "Peak"  
Peak power
- "Avg"   
Average power
- Measurement result at the x-marker position. The marker is set using [\[dBm\] / \[dB\] marker](#).
-



Power value at the y-marker position. The marker is set using [%] marker.

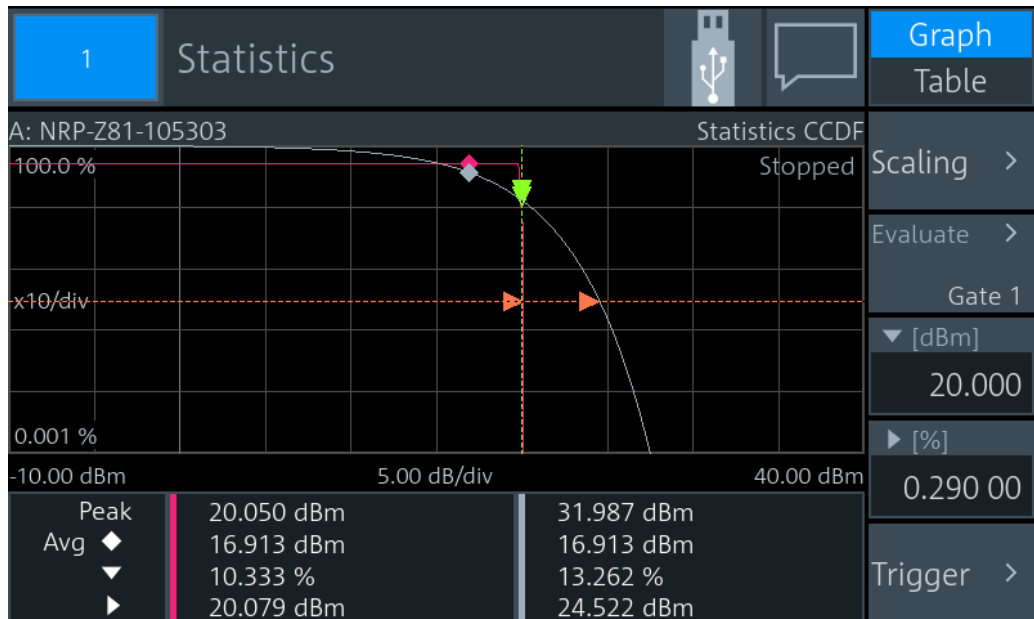


Figure 6-14: Statistics, graphical display

The graph displays the waveform of the selected trace.

Select **Table** to display the measurement results in tabular format. The table contains the measurement results for 2 traces. The second trace is measured by a second sensor or generated by an internal AWGN source.

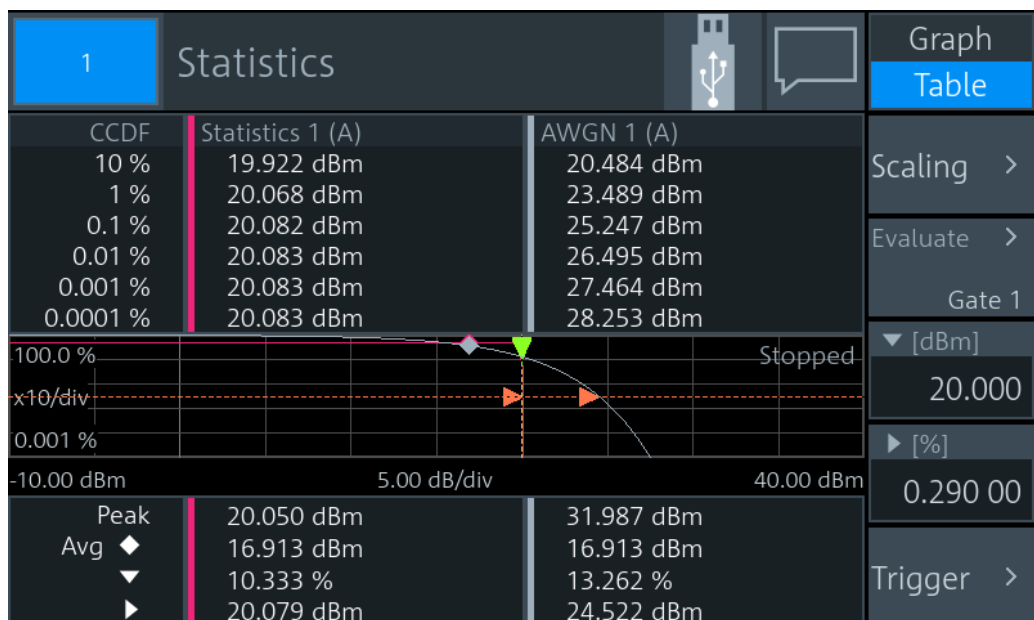


Figure 6-15: Statistics, tabular display

## 6.8.2 Statistics settings

Access: "Measurement Settings" > "Measurement Type" > "Statistics"

Graph / Table.....	106
Scaling.....	106
Evaluate.....	106
[dBm] / [dB] marker.....	106
[%] marker.....	106
Trigger.....	106

### Graph / Table

Available if "CCDF" or "CDF" is set under [Statistics Function](#).

Shows or hides the measurement results table.

Remote command:

`CALCulate<Measurement>:DMODE` on page 210

### Scaling

Opens the "Scale Configuration" dialog, see [Chapter 6.8.4, "Scale Configuration dialog"](#), on page 108.

### Evaluate

Opens the "Statistics Timing" dialog, see [Chapter 6.8.5, "Statistics Timing dialog"](#), on page 110.

### [dBm] / [dB] marker

Positions the x-marker to a power value. The associated measurement result is displayed in the lower pane, see [Figure 6-15](#).

Remote command:

`CALCulate<Measurement>:STATistics:MARKer:X:POSition:RELative`  
on page 334

`CALCulate<Measurement>:STATistics:MARKer:X:POSition[:ABSolute]`  
on page 334

### [%] marker

Positions the y-marker to a measurement value. The associated power value is displayed in the lower pane, see [Figure 6-15](#).

Remote command:

`CALCulate<Measurement>:STATistics:PDF:MARKer:Y:POSition`  
on page 335

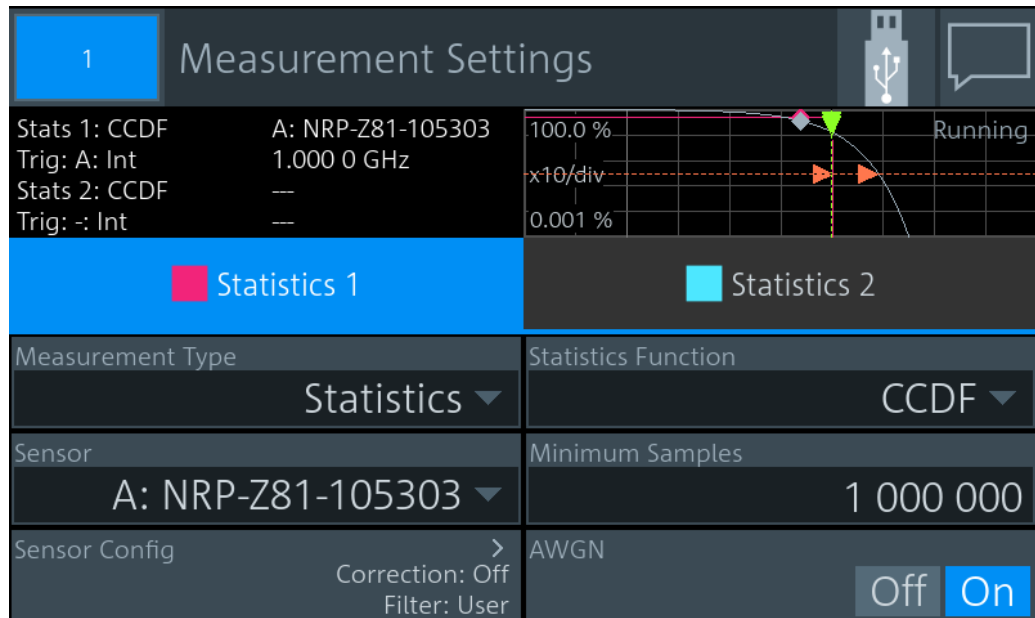
`CALCulate<Measurement>:STATistics[:CDF]:MARKer:Y:POSition`  
on page 333

### Trigger

See [Chapter 6.1.3, "Triggering"](#), on page 65.

### 6.8.3 Measurement Settings dialog

Access: In the "Statistics" dialog, select the *displayed table or graph*.



The settings in the left column are the same as for the other measurement types:

- "Measurement Type"; see ["Measurement Type"](#) on page 72.
- "Sensor"; see ["Primary Sensor, Secondary Sensor"](#) on page 72.
- "Sensor Config" > "Aperture"  
See ["Aperture"](#) on page 120.

The settings in the right column are specific for statistics measurements.

<a href="#">Statistics Function</a> .....	107
<a href="#">Minimum Samples</a> .....	108
<a href="#">AWGN</a> .....	108

#### Statistics Function

Sets the function used for analyzing the statistical distribution of the envelope power.

"CCDF"	Complementary cumulative distribution function Probability that the envelope power is higher than the corresponding x-axis power value. Linear or logarithmic scale.
"CDF"	Cumulative distribution function Probability that the envelope power is lower than the corresponding x-axis power value. Linear or logarithmic scale.
"PDF"	Probability density function Normalized distribution density of the envelope power. The measurement results are dimensionless and independent of the magnitude of the average power value ( $A_v$ ). Only a linear scale is available.

Remote command:

`CALCulate<Measurement>[:CHANnel<Channel>]:FEED<Channel>`

on page 251

### Minimum Samples

Sets the minimum number of samples.

Remote command:

`CALCulate<Measurement>:STATistics:SAMPles[:MINimum]` on page 328

### AWGN

Enables or disables the internal, additional white Gaussian noise (AWGN) source. If enabled, you cannot measure with a second sensor.

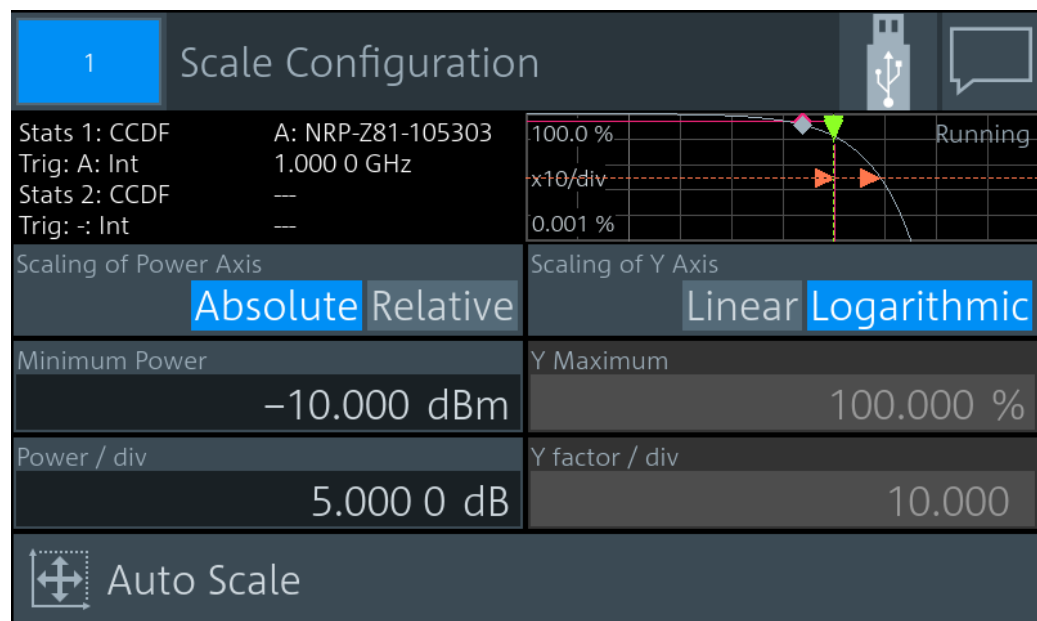
Remote command:

`CALCulate<Measurement>:STATistics:AWGN[:STATE]` on page 328

## 6.8.4 Scale Configuration dialog

Access: "Statistics" > "Scaling"

Used for configuring the axes of the display.



Scaling of Power Axis.....	109
Minimum Power.....	109
Power / div.....	109
Scaling of Y Axis.....	109
Y Maximum.....	109
Y / div.....	109
Auto Scale.....	109

**Scaling of Power Axis**

Sets relative or absolute scaling for the x-axis.

"Absolute" Absolute power in dBm.

"Relative" Relative power in dB, referenced to the average power.

Remote command:

[CALCulate<Measurement>:STATistics\[:SCALE\]:X:MODE](#) on page 331

**Minimum Power**

Sets the lower limit of the level range as a reference for the graphical display.

Remote command:

[CALCulate<Measurement>:STATistics\[:SCALE\]:X:RLEVel\[:ABSolute\]](#)  
on page 332

[CALCulate<Measurement>:STATistics\[:SCALE\]:X:RLEVel:RELative](#)  
on page 332

**Power / div**

Sets the scaling of the power axis.

Remote command:

[CALCulate<Measurement>:STATistics\[:SCALE\]:X:POINts](#) on page 331

[CALCulate<Measurement>:STATistics\[:SCALE\]:X:RANGE](#) on page 332

**Scaling of Y Axis**

Sets linear or logarithmic scaling for the y-axis.

Remote command:

[CALCulate<Measurement>:STATistics\[:SCALE\]:Y:SPACing](#) on page 333

**Y Maximum**

Available if "Linear" is set under [Scaling of Y Axis](#).

Sets the maximum value of the y-axis.

Remote command:

[CALCulate<Measurement>:STATistics:PDF\[:SCALE\]:Y:TOP](#) on page 330

[CALCulate<Measurement>:STATistics\[:CDF\]\[:SCALE\]:Y\[:LINear\]:TOP](#)  
on page 331

**Y / div**

Available if "Linear" is set under [Scaling of Y Axis](#).

Sets the scaling of the y-axis.

Remote command:

[CALCulate<Measurement>:STATistics:PDF\[:SCALE\]:Y:PDIVision](#)  
on page 330

[CALCulate<Measurement>:STATistics\[:CDF\]\[:SCALE\]:Y\[:LINear\]:  
PDIVision](#) on page 330

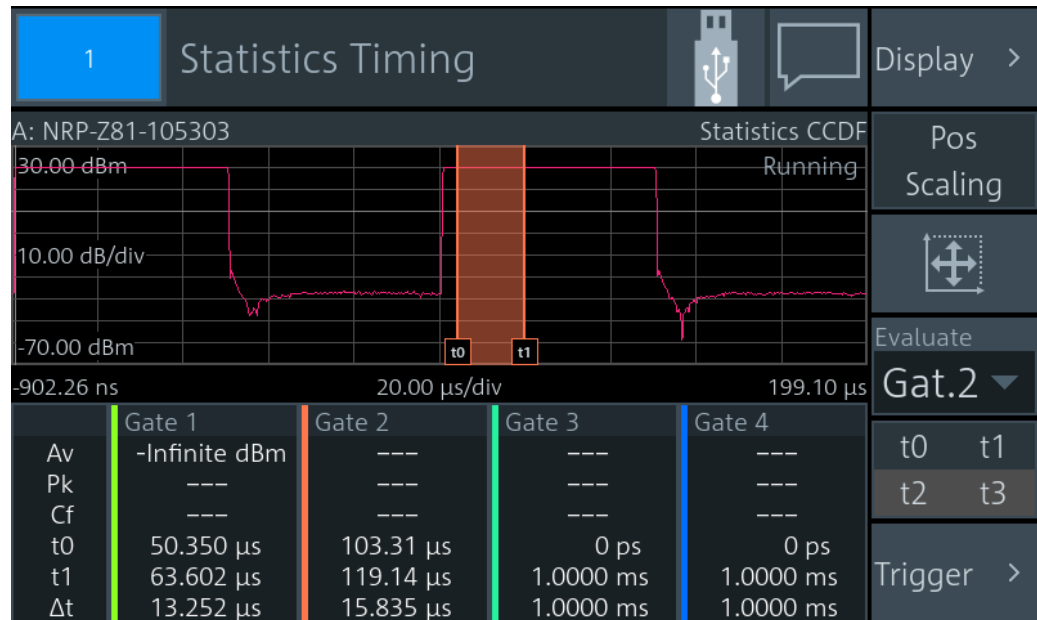
**Auto Scale**

Adapts the scaling of the power axis to the trace.

### 6.8.5 Statistics Timing dialog

Access: "Statistics" > "Evaluate"

Configures the sampling window of the measurement.



If you select the lower pane, the "Gate Configuration" dialog opens, see [Chapter 6.6.3, "Gate Configuration dialog"](#), on page 97.

<a href="#">Display</a> .....	110
<a href="#">Pos / Scaling</a> .....	110
<a href="#">Autoscale</a> .....	110
<a href="#">Evaluate</a> .....	111
<a href="#">t0 / t1 / t2 / t3</a> .....	111

#### Display

Opens the "Trace Configuration" dialog that contains the scaling functions:

- "Start Time" on page 59
- "Time / Div" on page 59
- "Power Reference" on page 59
- "Power / Div" on page 59
- "Unit" on page 60

#### Pos / Scaling

Defines the effect of the cursor keys on the displayed trace.

- "Pos" Shifts the position. Press one of the cursor keys to shift the trace in x- and y-direction.
- "Scaling" Changes the scaling. Press one of the cursor keys to expand or compress the trace.



#### Autoscale

Adapts the scaling of the power axis to the trace.

**Evaluate**

Opens the "Evaluate" dialog to configure the sampling window.

"Gate 1" / "Gate 2" / "Gate 3" / "Gate 4"

Select the gate that you want to configure and use for the measurement.

Continuous Sets unsynchronized acquisition. Set the duration of the sampling window using [Aperture](#).

Remote command:

[CALCulate<Measurement>:STATistics:TGate:SElection](#) on page 329

**t0 / t1 / t2 / t3**

Available if [Pos / Scaling](#) is disabled.

The same gates are used in the time gate and statistics measurements. See "[t0 / t1 / t2 / t3](#)" on page 96.

## 6.9 NRT

Requires the R&S NRX-B9 sensor interface for R&S NRT, see [Chapter 3.2.1.2, "Module bay"](#), on page 28.

Used for power reflection measurements with the R&S NRT-Zxx directional sensor.

The R&S NRT-Zxx directional sensor measures the forward and reverse power. The forward power is the power flux from the source to the load.

The ratio of forward and reverse power is a measure of the matching of the load which can be measured as standing wave ratio (SWR), return loss or reflection coefficient.

**To observe during the power reflection measurement**

- ▶ **CAUTION!** Risk of electric shock and severe skin burns. During the measurement, the RF power flow can be high.



After switching on the RF power, do not touch the RF ports.

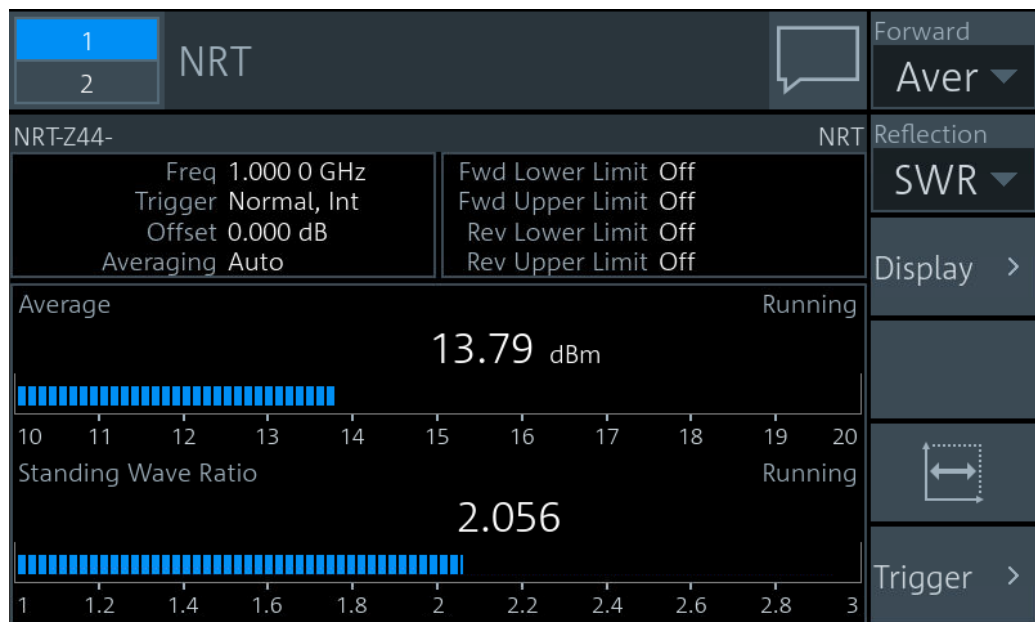
Never exceed the permissible continuous power that is shown in the diagram on the back of the sensor.

Further information:

- [Chapter 7.5, "Channel configuration for NRT measurements"](#), on page 131
- Setup see [Chapter 3.1.8.2, "Optional sensor interface for R&S NRT"](#), on page 24.

### 6.9.1 NRT result display

The R&S NRX displays the forward and reflected power simultaneously.



Displays two scalar values. One for the selected **Forward** measurement and one for the **Reflection** measurement.

In this example, **Average** and **Return Loss** are selected.

## 6.9.2 NRT settings

Access: **Measurement settings dialog** > "Measurement Type" > "NRT"

<b>Forward</b> .....	112
L <b>Average</b> .....	113
L <b>CCDF</b> .....	113
L <b>Peak Envelope Power (PEP)</b> .....	113
L <b>Absorption Average</b> .....	113
L <b>Crest Factor (CF)</b> .....	114
L <b>Absorption PEP</b> .....	114
L <b>Burst Average</b> .....	114
L <b>Absorption Burst</b> .....	114
<b>Reflection</b> .....	115
L <b>Off</b> .....	115
L <b>Reverse Power</b> .....	115
L <b>Standing Wave Ratio (SWR)</b> .....	115
L <b>Return Loss</b> .....	115
L <b>Reflection Coefficient</b> .....	115
L <b>Reflection Ratio</b> .....	116
<b>Display</b> .....	116
<b>Autoscale</b> .....	116
<b>Trigger</b> .....	116

### Forward

Opens a dialog to measure power, power differences and envelope parameters.



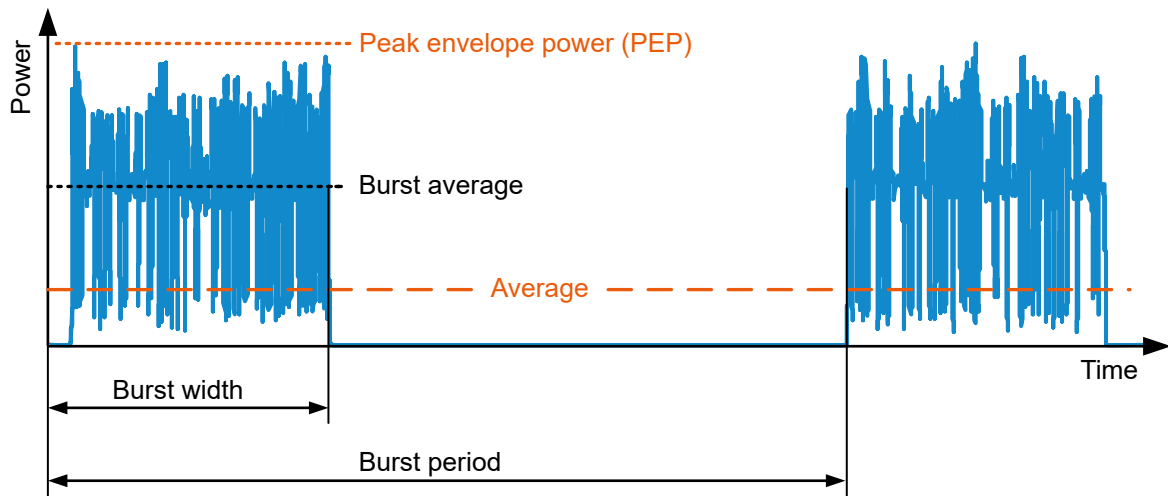


Figure 6-16: Forward power measurement parameters

#### Average ← Forward

Average power

Remote command:

```
CALCulate<Measurement>[:CHANnel<Channel>]:FEED<Channel>
"POWer:FORWard:AVERAge"
```

#### CCDF ← Forward

Complementary cumulative distribution function. Probability that the envelope power is higher than the threshold set under "[CCDF Threshold](#)" on page 134.

Suitable for assessing the power distribution of spread spectrum signals, for example CDMA.

Remote command:

```
CALCulate<Measurement>[:CHANnel<Channel>]:FEED<Channel>
"POWer:FORWard:CCDFunction"
```

#### Peak Envelope Power (PEP) ← Forward

Peak power of an amplitude-modulated signal. Depending on the selected [Video Bandwidth](#), this parameter allows detecting short-time overshoots at the beginning of a burst.

The peak envelope power (PEP) is an important parameter for describing the modulation characteristics of transmitter output stages.

Remote command:

```
CALCulate<Measurement>[:CHANnel<Channel>]:FEED<Channel>
"POWer:FORWard:PEP"
```

#### Absorption Average ← Forward

Absorbed average power. Difference between the forward and reverse average measurement.

This parameter measures the effective power transmitted to the load. With good matching, the difference between forward power and net power is less than one per cent.

Remote command:

```
CALCulate<Measurement>[:CHANnel<Channel>]:FEED<Channel>
"POWer:ABSorption:AVERage"
```

#### **Crest Factor (CF) ← Forward**

Level difference between the peak envelope power and the average power in dB.

$$\text{Crest factor} = 10 \text{ dB} \times \log \frac{\text{Peak envelope power}}{\text{Average power}}$$

Allows recognizing larger modulation distortions quickly.

Remote command:

```
CALCulate<Measurement>[:CHANnel<Channel>]:FEED<Channel>
"POWer:CFACTOR"
```

#### **Absorption PEP ← Forward**

Absorbed peak envelope power (PEP). Difference of peak envelope power between forward and reflected power measurement.

Remote command:

```
CALCulate<Measurement>[:CHANnel<Channel>]:FEED<Channel>
"POWer:ABSorption:PEP"
```

#### **Burst Average ← Forward**

Average power within a burst. The R&S NRX determines the average burst power by multiplying the average power with the ratio of burst period to burst width:

$$\text{Burst average} = \text{Average} \frac{\text{Burst period}}{\text{Burst width}}$$

Burst period and burst width are derived depending on the setting of "[Burst Mode](#)" on page 133.

For pulsed RF signals, the burst average defines the average carrier power within the burst. If the burst is unmodulated and has no overshoots, the average burst is equal to the peak envelope power.

Remote command:

```
CALCulate<Measurement>[:CHANnel<Channel>]:FEED<Channel>
"POWer:FORWARD:AVERage:BURSt"
```

#### **Absorption Burst ← Forward**

Absorbed burst average. Difference of burst average between forward and reflected power measurement.

Remote command:

```
CALCulate<Measurement>[:CHANnel<Channel>]:FEED<Channel>
"POWer:ABSorption:AVERage:BURSt"
```

**Reflection**

Opens a dialog to measure reflection parameters.

The ratio of forward and reflected power is a measure for the matching of the load that can be expressed as standing wave ratio (SWR), return loss or reflection coefficient.

**Off ← Reflection**

Disabled.

Remote command:

```
CALCulate<Measurement>[:CHANnel<Channel>]:FEED<Channel>
"POWer:OFF"
```

**Reverse Power ← Reflection**

Reflected power in W or dBm.

Remote command:

```
CALCulate<Measurement>[:CHANnel<Channel>]:FEED<Channel>
"POWer:REVerse"
```

**Standing Wave Ratio (SWR) ← Reflection**

$$\text{Standing wave ratio} = \frac{1 + \text{Reflection coefficient}}{1 - \text{Reflection coefficient}}$$

See also "[Reflection Coefficient](#)" on page 115.

Remote command:

```
CALCulate<Measurement>[:CHANnel<Channel>]:FEED<Channel>
"POWer:SWRatio"
UNIT<Measurement>:POWer:REFlection
```

**Return Loss ← Reflection**

$$\text{Return loss} = 10 \times \log \frac{\text{Forward power}}{\text{Reverse power}}$$

Remote command:

```
CALCulate<Measurement>[:CHANnel<Channel>]:FEED<Channel>
"POWer:RLOSs"
UNIT<Measurement>:POWer:REFlection
```

**Reflection Coefficient ← Reflection**

$$\text{Reflection coefficient} = \sqrt{\frac{\text{Reverse power}}{\text{Forward power}}}$$

Remote command:

```
CALCulate<Measurement>[:CHANnel<Channel>]:FEED<Channel>
"POWer:RCoefficient"
UNIT<Measurement>:POWer:REFlection
```

**Reflection Ratio ← Reflection**

$$\text{Reflection ratio} = 100 \frac{\text{Reverse power}}{\text{Forward power}}$$

Remote command:

```
CALCulate<Measurement>[:CHANnel<Channel>]:FEED<Channel>
"POWer:RFRatio"
UNIT<Measurement>:POWer:REFLection
```

**Display**

Opens the "Display" dialog. See [Chapter 6.1.1, "Display settings"](#), on page 54.

**Autoscale**

Adapts the scaling of the graphical display.

Remote command:

```
[SENSe<Sensor>:]POWer:REFLection:RANGe:AUTO
[SENSe<Sensor>:]POWer[:POWer]:RANGe:AUTO
```

**Trigger**

Opens the "Measurement Trigger Configuration" dialog:

- ["Trigger Mode"](#) on page 68
- ["Trigger Source"](#) on page 69

**6.9.3 Measurement Main Configuration dialog**

Access: In the "NRT" dialog, select the *displayed graph*.

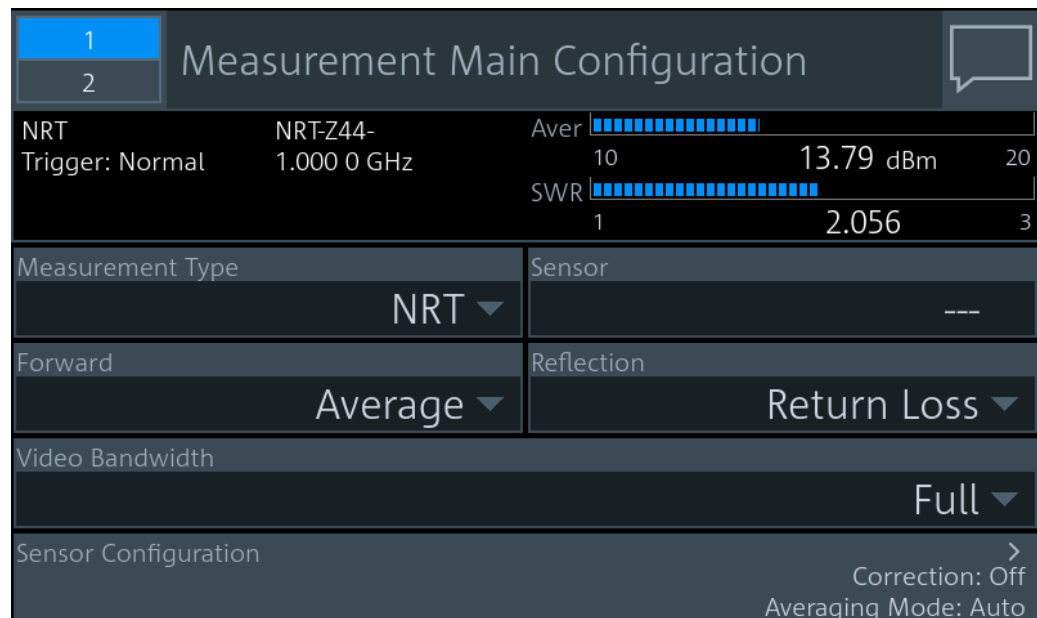


Figure 6-17: Measurement Main Configuration dialog

**Measurement Type**

See ["Measurement Type"](#) on page 72.

**Sensor**

Assigns the sensor to the NRT measurement. Suitable are R&S NRT-Zxx directional sensors connected to the R&S NRX-B9 sensor interface for R&S NRT.

See also ["Primary Sensor, Secondary Sensor"](#) on page 72.

**Forward**

See ["Forward"](#) on page 112.

**Reflection**

See ["Reflection"](#) on page 115.

**Video Bandwidth**

See ["Video Bandwidth"](#) on page 137.

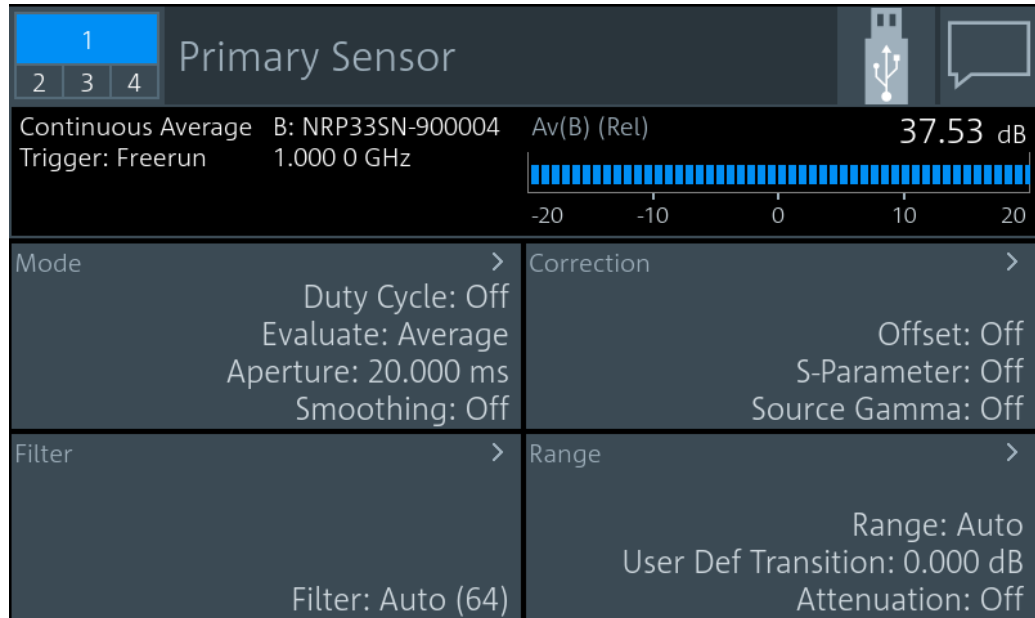
**Sensor Configuration**

Opens the "Channel Configuration" dialog.

See [Chapter 7.5, "Channel configuration for NRT measurements"](#), on page 131.

## 7 Sensor configuration

Access: "Measurement Settings" > "Primary Sensor Config" or "Secondary Sensor Config"



You can define two sensor configurations in parallel, a primary and a secondary sensor configuration. To these configurations, you can assign a sensor that is connected to one of the sensor ports of the sensor. These sensors are called primary sensor and secondary sensor.



The channel configuration of NRT measurements is performed in another dialog. See [Chapter 7.5, "Channel configuration for NRT measurements"](#), on page 131.

Further information:

- ["Primary Sensor, Secondary Sensor"](#) on page 72
- [Chapter 6, "Measurement and display configuration"](#), on page 54
- [Chapter 12.8.6, "Standardized signals"](#), on page 368
- [Chapter 10.1.4, "Sensor management"](#), on page 155

The "Primary Sensor" and "Secondary Sensor" dialogs provide access to:

- [Mode settings](#)..... 119
- [Correction settings](#)..... 122
- [Filter settings](#)..... 125
- [Range settings](#)..... 129
- [Channel configuration for NRT measurements](#)..... 131

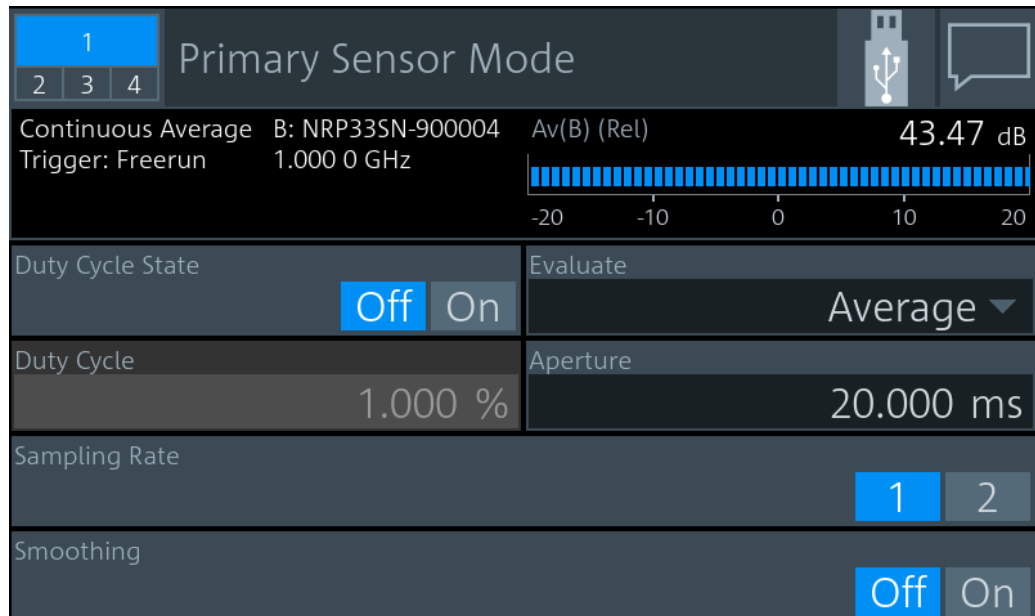
## 7.1 Mode settings

Access:

"Measurement Settings" > "Primary Sensor Config" > "Mode"

"Measurement Settings" > "Secondary Sensor Config" > "Mode"

Available for all measurement types.



Duty Cycle State.....	119
Duty Cycle.....	119
Equivalent Time Sampling.....	120
Evaluate.....	120
Aperture.....	120
Sampling Rate.....	121
Smoothing.....	121
Dropout Tolerance.....	121
Exclude from Start, Exclude from End.....	122

### Duty Cycle State

Available for continuous average measurements.

Enables or disables the duty cycle correction.

Remote command:

`CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:DCYClE:STATe` on page 348

### Duty Cycle

Available for continuous average measurements.

Sets the duty cycle for measuring pulse-modulated signals. The duty cycle defines the percentage of one period during which the signal is active. If the duty cycle is enabled, the sensor considers this percentage when calculating the signal pulse power from the average power.

For thermal power sensors or multipath power sensors, the duty cycle correction is the only way to determine the power of pulsed signals.

Remote command:

`CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:DCYCLe[:VALue]` on page 348

### Equivalent Time Sampling

Available for trace, pulse analysis measurements.

Enables or disables the automatic equivalent sampling that allows for high-resolution measurements.

Remote command:

`CALCulate<Measurement>[:CHANnel<Channel>]:TRACe:ESAMpling` on page 349

`CALCulate<Measurement>:TRACe:MEASurement:TRANSition:ESAMpling:AUTO[:STATe]` on page 351

### Evaluate

Available for continuous average, burst average, trace, pulse analysis, time gate, time-slot measurements.

Sets the display type.

"Average"	Average power value, resulting in a flicker-free display and smooth trace.
"Random"	Power of a randomly selected sample, i.e. a realistic display with signal details.
"Peak"	Highest power measured (peak power).

Remote command:

`CALCulate<Measurement>[:CHANnel<Channel>]:FEED<Channel>` on page 251

### Aperture

Available for continuous average, statistics measurements.

Sets the width of the sampling window. The usage depends on the measurement type.

- Continuous average measurement  
When measuring modulated signals, the measurement can show fluctuation due to the modulation. If that is the case, adapt the size of the sampling window exactly to the modulation period to get an optimally stable display. If the modulation period varies or is not precisely known, you can also enable [Smoothing](#).
- Statistics measurement  
Applies for unsynchronized acquisition that is if [Evaluate](#) is set to "Continuous".



Remote command:

`CALCulate<Measurement>[:CHANnel<Channel>][:POWer][:AVG]:`

`APERture[:VALue]` on page 350

`CALCulate<Measurement>:STATistics:APERture` on page 328

### Sampling Rate

Available for continuous average measurements.

Sets the sampling rate.

If the sampling frequency is located within the video bandwidth, aliasing can occur, that is when spectral components near the sampling frequency cause beating effects. If you change the sampling rate, the beating effects usually disappear.

"1" Normal sampling rate

"2" Lower sampling rate

Recommended avoiding measurement errors caused due to aliasing effects. However, this setting extends the measurement time.

Remote command:

`CALCulate<Measurement>[:CHANnel<Channel>]:SAMPling` on page 349

### Smoothing

Available for continuous average measurements.

Enables or disables the smoothing filter, a steep-edge digital lowpass filter. The filter reduces result fluctuations caused by modulation.

"Off" If the modulation frequency is known, set the [Aperture](#) time exactly to an integer multiple of the modulation period and disable smoothing. Otherwise, the modulation can have a considerable influence, even if the sampling window is much larger than the modulation period. 300 to 3000 periods are required to obtain the same effect as with smoothing enabled. The sampling values are considered equivalent and are averaged in a sampling window, which yields an integrating behavior of the measuring instrument.

"On" If the modulation period varies or is not precisely known, enable smoothing.

The selected sampling window has to be 5 to 9 times larger than the modulation period so that the fluctuations caused by modulation are sufficiently reduced. The sampling values are subjected to weighting (raised-von-Hann window), which corresponds to video filtering.

Remote command:

`CALCulate<Measurement>[:CHANnel<Channel>][:POWer][:AVG]:`

`SMOothing[:STATe]` on page 351

### Dropout Tolerance

Available for burst average measurements.

Detects the falling edge of a burst. If the power keeps low for at least the set time, the end of the burst is assumed. Modulation-specific power drops that are shorter than the set value are ignored.

Remote command:

`CALCulate<Measurement>[:CHANnel<Channel>][:POWer]:BURSt:  
DTOLerance` on page 350

#### **Exclude from Start, Exclude from End**

Available for burst average measurements.

Sets the time interval at the beginning or end of bursts that are excluded from the measurement. Thus, signal overshoots are omitted.

Remote command:

`CALCulate<Measurement>[:CHANnel<Channel>]:BURSt:TIMing:EXCLude:  
START` on page 347

`CALCulate<Measurement>[:CHANnel<Channel>]:BURSt:TIMing:EXCLude:  
STOP` on page 348

## 7.2 Correction settings

Access:

"Measurement Settings" > "Primary Sensor Config" > "Correction"

"Measurement Settings" > "Secondary Sensor Config" > "Correction"

Available for all measurement types.

#### **Offset corrections**

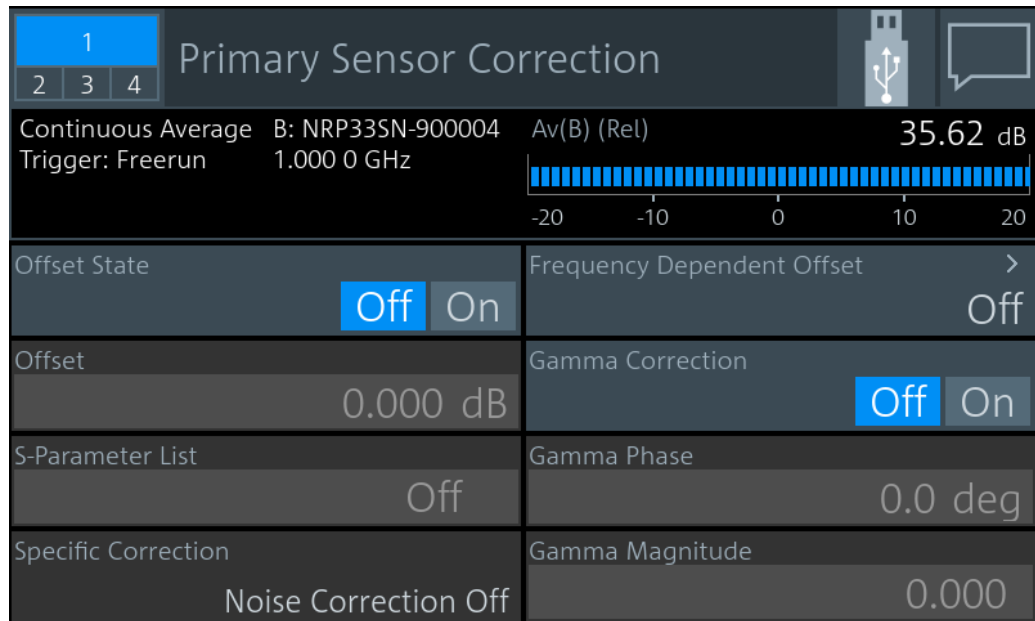
Add a fixed level offset in dB to compensate for external losses or gains. If you take the attenuation of an attenuator located ahead of the sensor or the coupling attenuation of a directional coupler into account, use a positive offset. That means the sensor calculates the power at the input of the attenuator or the directional coupler. If you want to correct the influence of an amplifier connected ahead, use a negative offset.

#### **S-parameter corrections**

Used to compensate for losses and reflections introduced by a two-port component that is attached to a sensor, such as an attenuator, directional coupler, or matching pad. Using S-parameters instead of a fixed offset increases the measurement accuracy, because the interaction between the sensor and the component is considered. For information on how to proceed, see the user manual of the sensor.

#### **S-gamma corrections**

Using the complex reflection coefficient, you can determine the power delivered by the signal source with considerably greater accuracy. For information on how to proceed, see the user manual of the sensor.



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└ Edit table "<table name>".....	124
└ Export file name, Import file name.....	125
└ Export table to file, Import table from file.....	125
Gamma Correction.....	125
Gamma Phase.....	125
Gamma Magnitude.....	125

### Offset State

Enables or disables the offset entered under [Offset](#).

Remote command:

```
CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:OFFSet:
STATe on page 354
```

### Offset

Sets a fixed offset for compensating external signal losses or gains. See also "[Offset corrections](#)" on page 122.

Remote command:

```
CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:OFFSet[:
MAGNitude] on page 356
```

**S-Parameter List**

Enables or disables the S-parameter data set stored in the calibration data of the sensor. See also "[S-parameter corrections](#)" on page 122.

Remote command:

[\[SENSe<Sensor>:\]CORRection:SPDevice:STATe](#) on page 352

[\[SENSe<Sensor>:\]CORRection:SPDevice:SELEct](#) on page 352

[\[SENSe<Sensor>:\]CORRection:SPDevice:LIST?](#) on page 352

**Frequency Dependent Offset**

Opens the [Primary Sensor Offsets](#), [Secondary Sensor Offsets](#) dialogs.

**Primary Sensor Offsets, Secondary Sensor Offsets dialogs ← Frequency Dependent Offset**

Configures the sensor offsets.

Remote command:

[MEMory:TABLE:...](#); see [Chapter 12.13, "Managing setups and correction tables"](#), on page 410.

**Frequency dependent offset active ← Primary Sensor Offsets, Secondary Sensor Offsets dialogs ← Frequency Dependent Offset**

Enables or disables the selected table.

If enabled, the measurement results are corrected using the specified offset. If the exact frequency value is not available in the table, the values of the table are interpolated. If the selected frequency is outside the specified frequency range, the first or last offset value of the table is used.

Remote command:

[CALCulate<Measurement>\[:CHANnel<Channel>\]:CORRection:OFFSet:TABLE\[:STATe\]](#) on page 355

**Frequency dependent offset table ← Primary Sensor Offsets, Secondary Sensor Offsets dialogs ← Frequency Dependent Offset**

Selects one of the available offset tables.

Remote command:

[CALCulate<Measurement>\[:CHANnel<Channel>\]:CORRection:OFFSet:TABLE:INDEX](#) on page 355

[MEMory:TABLE:SELEct](#) on page 416

**Edit table name ← Primary Sensor Offsets, Secondary Sensor Offsets dialogs ← Frequency Dependent Offset**

Enter the table name.

Remote command:

[MEMory:TABLE:MAP](#) on page 415

**Edit table "<table name>" ← Primary Sensor Offsets, Secondary Sensor Offsets dialogs ← Frequency Dependent Offset**

Opens a dialog to edit the selected table.

Remote command:

`MEMory:TABLE:FREQuency` on page 414

`MEMory:TABLE:FREQuency:POINts?` on page 414

`MEMory:TABLE:GAIN:POINts?` on page 414

`MEMory:TABLE:GAIN[:MAGNitude]` on page 415

**Export file name, Import file name** ← **Primary Sensor Offsets, Secondary Sensor Offsets dialogs** ← **Frequency Dependent Offset**

Edits the filename for export/import.

**Export table to file, Import table from file** ← **Primary Sensor Offsets, Secondary Sensor Offsets dialogs** ← **Frequency Dependent Offset**

Exports or imports the table specified under [Export file name, Import file name](#).

### Gamma Correction

Enables or disables the gamma correction. See also "[S-gamma corrections](#)" on page 122.

Remote command:

`CALCulate<Measurement>[:CHANnel<Channel>]:SGAMma:CORRection:STATE` on page 356

### Gamma Phase

Available if [Gamma Correction](#) is enabled.

Sets the phase angle of the complex reflection coefficient of the source.

Remote command:

`CALCulate<Measurement>[:CHANnel<Channel>]:SGAMma:PHASe` on page 356

### Gamma Magnitude

Available if [Gamma Correction](#) is enabled.

Sets the magnitude of the complex reflection coefficient of the source.

Remote command:

`CALCulate<Measurement>[:CHANnel<Channel>]:SGAMma[:MAGNitude]` on page 357

## 7.3 Filter settings

Access:

"Measurement Settings" > "Primary Sensor Config" > "Filter"

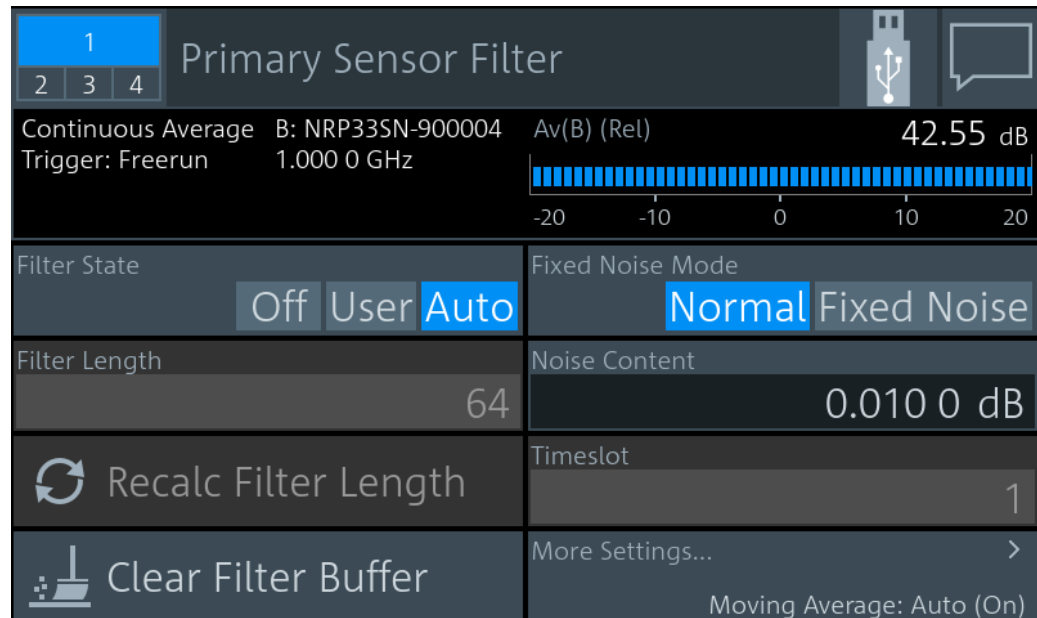
"Measurement Settings" > "Secondary Sensor Config" > "Filter"

Available for all measurement types.

Use the averaging filter to reduce fluctuations in the measurement results. Such fluctuations can be caused by inherent noise of the sensor, modulation of the measurement signal or beats from the superposition of adjacent carriers. A more stable display is traded off against longer measurement times, caused by longer settling times when the

power changes. As a starting point, always use automatic filtering. If the automatically selected filter setting proves to be not adequate, you can increase or decrease the averaging number manually.

If you want to learn more about methods how to control the measurement, see the user manual of the sensor.



Filter State.....	126
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Noise Content.....	127
Maximum Settling Time.....	128
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Moving Average.....	128
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Video Bandwidth.....	129

### Filter State

Enables or disables the averaging filter. If enabled, the number of measured values is averaged. Averaging reduces the effect of noise so that more reliable results are obtained.

Remote command:

`CALCulate<Measurement>[:CHANnel<Channel>]:AVERage[:STATe]`

on page 362

`CALCulate<Measurement>[:CHANnel<Channel>]:TRACe:AVERage[:STATe]`

on page 364

**Filter Length**

Sets the number of readings that are averaged for one measured value. The higher the count, the lower the noise, and the longer it takes to obtain a measured value.

If [Filter State](#) is set to "Auto", this parameter is read-only.

Remote command:

`CALCulate<Measurement>[:CHANnel<Channel>]:AVERage:COUNT[:VALue]`  
on page 391

`CALCulate<Measurement>[:CHANnel<Channel>]:TRACe:AVERage:COUNT[:VALue]` on page 362

**Recalc Filter Length**

Available for continuous average, burst average, time gate measurements.

Recalculates the number of readings that are averaged for one measured value.

Remote command:

`CALCulate<Measurement>[:CHANnel<Channel>]:AVERage:COUNT:AUTO[:STATe]` on page 391

**Clear Filter Buffer**

Available for continuous average, burst average, time gate measurements.

Clears the filter buffer.

Remote command:

`[SENSe<Sensor>:]AVERage:RESet` on page 358

**Fixed Noise Mode**

Available for continuous average, burst average measurements.

Sets the autofilter.

- |               |   |
|---------------|---|
| "Normal"      | Sets the averaging number so that the inherent noise of the sensor, 2 standard deviations, does not exceed the specified <a href="#">"Noise Content"</a> on page 127. |
| "Fixed Noise" | Limits the averaging number as specified in <a href="#">Maximum Settling Time</a> to avoid long settling times.   |

Remote command:

`CALCulate<Measurement>[:CHANnel<Channel>]:AVERage:COUNT:AUTO:TYPE` on page 360

**Noise Content**

If [Fixed Noise Mode](#) is set to "Normal", available for continuous average, burst average measurements.

Sets the averaging number so that the inherent noise of the sensor does not exceed the specified value.

Remote command:

`CALCulate<Measurement>[:CHANnel<Channel>]:AVERage:COUNT:AUTO:NSRatio` on page 359

**Maximum Settling Time**

If **Fixed Noise Mode** is set to "Fixed Noise", available for continuous average, burst average measurements.

Sets an upper time limit, a maximum time that is never exceeded.

Remote command:

`CALCulate<Measurement>[:CHANnel<Channel>]:AVERage:COUNT:AUTO:MTIME` on page 359

**Timeslot**

Available for continuous average, burst average measurements.

Sets a timeslot from which the measured value is used to determine the filter length automatically. The timeslot number must not exceed the number of the currently set timeslots.

Remote command:

`CALCulate<Measurement>[:CHANnel<Channel>]:AVERage:COUNT:AUTO:SLOT` on page 359

**Moving Average State**

Available for continuous average, burst average, trace, pulse analysis, timeslot, statistics measurements.

Enables or disables the automatic termination control.

Remote command:

`CALCulate<Measurement>[:CHANnel<Channel>]:AVERage:TCONtrol:AUTO` on page 360  
`CALCulate<Measurement>[:CHANnel<Channel>]:TRACe:AVERage:TCONtrol:AUTO` on page 363

**Moving Average**

Available for continuous average, burst average, trace, pulse analysis, timeslot, statistics measurements.

Defines how the measurement results are output, also called termination control.

- |     |  |
|-----|--|
| On  | Outputs intermediate values to facilitate early detection of changes in the measured quantity. In the settled state that means when the number of measurements specified by the average count has been performed, a moving average is output.                      |
| Off | Specifies that a measurement result is not output until the entire measurement has been completed. This means that the number of measurement cycle repetitions is equal to the set average count. If the average count is large, the measurement time can be long. |

Remote command:

`CALCulate<Measurement>[:CHANnel<Channel>]:AVERage:TCONtrol[:ENUM]` on page 361  
`CALCulate<Measurement>[:CHANnel<Channel>]:TRACe:AVERage:TCONtrol[:ENUM]` on page 363



**Averaging Domain**

Requires a frequency selective power sensor.

Sets the averaging method. See also the user manual of the sensor.

"Power"	Power averaging
"Video"	Logarithmic averaging
"Linear"	Amplitude averaging

Remote command:

`CALCulate<Measurement>[:CHANnel<Channel>]:AVERage:TYPE` on page 362

**Video Bandwidth**

Requires a wideband power sensor.

Sets the video filter bandwidth. Reducing the video bandwidth also increases the trigger sensitivity.

**Note:** The video bandwidth must never be smaller than the RF bandwidth of the signal.

Remote command:

`CALCulate<Measurement>[:CHANnel<Channel>][:POWER]:VBwidth:ENUM`  
on page 365

## 7.4 Range settings

Access:

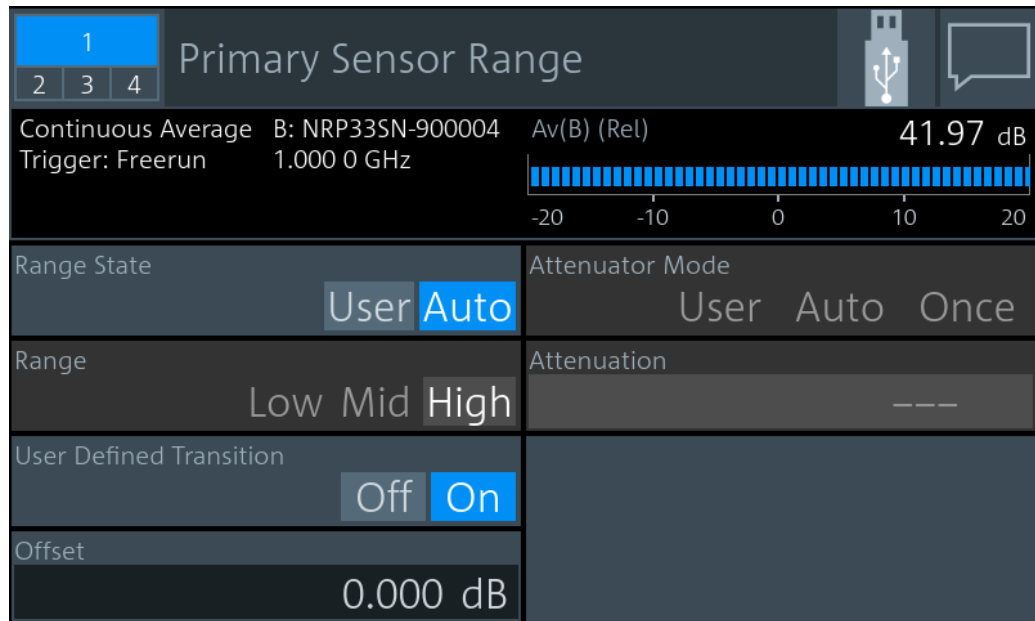
"Measurement Settings" > "Primary Sensor Config" > "Range"

"Measurement Settings" > "Secondary Sensor Config" > "Range"

Available for continuous average, burst average, trace, pulse analysis, time gate, time-slot, statistics measurements.

Some sensors have only one measurement range, others have two or three measurement ranges. For details, see the specifications document of the sensor.

The measurement ranges are also called measurement paths. All available paths are continuously and simultaneously measured. Adjacent paths overlap by about 6 dB, and the final measurement result is achieved by appropriately weighting the measurement results of all paths.



<a href="#">Range State</a> .....	130
<a href="#">Range</a> .....	130
<a href="#">User Defined Transition</a> .....	130
<a href="#">Offset</a> .....	131
<a href="#">Attenuator Mode</a> .....	131
<a href="#">Attenuation</a> .....	131

### Range State

Enables or disables the automatic measurement path selection.

Remote command:

`CALCulate<Measurement>[:CHANnel<Channel>][:POWer][:AVG]:RANGe:  
AUTO` on page 366

### Range

Available if [Range State](#) is set to "User".

Sets the active measurement path in which the sensor is measuring.

Remote command:

`CALCulate<Measurement>[:CHANnel<Channel>][:POWer][:AVG]:RANGe[:  
VALue]` on page 367

### User Defined Transition

Available if [Range State](#) is set to "Auto".

Enables or disables the reduction of the transition region between the measurement paths entered under [Offset](#).

Remote command:

`CALCulate<Measurement>[:CHANnel<Channel>][:POWer][:AVG]:RANGe:  
CLEVel:STATe` on page 367

**Offset**

Reduces the transition region between the measurement paths, 0 -> 1 and 1 -> 2, by the set value, the so-called cross-over level. Thus, you can improve the measurement accuracy for signals with a high peak-to-average ratio, since the headroom for modulation peaks becomes larger. However, the signal-to-noise ratio is reduced at the lower limits of the transition regions.

Remote command:

`CALCulate<Measurement>[:CHANnel<Channel>][:POWer][:AVG]:RANGe:CLEVel[:VALue]` on page 367

**Attenuator Mode**

Requires a frequency selective power sensor.

"User"	Disables the automatic setting of the input attenuation.
"Auto"	Enables the automatic setting of the input attenuation.
"Once"	Adjusts the input attenuation one time, then disables the automatic setting.

Remote command:

`CALCulate<Measurement>[:CHANnel<Channel>]:INPut:ATTenuation:AUTO` on page 365

**Attenuation**

Requires a frequency selective power sensor.

Available if [Attenuator Mode](#) is set to "User".

Sets the input attenuation. Only two values are possible, 0.0 dB and 30.0 dB. The entered value is rounded to the next value.

Remote command:

`CALCulate<Measurement>[:CHANnel<Channel>]:INPut:ATTenuation[:VALue]` on page 366

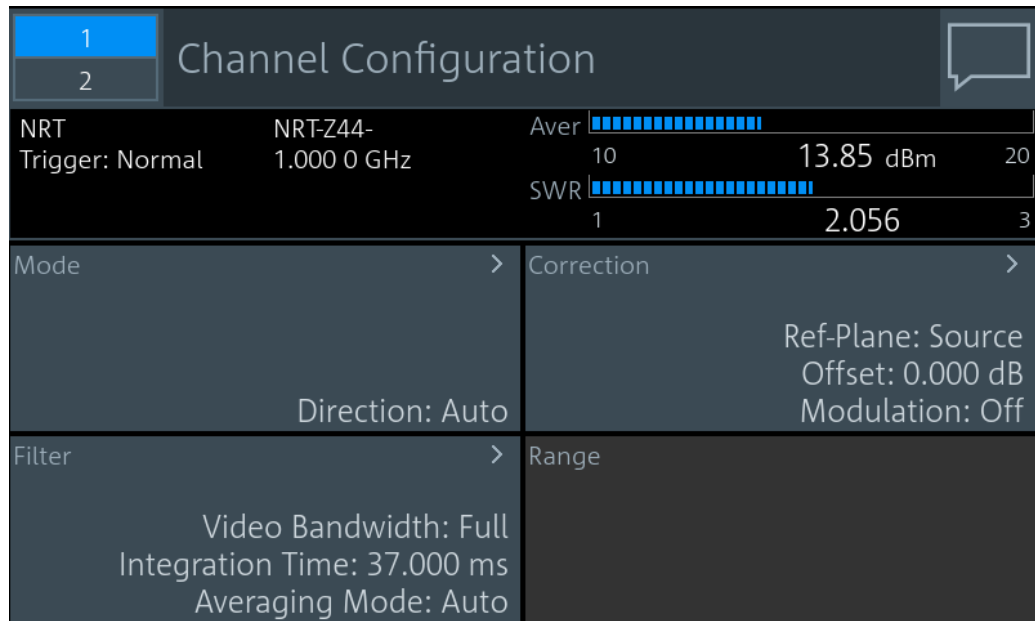
## 7.5 Channel configuration for NRT measurements

Access: "Measurement Main Configuration" > "Sensor Configuration"

Requirements:

- "Measurement Settings" > "Measurement Type" > "NRT"
- R&S NRX-B9 sensor interface for R&S NRT; see [Chapter 3.2.1.2, "Module bay"](#), on page 28.
- R&S NRT-Zxx directional sensors

The "Channel Configuration" dialog offers access to all sensor-related settings.



An R&S NRT-Zxx directional sensor has two measurement channels, one channel for forward power and one channel for reflected power.

Further information:



- [Chapter 6.9, "NRT"](#), on page 111

The "Channel Configuration" dialog provides access to:

- [Channel mode settings](#)..... 132
- [Channel correction settings](#).....134
- [Channel filter settings](#).....136

### 7.5.1 Channel mode settings

Access: "Measurement Main Configuration" > "Sensor Configuration" > "Mode"

1		Channel Mode Configuration			
2					
NRT	NRT-Z44-	Aver			
Trigger: Normal	1.000 0 GHz	10	13.83 dBm	20	
		SWR			
		1	2.077	3	
Burst Mode		Auto User		Direction	
		Auto		1 > 2 2 > 1	
Burst Period		100.00 ms		CCDF Threshold	
				1.000 0 mW	
Burst Width		10.000 ms		PEP Hold Time	
				10.000 ms	

Burst Mode.....	133
Burst Period.....	133
Burst Width.....	133
Direction.....	134
CCDF Threshold.....	134
PEP Hold Time.....	134

### Burst Mode

Defines how the average burst power is determined.

"Auto" Not supported by all sensors.  
The sensor automatically recognizes the duty cycle of the burst series and calculates the average burst power from this duty cycle and the average power. Set an appropriate [Video Bandwidth](#).

"User" Define the duty cycle by:

- [Burst Period](#)
- [Burst Width](#)

The R&S NRX calculates the average burst power from these values.

Remote command:

```
CALCulate<Measurement>[:CHANnel<Channel>]:NRT:BURSt:MODE
```

### Burst Period

Available if "User" is set under "[Burst Mode](#)" on page 133.

Sets the burst period.

Remote command:

```
CALCulate<Measurement>[:CHANnel<Channel>]:NRT:BURSt:PERiod
```

### Burst Width

Available if "User" is set under "[Burst Mode](#)" on page 133.

Sets the burst width.

Remote command:

```
CALCulate<Measurement>[:CHANnel<Channel>]:NRT:BURSt:WIDTh
```

### Direction

Defines how the forward power is determined.

"Auto" Determines the power flow direction automatically. The greater value of two measured values is automatically assigned as forward power.

"1 > 2", "2 > 1" Sets a fixed direction of the forward power, either from port 1 to port 2, or from port 2 to port 1.

The two ports are indicated on the directional power sensor.

Remote command:

```
CALCulate<Measurement>[:CHANnel<Channel>]:NRT:DIRection
INPut<Sensor>:PORT:SOURce:AUTO
INPut<Sensor>:PORT:SOURce[:VALue]
```

### CCDF Threshold

Sets the threshold for the complementary cumulative distribution function. See also "CCDF" on page 113.

Remote command:

```
CALCulate<Measurement>[:CHANnel<Channel>]:NRT:CCDF:THReshold
```

### PEP Hold Time

Sets the hold time of the peak hold circuit of the sensor. See also "Peak Envelope Power (PEP)" on page 113.

Remote command:

```
CALCulate<Measurement>[:CHANnel<Channel>]:NRT:PEP:HOLD:TIME
```

## 7.5.2 Channel correction settings

Access: "Measurement Main Configuration" > "Sensor Configuration" > "Correction"

Channel Correction Configuration

NRT	NRT-Z44-	Aver	
Trigger: Normal	1.000 0 GHz	10	13.80 dBm 20
		SWR	
		1	2.015 3

Offset Reference Plane

Source Load

Offset

0.000 dB

Modulation

Off ▼

WCDMA Chip Rate

1.000 0 MHz

Offset Reference Plane.....	135
Offset.....	135
Modulation.....	135
WCDMA Chip Rate.....	136

### Offset Reference Plane

Selects the sensor port to which the measurement results are referred to.

"Source"            Source connector of the R&S NRT-Zxx directional sensor

"Load"             Load connector of the R&S NRT-Zxx directional sensor

Remote command:

```
CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:OFFSet:
RPLane
INPut<Sensor>:PORT:POSition
```

### Offset

Considers the transmission loss in a cable that connects the desired measurement point, set by [Offset Reference Plane](#), and the sensor.

Remote command:

```
CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:OFFSet:
STATe
CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:OFFSet[:
MAGNitude]
INPut<Sensor>:PORT:OFFSet
```

### Modulation

Sets a communication standard for the modulation correction to reduce systematic deviations occurring in power measurements.

"Off"              Disabled.

- "IS95" IS- 95 CDMA standard for base stations.
- "WCDMA" WCDMA standard for base stations.
- "DVBT" DVB-T standard for terrestrial DVB TV transmitters.
- "DAB" DAB standard for radio transmitters.

Remote command:

```
CALCulate<Measurement>[:CHANnel<Channel>]:NRT:DMODulation[:
VALue]
[SENSe<Sensor>:]DM:STATe
[SENSe<Sensor>:]DM:STANdard
```

**WCDMA Chip Rate**

Available if "WCDMA" is set under [Modulation](#).

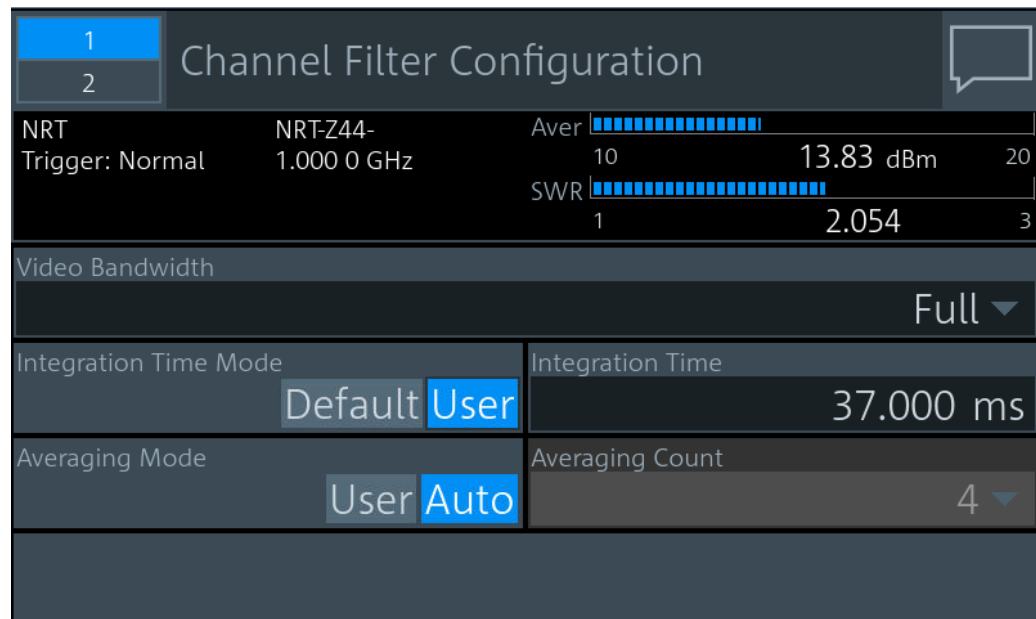
Sets the chip rate for the WCDMA communication standard.

Remote command:

```
CALCulate<Measurement>[:CHANnel<Channel>]:NRT:DMODulation:WCDMa:
CRATe
```

**7.5.3 Channel filter settings**

Access: "Measurement Main Configuration" > "Sensor Configuration" > "Filter"



Video Bandwidth..... 137

Integration Time Mode..... 137

Integration Time..... 137

Averaging Mode..... 137

Averaging Count..... 137



**Video Bandwidth**

For measuring the peak envelope power, specify the video bandwidth that the sensor uses for measuring the detected RF signal.

"4 kHz" | "200 kHz" | "Full"

"Full" means that the maximum bandwidth of the sensor is used.

Remote command:

```
CALCulate<Measurement>[:CHANnel<Channel>]:NRT:VBWidth[:VALue]
[SENSe<Sensor>:]BANDwidth:VIDeo:FNUMber
[SENSe<Sensor>:]BWIDth:VIDeo:FNUMber
```

**Integration Time Mode**

Specifies which integration time is used for a single measurement.

"Default" Uses the default settings.

"User" Define a value under [Integration Time](#).

Remote command:

```
CALCulate<Measurement>[:CHANnel<Channel>]:NRT:APERture:MODE
```

**Integration Time**

Available if [Integration Time Mode](#) is set to "User".

Defines the integration time for a single measurement.

Remote command:

```
CALCulate<Measurement>[:CHANnel<Channel>]:NRT:APERture[:VALue]
```

**Averaging Mode**

Sets the averaging mode.

"User" Define the value under [Averaging Count](#).

"Auto" Determines the average count automatically from the level of the input signal.

Remote command:

```
CALCulate<Measurement>[:CHANnel<Channel>]:AVERage:COUNT:AUTO[:
STATE]
```

**Averaging Count**

Available if [Averaging Mode](#) is set to "User".

Sets the number of readings that are averaged for one measured value. The higher the count, the lower the noise, and the longer it takes to obtain a measured value.

Remote command:

```
CALCulate<Measurement>[:CHANnel<Channel>]:AVERage:COUNT[:VALue]
```

## 8 Saving and recalling settings

When shutting down, the R&S NRX saves the measurement settings. When booting the next time, the R&S NRX uses the settings from the last session. See also [Chapter 3.1.10, "Switching on or off"](#), on page 26.

If you want to return to a defined initial state, perform a preset. See "[Preset](#)" on page 139.

If you want to save specific measurement settings to reuse at another time, save the setup in a file. The R&S NRX offers 20 setup files for this purpose.

Access: [Preset] > "Save / Recall / Preset" dialog

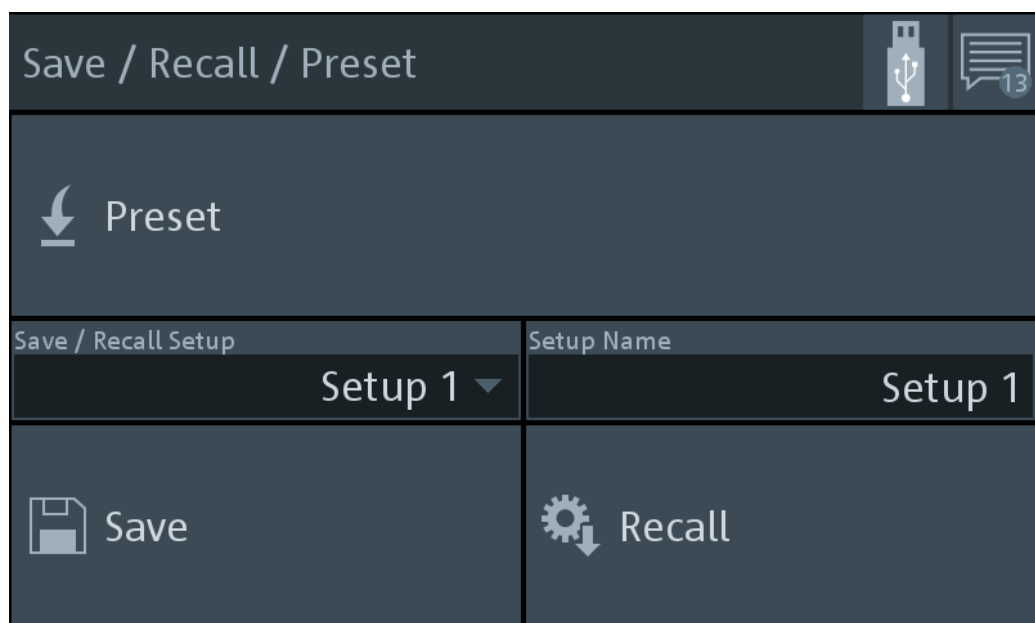


Figure 8-1: Save / Recall / Preset dialog

### To save settings

1. Press [Preset].
2. Under "Save / Recall Setup", select a setup, for example "Setup 2".
3. If you want to give the setup a meaningful name, enter a new name under "Setup Name".
4. Select "Save".

### To recall settings

1. Press [Preset].
2. Under "Save / Recall Setup", select the setup you want to load, for example "Setup 2".

3. Select "Recall".

Preset.....	139
Save / Recall Setup.....	139
Save.....	139
Setup Name.....	139
Recall.....	139

### Preset

Sets the R&S NRX and the connected sensors to a defined initial state. Thus, you can change parameter values from a well defined starting point.

If the default setting of the R&S NRX is not compatible with the sensor, either the default settings are adapted for the sensor or a setting conflict results. See also [Chapter 5.5, "Settings conflict"](#), on page 52.

For details on sensor settings, see the user manual of the sensor.

Remote command:

`SYSTEM:PRESet`

`*RST`

### Save / Recall Setup

Selects the setup file in which the instrument settings are saved.

Remote command:

`MEMORY:STATe:DEFine`

`MEMORY:STATe:MAP`

### Save

Saves the current instrument settings in the selected setup file.

Remote command:

`*SAV`

### Setup Name

Selects the setup file from which to load the instrument settings.

Remote command:

`MEMORY:STATe:DEFine`

`MEMORY:STATe:MAP`

### Recall

Restores the selected instrument settings.

Remote command:

`*RCL`

## 9 Zeroing sensors

Zeroing removes offset voltages from the analog circuitry of the sensors, so that there are only low powers displayed when there is no power applied.

Zeroing is recommended if:

- The temperature has varied by more than 5 K.
- The sensor has been replaced.
- No zeroing was performed in the last 24 hours.
- Signals of very low power are to be measured, for instance, if the expected measured value is less than 10 dB above the lower measurement range limit.

Access: [Zero] > "Zeroing Sensors" dialog

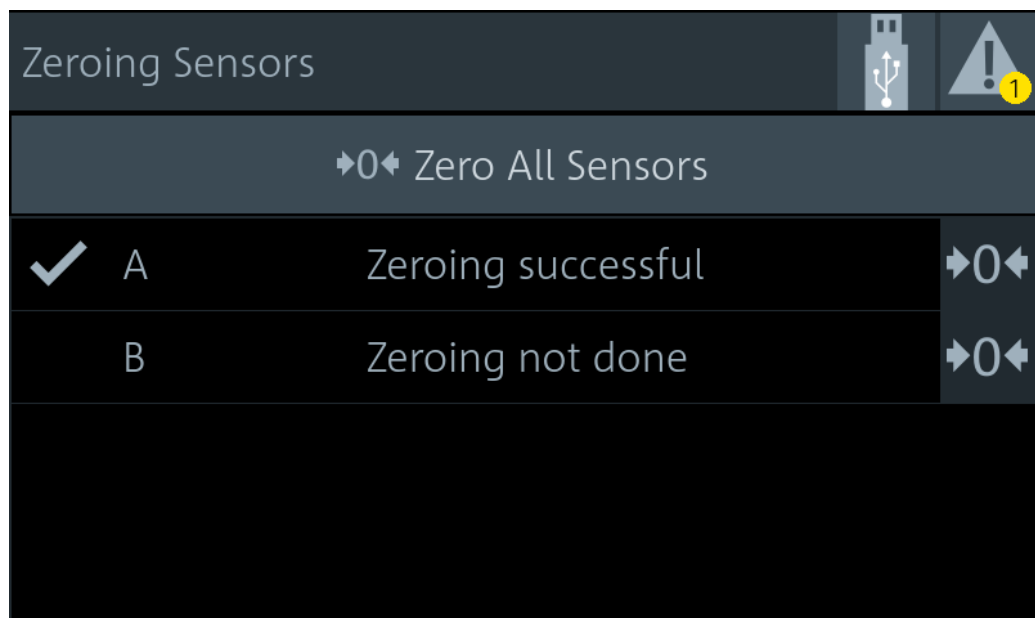


Figure 9-1: Zeroing Sensors dialog

The table below "Zero All Sensors" shows all connected sensors with:

- Port name, A to D
- Zeroing status: not done, in progress, successful


Sensors zeroed successful are also checked:

### To zero sensors

1. Disconnect the sensors that you want to zero from all power sources. Any signals present at the RF input of a sensor is taken into account. You can either switch off the RF output of a DUT or disconnect the sensor physically from any power source.

**Note:** An active test signal during zeroing causes an error.

2. Press [Zero].

3. You can zero an individual sensor or all sensors at once:
  - Select "Zero All Sensors".
  - Select  in the row of the sensor that you want to zero.

The status changes from in progress to successful.

Remote command:

- See [Chapter 12.11, "Zeroing"](#), on page 405.

## 10 System settings

The system settings do not affect the measurements directly.

Access: [System]

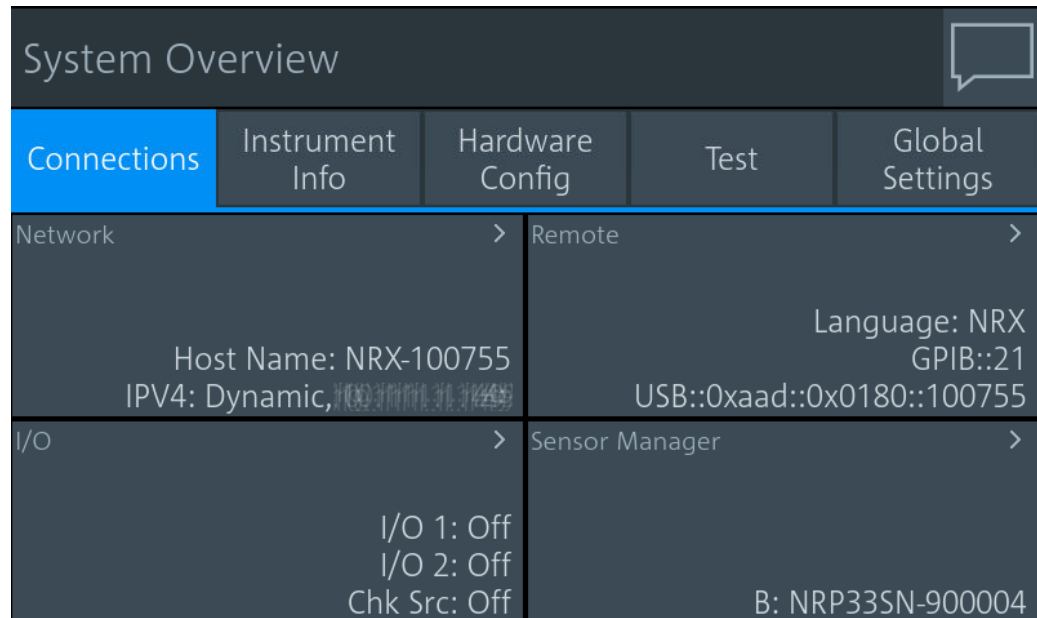


Figure 10-1: System Overview dialog

The "System Overview" dialog provides access to:

- [Connections configuration](#).....142
- [Instrument information](#).....162
- [Instrument security management](#).....167
- [Option management](#).....176
- [User interface tests](#).....180
- [Global settings](#).....182

### 10.1 Connections configuration

Access: [System] > "Connections"

See [Figure 10-1](#).

On this tab, you can display and configure the following settings:

- [Network settings](#).....143
- [Remote settings](#).....146
- [Input/output settings \(I/O\)](#).....149
- [Sensor management](#).....155

### 10.1.1 Network settings

Access: [System] > "Connections" > "Network"

Contains the settings for integrating the R&S NRX in a network. There are two methods to establish a network connection between R&S NRX and computer:

- ▶ Connect both to a common network (infrastructure network).
- ▶ Connect R&S NRX and computer only over the switch (peer-to-peer network).  
In this case, the use of a static IP address is recommended.

Connection errors can affect the entire network. If your network does not support DHCP, or if you choose to disable dynamic TCP/IP configuration, assign a valid address information before connecting the R&S NRX to the LAN. Contact your network administrator to obtain valid IP addresses.

After integrating the R&S NRX into a network, you can set up the following connections:

- Remote control connection to control the R&S NRX using SCPI commands.  
See [Chapter 4.3, "Remote control"](#), on page 46.
- Remote desktop connection for remote operation or file transfer.  
See [Chapter 4.2, "Remote operation"](#), on page 45.

The "Network" dialog is divided into the following tabs:

Overview tab.....	144
L Host Name.....	144
L IP Address.....	144
L Default Gateway.....	145
L DNS Server.....	145
IPv4 tab.....	145
L Address Mode.....	145
L DNS Suffix.....	145
L IPv4 Address.....	146
L Subnet Mask.....	146
L Default Gateway.....	146
L DNS Server.....	146

**Overview tab**

Network	
Overview	IPv4
Host Name	RSPowerMeter
IP Address	Dynamic, [0011111111111111]
Default Gateway	[100111110011]
DNS Server	[100002211000]

Apart from the [Host Name](#), the other parameters are only displayed here. Configure them on the ["IPv4 tab"](#) on page 145.

**Host Name ← Overview tab**

Sets the individual hostname of the R&S NRX.

In a LAN that uses a domain name system server (DNS server), you can access each connected instrument using a unique hostname instead of its IP address. The DNS server translates the hostname to the IP address. Using a hostname is especially useful if a DHCP server is used, as a new IP address can be assigned each time the R&S NRX is restarted.

For the default hostname, see [Chapter 3.2.2.7, "Name plate"](#), on page 34.

When you change the hostname, the R&S NRX restarts its connection to the network, which can take several seconds. During this time, you cannot address the R&S NRX. After the restart, you can only address the R&S NRX using the newly set hostname.

**Note:** It is recommended that you do not change the default hostname to avoid problems with the network connection. However, if you change the hostname, be sure to use a unique name.

Remote command:

```
SYSTem:COMMunicate:NETWork[:COMMon]:HOSTname
```

**IP Address ← Overview tab**

Displays the IP address, and whether it is static or dynamic.

Set the parameters under:

- ["Address Mode"](#) on page 145
- ["IPv4 Address"](#) on page 146



**Default Gateway ← Overview tab**

Displays the IP address of the default gateway of the local subnet. Set the parameter under "[Default Gateway](#)" on page 146.

**DNS Server ← Overview tab**

Displays the IP address of the DNS server of the local subnet. Set the parameter under "[DNS Server](#)" on page 146.

**IPv4 tab**

Network	
Overview	IPv4
Address Mode	DNS Suffix
Dynamic Static	
IPv4 Address	
Subnet Mask	Default Gateway
DNS Server	

Addresses consist of 4 number blocks separated by dots. In maximum, each block contains 3 digits, for example *100.100.100.100*. Fewer digits in a block are also allowed.

**Address Mode ← IPv4 tab**

Sets how the IP address is assigned.

"Dynamic" Assigns the IP address automatically, provided the network supports the dynamic host configuration protocol (DHCP).

"Static" Enables assigning the IP address manually.

Remote command:

```
SYSTEM:COMMUNICATE:NETWORK[:IPADDRESS]:MODE
```

```
SYSTEM:COMMUNICATE:INET[:SELF]:MODE
```

**DNS Suffix ← IPv4 tab**

Sets the primary DNS suffix that means the domain name. DNS uses the suffix for registration and name resolution to identify the R&S NRX uniquely in the entire network.

Remote command:

```
SYSTEM:COMMUNICATE:NETWORK[:COMMON]:DOMAIN
```

```
SYSTEM:COMMUNICATE:INET[:SELF]:DNS:SUFFIX
```

**IPv4 Address ← IPv4 tab**

Available if "Static" is set under [Address Mode](#).

Sets the IP address of the R&S NRX.

Remote command:

```
SYSTem:COMMunicate:NETWork[:IPAddress][:Address]
SYSTem:COMMunicate:INET[:SELF]:ADDRESS
```

**Subnet Mask ← IPv4 tab**

Available if "Static" is set under [Address Mode](#).

Sets the subnet mask of your local subnet.

Remote command:

```
SYSTem:COMMunicate:NETWork[:IPAddress]:SUBNet:MASK
SYSTem:COMMunicate:INET[:SELF]:SUBNetmask:ADDRESS
```

**Default Gateway ← IPv4 tab**

Available if "Static" is set under [Address Mode](#).

Sets the IP address of the default gateway.

Remote command:

```
SYSTem:COMMunicate:NETWork[:IPAddress]:GATeway
SYSTem:COMMunicate:INET[:SELF]:GATeway:ADDRESS
```

**DNS Server ← IPv4 tab**

Available if "Static" is set under [Address Mode](#).

Sets the DNS server address of your local subnet.

Remote command:

```
SYSTem:COMMunicate:NETWork[:IPAddress]:DNS
SYSTem:COMMunicate:INET[:SELF]:DNS:ADDRESS
```

## 10.1.2 Remote settings

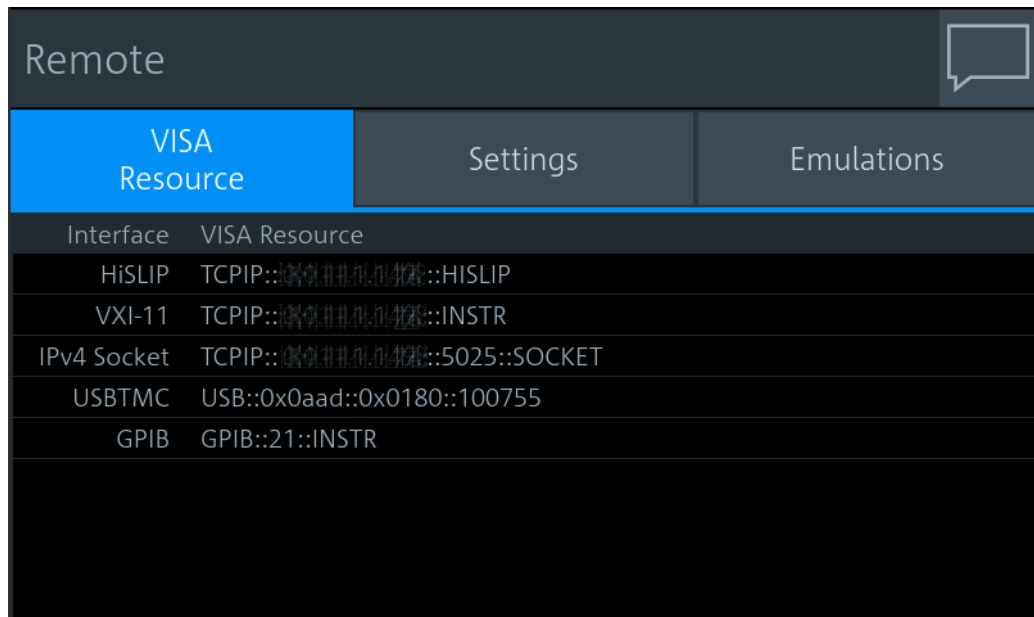
Access: [System] > "Connections" > "Remote"

Contains the settings for remote control.

The "Remote" dialog is divided into the following tabs:

VISA Resource tab.....	147
L Interface - VISA Resource table.....	147
Settings tab.....	147
L GPIB Address.....	148
Emulations tab.....	148
L Language.....	148
L Language Specific Settings.....	148
L Customization of *IDN?.....	149
L Customization of *OPT?.....	149
L Custom IDN String.....	149
L Custom OPT String.....	149

## VISA Resource tab



Interface	VISA Resource
HiSLIP	TCPIP:: <b>192.168.1.100</b> ::HISLIP
VXI-11	TCPIP:: <b>192.168.1.100</b> ::INSTR
IPv4 Socket	TCPIP:: <b>192.168.1.100</b> ::5025::SOCKET
USBTMC	USB::0x0aad::0x0180::100755
GPIB	GPIB::21::INSTR

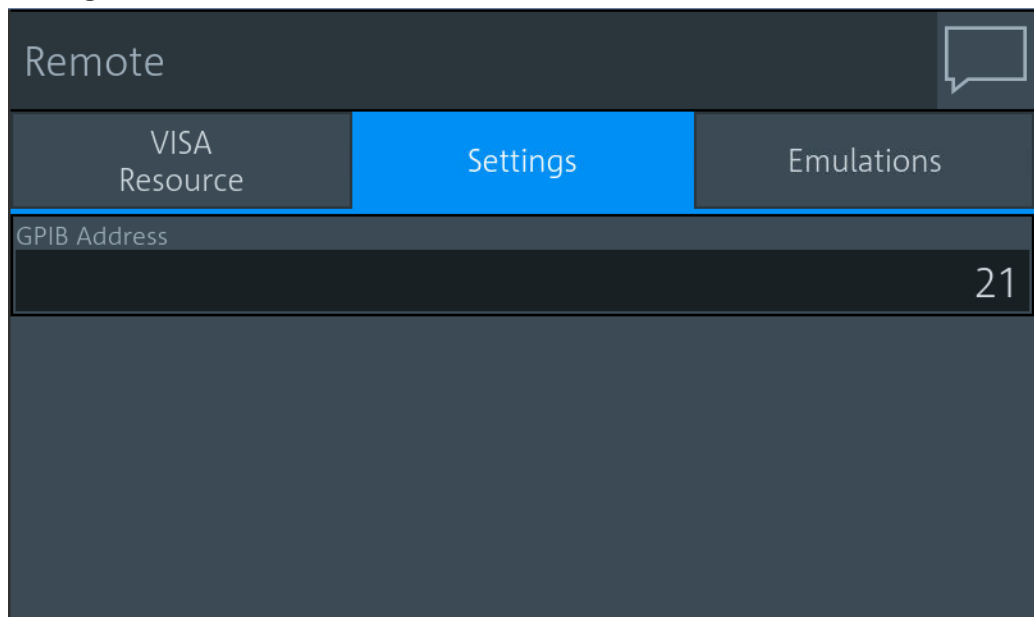
## Interface - VISA Resource table ← VISA Resource tab

Displays the VISA resource strings of the interfaces available for remote control.

In a LAN, the VISA resource string is required to establish a communication session between the controller and the R&S NRX. The resource string is a unique identifier, composed of the specific IP address of the instrument and some network and VISA-specific keywords. The resource string depends on the interface used for remote control.

For details on the strings, see [Table 13-1](#).

## Settings tab



GPIB Address
21

**GPIB Address ← Settings tab**

Sets the GPIB address.

See also [Chapter 13.1.3, "GPIB interface"](#), on page 485.

"1" to "30" Channel address

Remote command:

`SYSTem:COMMunicate:GPIB[:SELF]:ADDRes`

**Emulations tab**

Remote	
VISA Resource	Settings
<b>Emulations</b>	
Language Keysight N1911A ▼	Language Specific N8482A / N8482H >
Customization of *IDN? <input type="checkbox"/> Off <input type="checkbox"/> User <input type="checkbox"/> Set to Default	Customization of *OPT? <input type="checkbox"/> Off <input type="checkbox"/> User <input type="checkbox"/> Set to Default
Custom IDN String	
Custom OPT String	

**Language ← Emulations tab**

Sets the language for the remote commands. See also [Chapter 12.16, "Remote emulation"](#), on page 441.

"Rohde & Schwarz NRX"

Native remote command set of the R&S NRX, based on the standard commands for programmable instruments (SCPI-99).

"Rohde & Schwarz NRP2", "Rohde & Schwarz NRP"

Emulation for a predecessor

"Keysight N432A", "Keysight 1911A", "Keysight N1912A", "Keysight E4418B", "Keysight E4419B"

Requires the R&S NRX-K301 Keysight emulation mode.  
Emulation of a Keysight power meter.

Remote command:

`SYSTem:LANGuage`

**Language Specific Settings ← Emulations tab**

Available if [Language](#) is set to the emulation of a Keysight power meter.

Requires the R&S NRX-K301 Keysight emulation mode.

Opens the "Language Specific Settings" dialog to configure the response to the `SERVICE:SENSOR[1]|2:TYPE?` query for channel A and channel B. Default setting for channel A is N8482A.

#### Customization of \*IDN? ← Emulations tab

Sets which identification string is used.

- "Off" Default identification string
- "User" Customized identification string. Enter the customized instrument identification string under [Custom IDN String](#).
- "Set to Default" Sets the content of [Custom IDN String](#) to the default identification string.

Remote command:

`SYSTEM:IDN:MODE`

`SYSTEM:IDN:AUTO`

#### Customization of \*OPT? ← Emulations tab

Sets which option string is used.

- "Off" Default option string
- "User" Customized option string. Enter the customized option string under [Custom OPT String](#).
- "Set to Default" Sets the content of [Custom OPT String](#) to the default identification string.

Remote command:

`SYSTEM:OPT:MODE`

`SYSTEM:OPT:AUTO`

#### Custom IDN String ← Emulations tab

Available if [Customization of \\*IDN?](#) is set to "User".

Sets the customized instrument identification string so that you can identify each R&S NRX individually.

Remote command:

`SYSTEM:IDN:ANSWER`

#### Custom OPT String ← Emulations tab

Available if [Customization of \\*OPT?](#) is set to "User".

Sets the customized option identification string.

Remote command:

`SYSTEM:OPT:ANSWER`

### 10.1.3 Input/output settings (I/O)

Access: [System] > "Connections" > "I/O"

The "I/O" dialog is divided into the following tabs:

Sensor Check Source tab.....	150
L Signal Output.....	150
L Frequency.....	151
L Measurement for Preview.....	151
L Power Level.....	151
L Sensor Check Source Info.....	151
I/O 1, I/O 2 tabs.....	152
L Mode.....	152
L Measurement for Recorder Output.....	153
L 0 V Equivalent.....	153
L 2.5 V Equivalent.....	153
L Measurement for Limit Output.....	154
L Fail Voltage.....	154
L Trigger Source for Trigger Output.....	154
L Impedance for Trigger Input.....	154

### Sensor Check Source tab

Requires the R&S NRX-B1 sensor check source. If the option is installed, this tab is displayed as the first tab.

Configures the R&S NRX-B1 sensor check source that is installed in the module bay. See "[R&S NRX-B1 sensor check source](#)" on page 28.

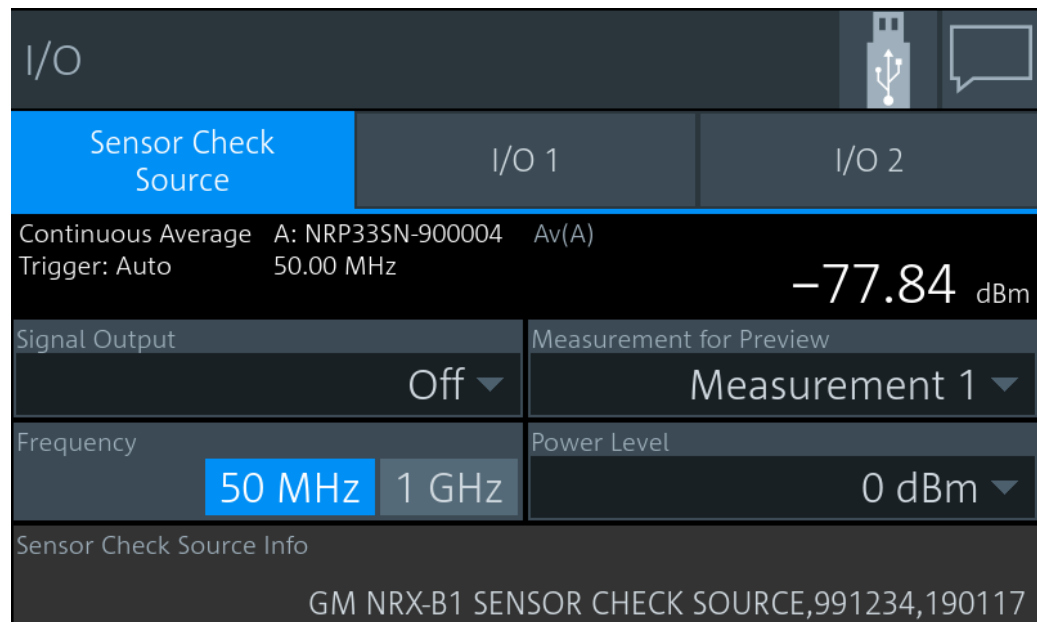


Figure 10-2: Sensor Check Source tab

In the upper pane, the result display shows the effect of parameter changes on the measurement.

### Signal Output ← Sensor Check Source tab

Disables the output or sets the signal type, continuous wave or pulses.

Remote command:

`SOURce:OUTPut:STATe`

`OUTPut:SOURce:STATe`

`SOURce:PULM:STATe`

#### Frequency ← Sensor Check Source tab

Sets the frequency of the output signal.

Remote command:

`SOURce[:RF]:FREQuency[:VALue]`

#### Measurement for Preview ← Sensor Check Source tab

Selects the measurement that is displayed in the upper right corner.

#### Power Level ← Sensor Check Source tab

Sets the power level for the output signal.

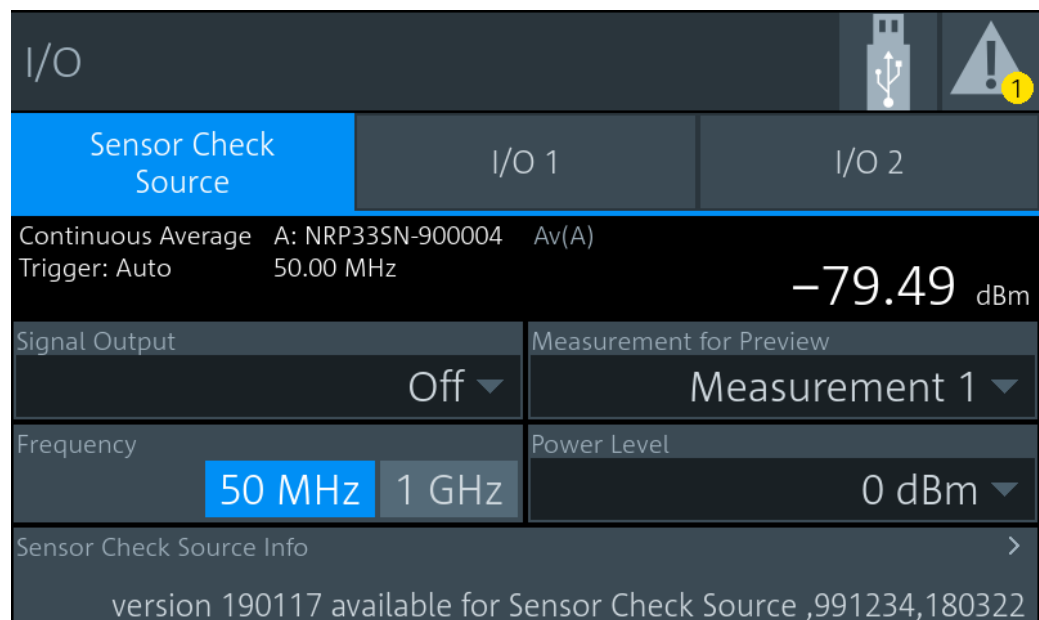
Remote command:

`SOURce:POWer[:VALue]`

`SOURce:UNIT:POWer`

#### Sensor Check Source Info ← Sensor Check Source tab

The firmware of the R&S NRX includes a package for the R&S NRX-B1 sensor check source, but the R&S NRX-B1 sensor check source is not updated automatically. If a new version is available, a warning message is displayed in the notification center and the new version is displayed here as shown in [Figure 10-3](#). Select the info field to update the R&S NRX-B1 sensor check source.

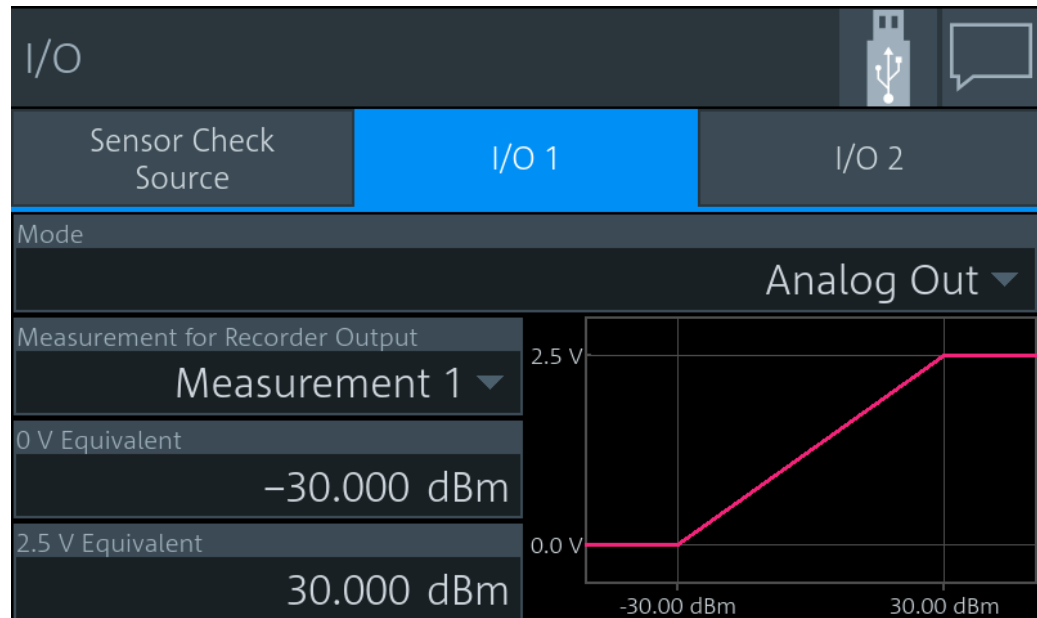


**Figure 10-3: New version available for installation**

**I/O 1, I/O 2 tabs**

Configures the two multifunctional BNC connectors at the rear of the R&S NRX, see [Chapter 3.2.2.2, "Trig In / Out 2 and Out 1 / Trig Out connectors"](#), on page 32.

- Use the "I/O 1" tab for Out 1 / Trig Out connector.
- Use the "I/O 2" tab for Trig In / Out 2 connector.



*Figure 10-4: Example*

**Mode ← I/O 1, I/O 2 tabs**

Sets the functionality of the Out 1 / Trig Out and Trig In / Out 2 connectors.

- "Off" Disables the connector.
- "Analog Out" Available for continuous average, burst average, time gate, timeslot measurements.  
Provides an analog voltage that is proportional to the displayed value.
- "Forw Analog Out", "Refl Analog Out" Available for NRT measurements.  
Provides an analog voltage that is proportional to the displayed value.
- "Limit Violation" (only for Out 1 / Trig Out on "I/O 1" tab) Available for continuous average, burst average, time gate, timeslot measurements.  
Sets the fail voltage that is output if a measured value causes a limit violation.
- "Forw Limit Violation" (only for Out 1 / Trig Out on "I/O 1" tab) Available for NRT measurements.  
Sets the fail voltage that is output if a value of the forward measurement causes a limit violation.
- "Refl Limit Violation" (only for Out 1 / Trig Out on "I/O 1" tab) Sets the fail voltage that is output if a value of the reflection measurement causes a limit violation.



"Trigger Out" (only for Out 1 / Trig Out on "I/O 1" tab)

Provides a trigger signal at the Out 1 / Trig Out connector. Select the trigger source under [Trigger Source for Trigger Output](#).

"Trigger In" (only for Out 1 / Trig Out on "I/O 1" tab)

Apply an external trigger signal at the Trig In / Out 2 connector. Set the termination resistance under [Impedance for Trigger Input](#).

Remote command:

```
[SENSe<Sensor>:] POWer:REFlection:RANGe:LIMit[:STATe]
[SENSe<Sensor>:] POWer[:POWer]:RANGe:LIMit[:STATe]
OUTPut:MODE<output>
```

### Measurement for Recorder Output ← I/O 1, I/O 2 tabs

Available if [Mode](#) is set to:

- "Analog Out"
- "Forw Analog Out"
- "Refl Analog Out"

Sets the measurement of which the results are output.

Remote command:

```
OUTPut:REcorder<output>:FEED:INDEX
```

### 0 V Equivalent ← I/O 1, I/O 2 tabs

Available if [Mode](#) is set to:

- "Analog Out"
- "Forw Analog Out"
- "Refl Analog Out"

Enter the measurement value that corresponds to 0 V output voltage.

Remote command:

```
OUTPut:REcorder<output>:LIMit:LOWer:CCDF
OUTPut:REcorder<output>:LIMit:LOWer:POWer
OUTPut:REcorder<output>:LIMit:LOWer:RATio:RCoefficient
OUTPut:REcorder<output>:LIMit:LOWer:RATio:RFRatio
OUTPut:REcorder<output>:LIMit:LOWer:RATio:RLOSs
OUTPut:REcorder<output>:LIMit:LOWer:RATio:SWR
OUTPut:REcorder<output>:LIMit:LOWer:RATio[:VALue]
OUTPut:REcorder<output>:LIMit:LOWer[:VALue]
```

### 2.5 V Equivalent ← I/O 1, I/O 2 tabs

Available if [Mode](#) is set to:

- "Analog Out"
- "Forw Analog Out"
- "Refl Analog Out"

Enter the measurement value that corresponds to 2.5 V output voltage.

Remote command:

```
OUTPut:REcorder<output>:LIMit:UPPer:CCDF
OUTPut:REcorder<output>:LIMit:UPPer:POWer
OUTPut:REcorder<output>:LIMit:UPPer:RATio:RCoefficient
OUTPut:REcorder<output>:LIMit:UPPer:RATio:RFRatio
```

```

OUTPut:REcorder<output>:LIMit:UPPer:RATio:RLOSs
OUTPut:REcorder<output>:LIMit:UPPer:RATio:SWR
OUTPut:REcorder<output>:LIMit:UPPer:RATio[:VALue]
OUTPut:REcorder<output>:LIMit:UPPer[:VALue]

```

#### Measurement for Limit Output ← I/O 1, I/O 2 tabs

Available if **Mode** is set to:

- "Limit Violation"
- "Forw Limit Violation"
- "Refl Limit Violation"

Sets the measurement that is monitored.

Remote command:

```

[SENSe<Sensor>:] POWer:REFLection:RANGe:LOWer
[SENSe<Sensor>:] POWer[:POWer]:RANGe:LOWer
[SENSe<Sensor>:] POWer:REFLection:RANGe[:UPPer]
[SENSe<Sensor>:] POWer[:POWer]:RANGe[:UPPer]
OUTPut:LIMit:FEED:INDEX

```

#### Fail Voltage ← I/O 1, I/O 2 tabs

Available if **Mode** is set to:

- "Limit Violation"
- "Forw Limit Violation"
- "Refl Limit Violation"

Sets the fail voltage that is output if a measured value causes a limit violation.

"Low"	0 V
"High"	3.3 V

Remote command:

```

[SENSe<Sensor>:] POWer:REFLection:RANGe:AUTO
[SENSe<Sensor>:] POWer[:POWer]:RANGe:LIMit:DETECT
OUTPut:LIMit:FAIL

```

#### Trigger Source for Trigger Output ← I/O 1, I/O 2 tabs

Available if **Mode** is set to "Trigger Out".

Sets the trigger source.

Remote command:

```

OUTPut:TRIGger:SOURce

```

#### Impedance for Trigger Input ← I/O 1, I/O 2 tabs

Available if **Mode** is set to "Trigger In".

Sets the termination resistance of the external trigger signal that is supplied at the Trig In / Out 2 connector. Choose a setting that fits the impedance of the trigger source to minimize reflections on the trigger signals.

Remote command:

```

INPut<undef>:TRIGger:IMPedance

```

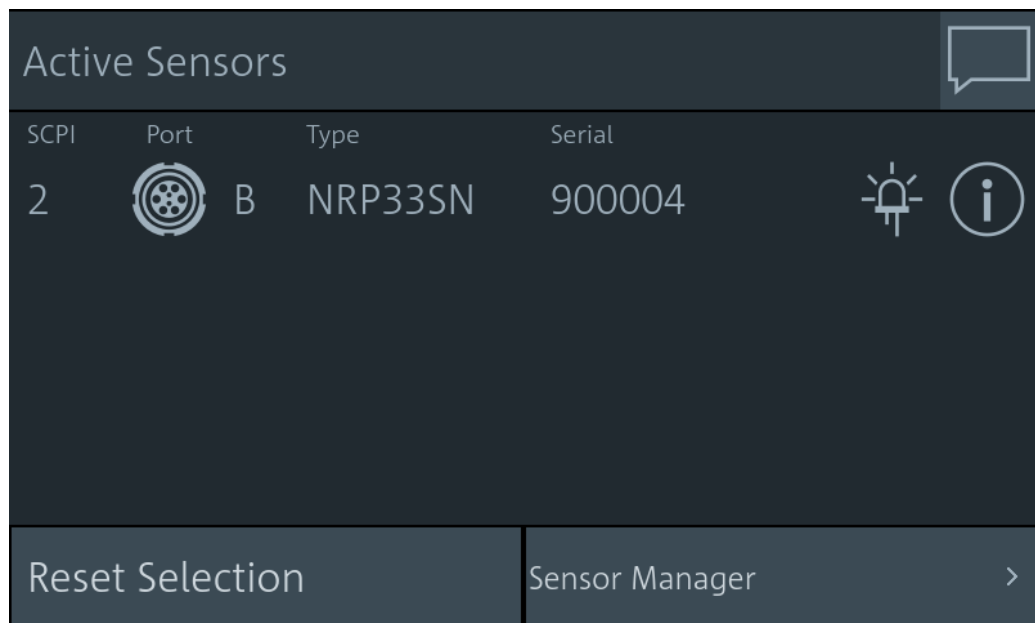
### 10.1.4 Sensor management

Access: [System] > "Connections" > "Sensor Manager"

Helps you to manage sensors, for example if:

- R&S NRX does not support parallel measurements.
- R&S NRX supports two parallel measurements, but four sensors are connected.
- You want to assign a LAN sensor.

See also [Chapter 5.1, "Parallel measurements"](#), on page 48.





*Figure 10-5: Example: R&S NRX that does not support parallel measurements*

In the "Active Sensors" dialog, the R&S NRX displays the sensors that are configured for a measurement. The number of these sensors depends on how many parallel measurements the R&S NRX supports. The R&S NRX recognizes the following configured sensors:

- Connected to the sensor connectors A to D.
- Connected to one of the USB host interfaces; directly or indirectly, by USB hub.

A sensor connected to the same LAN is not recognized automatically. You can add it, see ["To add a LAN sensor"](#) on page 156. After disconnecting and reconnecting the LAN sensor or restarting the R&S NRX, you have to add the LAN sensor again.

**Table 10-1: Information given in the Active Sensors dialog**

Column	Description
"SCPI"	The <Sensor> suffix matches the assigned port letter. Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100
"Port"	Symbol and letter of the assigned port. The same letter is assigned to the measurement pane. <ul style="list-style-type: none"> <li>• A to D: Sensors connected to sensor connectors are assigned the letter of the sensor connector.</li> <li>• E to Z: Assigned to sensors connected to USB and LAN ports.</li> </ul>
"Type"	Sensor type
"Serial"	Serial number of the sensor
	LED icon Select to identify a connected sensor. If the sensor has a status LED, it flashes yellow for 5 seconds.
	Info icon Select to open the "Sensor Info" dialog, see " <a href="#">Sensor Info</a> " on page 160.

**To select a sensor**

You have more sensors connected than the number of parallel measurements that the R&S NRX supports. For measuring, you do not need to connect and reconnect the sensors. You can change between the sensors as follows:

1. In the "Active Sensors" dialog, select the sensor you want to replace as active sensor.  
The "Select Sensor" dialog is displayed, see "[Select Sensor](#)" on page 158.
2. Select the sensor that you want to select as the active sensor.
3. Go back to the measurement.

**To add a LAN sensor**

1. In the "Active Sensors" dialog, select "Sensor Manager".  
The "Manage Sensors" dialog is displayed, see "[Manage Sensors](#)" on page 158.
2. Select "Add Sensor".  
The "Add Sensor" dialog is displayed, see "[Add Sensor](#)" on page 159.
3. Enter the hostname or IP address of the sensor.
4. Select "Check Sensor".  
If the sensor is found, the type, firmware version and serial number of the sensor are displayed.
5. Under "ID", you can assign another letter. Otherwise, the R&S NRX assigns the letter automatically.

6. Select "Accept".

**To reset the selection**

- ▶ In the "Active Sensors" dialog, select "Reset Selection".


The R&S NRX scans the ports and updates the contents of the "Active Sensors" dialog accordingly.

**To display information about a sensor**

- ▶ In the "Active Sensors" dialog, select  of the sensor of interest.


The "Sensor Info" dialog is displayed, see ["Sensor Info"](#) on page 160.

**To perform an internal self-test of a sensor**

1. In the "Active Sensors" dialog, select  of the sensor of interest.
2. In the "Sensor Info" dialog, select "Sensor Test".

The "Sensor Test" dialog is displayed, see ["Sensor Test"](#) on page 160.


**To test a sensor with applied RF (without attenuator)**

1. If an attenuator is connected to the sensor, remove it.
2. Connect the sensor to the R&S NRX-B1 sensor check source.
3. In the "Active Sensors" dialog, select  of the sensor connected to the R&S NRX-B1 sensor check source.
4. In the "Sensor Info" dialog, select "Sensor Test at Check Source".
5. Select "Start Test" to start the test.

The test is performed with sensor standard settings. Therefore, zeroing is performed before the test starts. For test results, see ["Sensor Test at Check Source"](#) on page 161.

**To test a sensor with applied RF (with attenuator)**

This test is only suitable for high-power three-path diode power sensor R&S NRP18S-xx.

1. Connect the attenuator of the sensor to the R&S NRX-B1 sensor check source.
2. In the "Active Sensors" dialog, select  of the R&S NRP18S-xx.
3. In the "Sensor Info" dialog, select "... with Attenuator".
4. Select "Start Test" to start the test.

The test is performed with sensor standard settings. Therefore, zeroing is performed before the test starts. For test results, see ["... with Attenuator"](#) on page 161.

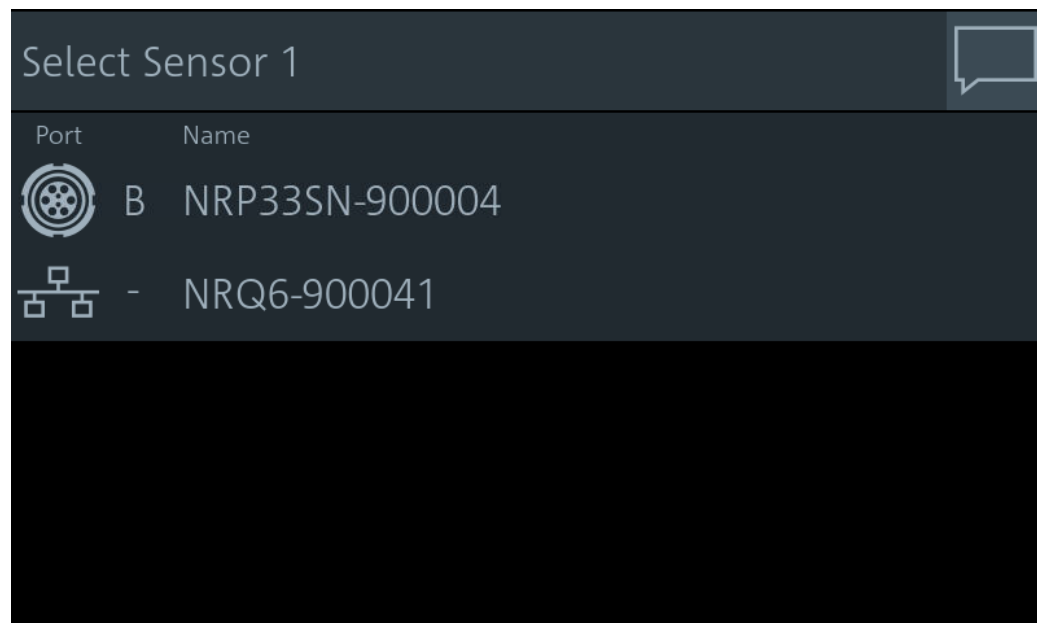
**The sensor manager gives access to:**

Select Sensor.....	158
Manage Sensors.....	158
Add Sensor.....	159
Sensor Info.....	160
L Sensor Test.....	160
L Sensor Test at Check Source.....	161
L ... with Attenuator.....	161

**Select Sensor**

Access: In the "Active Sensors" dialog, select a sensor entry.

Displays all connected sensors. Select a sensor as active sensor, see ["To select a sensor"](#) on page 156.



*Figure 10-6: Example: Changing the active sensor on an R&S NRX that does not support parallel measurements*

**Manage Sensors**

Access: [System] > "Connections" > "Sensor Manager" > "Sensor Manager"

Shows all active sensors with their hostname.

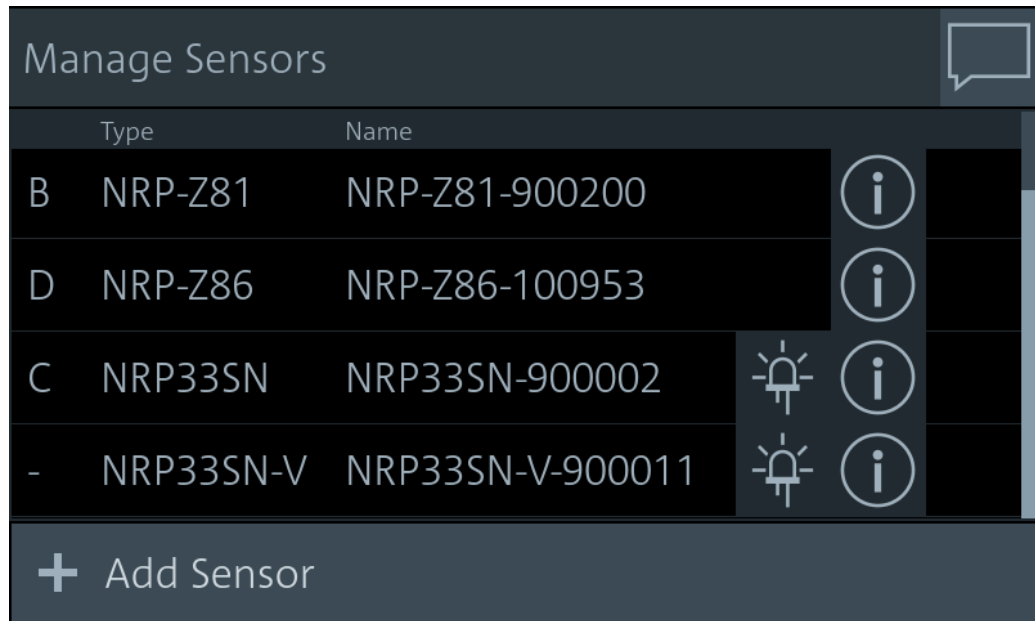
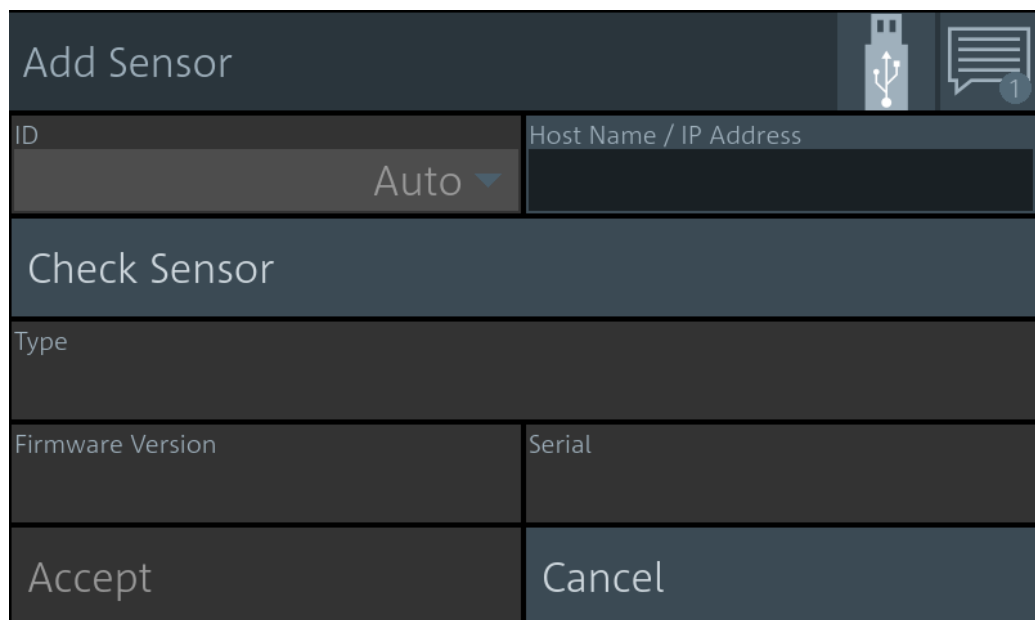


Figure 10-7: Example: Assigning a LAN sensor on an R&S NRX with 4 simultaneous measurements allowed

### Add Sensor

Access: [System] > "Connections" > "Sensor Manager" > "Sensor Manager" > "Add Sensor"

Add a LAN sensor, see ["To add a LAN sensor"](#) on page 156.



Remote command:

[SENSe<Sensor>:]ADD

**Sensor Info**

Access: [System] > "Connections" > "Sensor Manager" > ⓘ

Displays information about the selected sensor, including calibration data.

Sensor Info			
Connector	ID	Cal. Abs.	2015-07-08
Sensor A	A	Cal. Due Date	2017-07
Type	NRP33SN	Cal. Lin.	not applicable
Serial	Firmware Version	Cal. Misc.	2015-07-08
900004	03.00.231218	Cal. Refl.	2015-07-08
Sensor Name	NRP33SN-900004	Cal. S-Para.	not applicable
Sensor Test	>	Cal. S-Para. (User)	not applicable
Sensor Test at Check Source	>	Cal. Temp.	not applicable
		Coupling	AC
		Function	Power Terminating
		...	with Attenuator >

Remote command:

`SYSTem:SENSor<Sensor>:INFO?`

**Sensor Test ← Sensor Info**

Access: [System] > "Connections" > "Sensor Manager" > ⓘ > "Sensor Test"

When started, performs an internal self-test of the connected sensor. The internal self-test provides detailed information that you can use for troubleshooting. Do not apply a signal during the internal self-test.

Sensor Test			
Type	NRP33SN	Calibration Data:	
Serial	900004	Integrity of Factory Calibration Data Set:	
Firmware Version	03.00.231218	Integrity of User Calibration Data Set:	
Test Verdict	PASS	Operating Voltages:	
Sensor Name	NRP33SN-900004	+3V3_VCC_MIO:	PASS (+3.32 V)
		+1V8_PS:	PASS (+1.77 V)
		+1V0_PS:	PASS (+0.97 V)
		+3V3_VCC_13:	PASS (+3.33 V)
		+2V5_VCC_34:	PASS (+2.42 V)
		+1V8_VCC_35:	PASS (+1.81 V)
		+1V8_PL:	PASS (+1.75 V)
		+1V0_PL:	PASS (+0.97 V)
		+1V0_L_PRR00_0005:	PASS (+1.80 V)
		▶ Start Test	



"Test Verdict" Shows the status of the self-test.

Remote command:

`SYSTem:SENSor<Sensor>:TEST?`

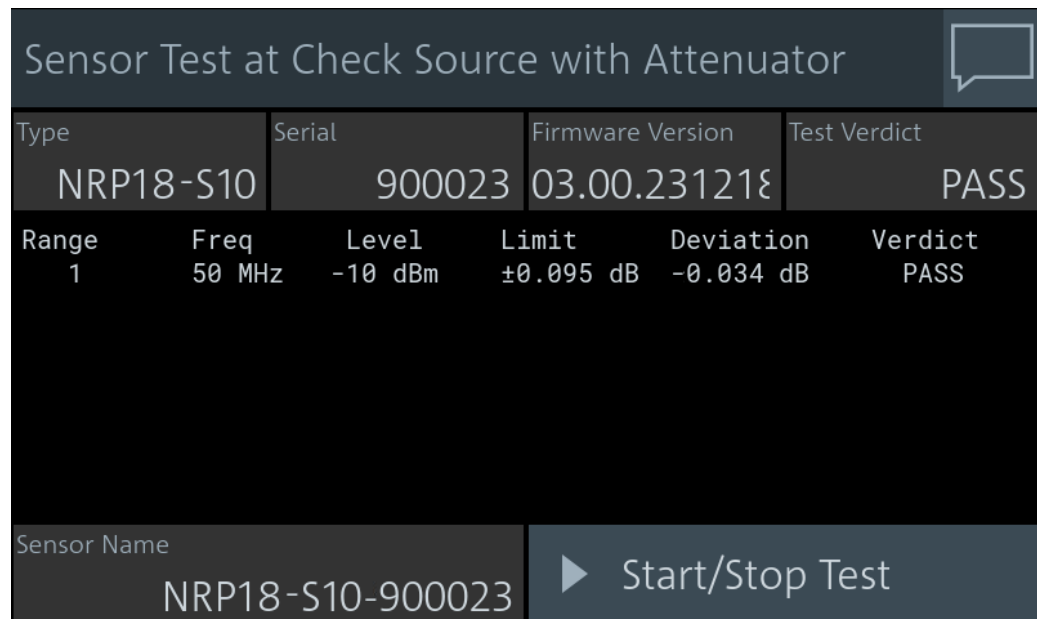
`TEST:SENSor<Sensor>?`

#### Sensor Test at Check Source ← Sensor Info

Access: [System] > "Connections" > "Sensor Manager" >  > "Sensor Test at Check Source"

Requires the R&S NRX-B1 sensor check source.

When started, performs a test of the connected sensor with the RF reference signal of the R&S NRX-B1 sensor check source applied.



Type	Serial	Firmware Version	Test Verdict
NRP18-S10	900023	03.00.231218	PASS

Range	Freq	Level	Limit	Deviation	Verdict
1	50 MHz	-10 dBm	±0.095 dB	-0.034 dB	PASS

Sensor Name: NRP18-S10-900023

Start/Stop Test

The test checks all measurement paths of a multipath sensor. The R&S NRX reads the limit for each measurement path from the sensor. If the deviation exceeds the limit, the test is failed.

See also ["To test a sensor with applied RF \(without attenuator\)"](#) on page 157.

#### ... with Attenuator ← Sensor Info

Access: [System] > "Connections" > "Sensor Manager" >  > "... with Attenuator"

Requires the R&S NRX-B1 sensor check source. The test is only suitable for a high-power three-path diode power sensor R&S NRP18S-xx. If another sensor is tested, the R&S NRX reports that no test cases are defined.

When started, performs a test of the connected R&S NRP18S-xx with the RF reference signal of the R&S NRX-B1 sensor check source applied.

Sensor Test at Check Source with Attenuator

Type	Serial	Firmware Version	Test Verdict		
NRP18-S10	900023	03.00.23121E	PASS		
Range	Freq	Level	Limit	Deviation	Verdict
1	50 MHz	-10 dBm	±0.095 dB	-0.034 dB	PASS

Sensor Name: NRP18-S10-900023

Start/Stop Test

The test checks only one path of the R&S NRP18S-xx. The R&S NRX reads the limit for this measurement path from the sensor. If the deviation exceeds the limit, the test is failed.

See also ["To test a sensor with applied RF \(with attenuator\)"](#) on page 157.

## 10.2 Instrument information

Access: [System] > "Instrument Info"

For displaying information on a connected sensor, see ["Sensor Info"](#) on page 160.

System Overview

Connections	Instrument Info	Hardware Config	Test	Global Settings
System >				
Dev Id: 1424.7005K02-900001-ML				
Fw Ver:02.40.20090401.beta				
*IDN?: Rohde&Schwarz,NRX,1424.7005k02/900001,02.40.20090401.beta				
Security >		Options >		
LAN Services: On		B1,B4,B8,K2,K4,K301		
USB Storage: Off				
User Interface: Enabled		Help & Copyrights >		
Volatile Mode: Off				

On this tab, you can display and configure the following settings:

- [System information](#)..... 163
- [Help & copyrights](#)..... 165
- [Hardware configuration](#)..... 166

### 10.2.1 System information

Access: [System] > "Instrument Info" > "System"

Displays a list of instrument-specific parameters.

System Info	
Manufacturer	Rohde&Schwarz
Type	NRX
Stock Number	1424.7005K02
HW Version	06.00
CPLD Version	2
Serial	100755
Device ID	1424.7005K02-100755-qy
SW Build	02.60.23022501.beta
Options	NRX-B1,NRX-B4,NRX-B8,NRX-K2,NRX-K4
Date and Time Settings >	
2023-03-02 / 15:36:26 / Berlin	

<a href="#">System Info</a> .....	163
<a href="#">Date and Time Settings</a> .....	164
L <a href="#">Date</a> .....	164
L <a href="#">Time</a> .....	165
L <a href="#">Time Zone Region</a> .....	165
L <a href="#">Time Zone</a> .....	165

#### System Info

Displays the information on the R&S NRX:

- "Manufacturer"
- "Type"
- "Stock Number"  
See [Chapter 3.2.2.7, "Name plate"](#), on page 34.
- "HW Version"
- "CPLD Version"  
Complex programmable logic device (CPLD) version
- "Serial"
- "Device ID"  
See [Chapter 3.2.2.7, "Name plate"](#), on page 34.

- "SW Build"  
Version of software build
- "Options"  
Short names of the installed options
- "MAC Address"  
Ethernet hardware address
- "Hostname"  
See "Host Name" on page 144.
- "IP Address"  
See "IP Address" on page 144.
- "\*IDN?"  
Instrument identification string: <manufacturer>,NRX,<serial number>,<firmware version>
- "\*OPT?"  
Option identification string; lists the installed options: <option 1>, <option 2>,....
- "Uptime"  
Operating time of the R&S NRX

Remote command:

`SYSTem:INFO[:INFO]?`

`SYSTem:DID?`

`SYSTem:DEVIce:ID?`

### Date and Time Settings

Opens the "Date and Time" dialog.

Date and Time	
Date	2023-03-01
Time	15:56:56
Time Zone Region	Europe ▼
Time Zone	Paris ▼

### Date ← Date and Time Settings

Sets the date in the format YYYY-MM-DD.

Remote command:

`SYSTem:DATE`

`SYSTem:DATE:UTC`

`SYSTem:DATE:LOCAl`

#### **Time ← Date and Time Settings**

Sets the time in the format HH:MM:SS.

Remote command:

`SYSTem:TIME`

`SYSTem:TIME:UTC`

`SYSTem:TIME:LOCAl`

#### **Time Zone Region ← Date and Time Settings**

Sets the time zone region.

Remote command:

`SYSTem:TIME:DSTime:RULE`

`SYSTem:TIME:DSTime:RULE:CATAlog?`

#### **Time Zone ← Date and Time Settings**

Sets the time zone.

Remote command:

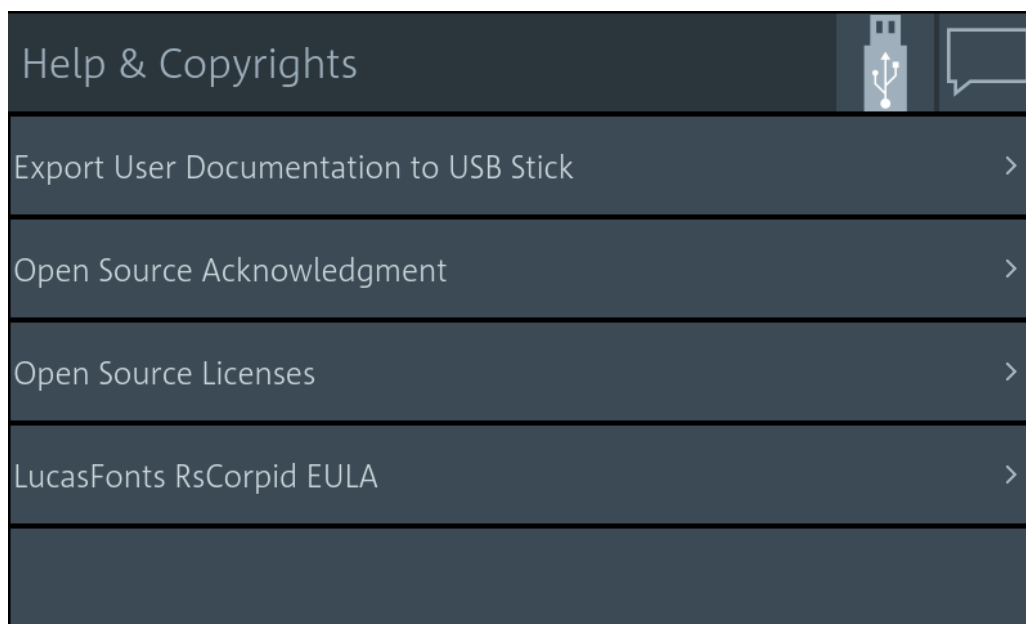
`SYSTem:TIME:DSTime:RULE`

`SYSTem:TIME:DSTime:RULE:CATAlog?`

## **10.2.2 Help & copyrights**

Access: [System] > "Instrument Info" > "Help & Copyrights"

Gives access to the user manual, open source acknowledgment and license information.



<a href="#">Export User Documentation to USB Stick</a> .....	166
<a href="#">Open Source Acknowledgment</a> .....	166
<a href="#">Open Source Licenses</a> .....	166
<a href="#">LucasFonts RsCorpid EULA</a> .....	166

#### **Export User Documentation to USB Stick**

Downloads the user manual to a connected USB flash drive. If no USB flash drive is connected, the file is saved to the volatile directory of the FTP directory. Information to the download is displayed in the "Notification Center". See also [Chapter 4.1.4, "Notification center"](#), on page 39.

#### **Open Source Acknowledgement**

Displays the open source acknowledgment.

#### **Open Source Licenses**

Displays the license texts of open source software packages used in the R&S NRX software. Under "Component", select the open source software package you want to display the license text of.

#### **LucasFonts RsCorpid EULA**

Displays the end user license agreement (EULA) of LucasFonts.

### **10.2.3 Hardware configuration**

Access: [System] > "Hardware Config"

System Overview				
Connections	Instrument Info	Hardware Config	Test	Global Settings
Assembly		Part Number	Serial	Revision
GM NRX POWER METER		1424.7005.02	100672	06.00
NJ PSU-0251-02 PSU 1X 75W 12.2V 6.15		1416.0870.00	128972	07.00
ED MAINBOARD NRX		1424.7405.02	100830	03.09
ED VERBUNDUNGSBOARD NRX		1424.7511.02	100944	03.01
ED SENSORBUCHSENEINHEIT		1424.7663.02	101203	03.00
ED USB CONNECTOR BOARD		1424.8001.02	101311	02.02
ED TASTENFELD FUER NRX		1424.8101.02	101142	02.01
ED ADAPTER DISPLAY NRX		1424.8224.02	101086	02.01
ND TFT 5.0 INCH WVGA RGB I2C TC		3623.4742.00	102035	01.00

Lists the hardware details of the R&S NRX assemblies. This tab can be useful for looking up the revision of hardware, for example when troubleshooting.

## 10.3 Instrument security management

The individual settings are described in [Chapter 10.3.5, "Security settings"](#), on page 171.

### 10.3.1 Protecting security-relevant settings

All security settings are protected by the security password. Before you can change a security setting, you have to unlock the security settings by entering the security password. When you leave the "Security" dialog, the settings are locked automatically.

The preconfigured security password is *123456*.



We recommend that you change the preconfigured security password before connecting the R&S NRX to a network.

#### To unlock the security settings for editing

1. Select [System] > "Instrument Info" > "Security" > "General".
2. Enter the security password.

All settings in the "Security" dialog are enabled for editing.

### To change the security password

1. Unlock the security settings. See ["To unlock the security settings for editing"](#) on page 167.
2. Change to the "Security password" tab.
3. Enter the new security password.
4. Select "Change Password" to assign the new password.

## 10.3.2 Managing instrument access

The R&S NRX offers the several possibilities to prevent unauthorized access.

### 10.3.2.1 Setting the instrument password

The instrument password is required for logon and accessing the R&S NRX, for example by VNC, browser or FTP.

The preconfigured instrument password is *instrument*.



We recommend that you change the preconfigured instrument password before connecting the R&S NRX to a network.

### To change the instrument password

1. Unlock the security settings. See ["To unlock the security settings for editing"](#) on page 167.
2. Change to the "Instrument password" tab.
3. Enter the new instrument password.
4. Select "Change Password" to confirm the new password.

### 10.3.2.2 Managing storage devices

#### USB storage

You can allow saving and reading files from USB storage, or you can restrict saving and reading files to the internal memory.

#### To disable file transfer using USB storage

1. Unlock the security settings. See ["To unlock the security settings for editing"](#) on page 167.
2. Select "Off".



### Non-volatile and volatile memory

For saving changed settings, you can select between the non-volatile and the volatile memory.

- Volatile memory: Deleted after reboot. Use the volatile mode if you want to reboot with a defined configuration for a measurement setup, regardless of any settings made manually or by remote control.
- Non-volatile memory: Remains unaffected by a reboot.

### To save changed settings in the volatile memory

1. Unlock the security settings. See ["To unlock the security settings for editing"](#) on page 167.
2. Select "On".
3. Reboot the R&S NRX.

If you change into the volatile mode or back, a reboot is required.

### Sanitizing the internal memory

If you have confidential data on the R&S NRX, you can sanitize the internal memory before removing the R&S NRX from your secure environment. For details, see the [Chapter 2.1.3, "Instrument security procedures"](#), on page 16.

#### 10.3.2.3 Restricting manual and remote operation

For security measures, you can restrict the manual and remote operation allowed at the R&S NRX.


### To restrict manual and remote operation

1. Unlock the security settings. See ["To unlock the security settings for editing"](#) on page 167.
2. Under "User Interface", select the restriction. Restrictions of various degrees are available, see ["User Interface"](#) on page 173.



If you use the R&S NRX in a remote operation session, you can set "Display Only" or "Disabled" to make sure that only authorized persons can interrupt the remote session.

### To lift the restrictions

Restrictions are indicated by .

1. Select the touchscreen or any control.
2. Enter the security password.

The R&S NRX sets "User Interface" to "Enabled".

### 10.3.3 Configuring LAN services

You can enable or disable the LAN services together or individually.

#### To disable all LAN services together

1. Unlock the security settings. See ["To unlock the security settings for editing"](#) on page 167.
2. Change to the "LAN Settings" tab.
3. Under "LAN Services", select "Disabled".

#### To configure a LAN service individually

1. Unlock the security settings. See ["To unlock the security settings for editing"](#) on page 167.
2. Change to the "LAN Settings" tab.
3. Enable or disable the LAN service. Available services see ["LAN Settings tab"](#) on page 173.

#### 10.3.3.1 Data exchange using FTP

You can transfer files from and to the R&S NRX using FTP (file transfer protocol).

The following directories on the R&S NRX are available by FTP:

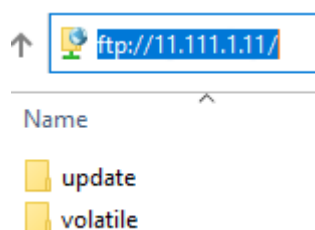
- `/update` directory  
Copy an Rohde & Schwarz update file (`*.rsu`) into this directory. When the copying process is completed, the firmware update starts automatically.
- `/volatile` directory  
Here, the screenshots are saved. You can copy the screenshots to a computer. See also [Chapter 4.1.8, "Creating and saving screenshots"](#), on page 44.



By default, FTP file transfer is enabled. Any user in the network who knows the password and IP address of the R&S NRX can access the R&S NRX directories.

#### To exchange data using FTP

1. Establish a network connection between R&S NRX and computer. See [Chapter 10.1.1, "Network settings"](#), on page 143.
2. On the computer, start the Windows Explorer.
3. In the address field, enter `ftp://<IP address of the instrument>`.  
Example: `ftp://11.111.1.11`  
A logon dialog opens and requests authentication.
4. Enter the user identification and password.
5. Access the directory of your choice.



### 10.3.4 Securing the firmware update

New firmware packages have an R&S signature. Old firmware packages remain unsigned. By default, the R&S NRX allows you to install only firmware packages with a valid R&S signature. Firmware packages with an invalid signature or no signature are rejected. If you want to install an older firmware package that is unsigned, change the setting as follows.

#### To install unsigned firmware packages

1. Unlock the security settings. See ["To unlock the security settings for editing"](#) on page 167.
2. Under "Secure Update Policy", select "All Packages".



After the firmware installation, set "R&S Signed Packages" again.

### 10.3.5 Security settings

Access: [System] > "Instrument Info" > "Security"

Contains the settings for access rights, LAN security and passwords.

Further information:

- [Chapter 10.3, "Instrument security management"](#), on page 167

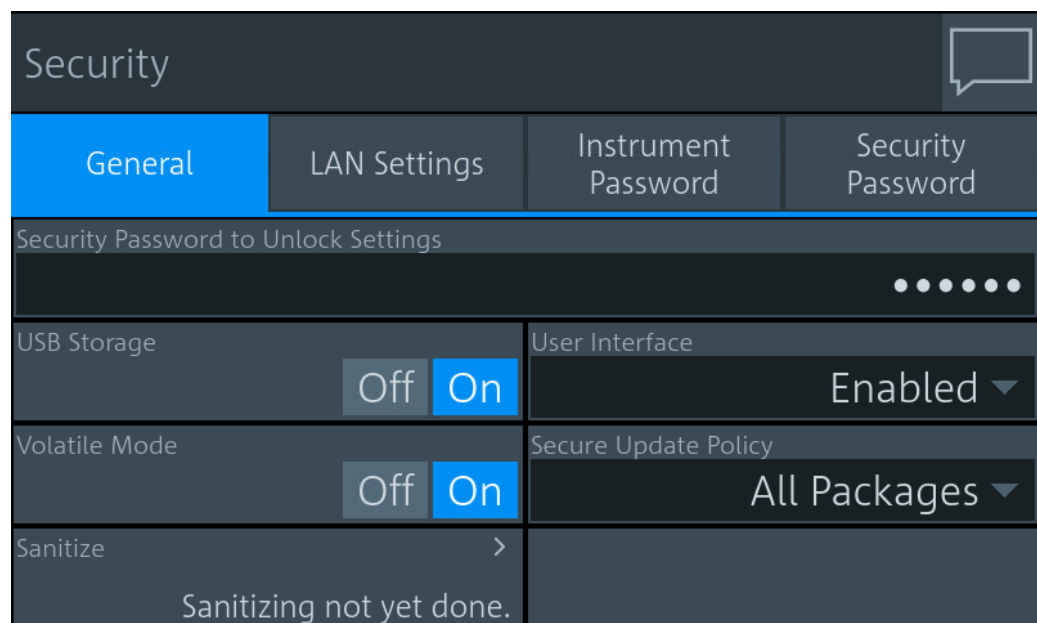
The "Security" dialog is divided into the following tabs:

General tab.....	172
L Security Password to Unlock Settings.....	172
L USB Storage.....	172
L Volatile Mode.....	172
L Sanitize.....	173
L User Interface.....	173
L Secure Update Policy.....	173
LAN Settings tab.....	173
L LAN Services.....	174
L SCPI over LAN.....	174
L VNC.....	174
L SSH.....	174

L	Web Server.....	174
L	Avahi (Zeroconf).....	174
L	Software Update.....	174
	Instrument Password tab.....	175
L	Old Password.....	175
L	New Password.....	175
L	Confirm Password.....	175
L	Change Password.....	175
	Security Password tab.....	175
L	Old Password.....	176
L	New Password.....	176
L	Confirm Password.....	176
L	Change Password.....	176

### General tab

Configures the access rights for storage devices and restrictions for the user interface.



### Security Password to Unlock Settings ← General tab

Enter the password that is required to enable the settings protected by a security password. See also [Chapter 10.3.1, "Protecting security-relevant settings"](#), on page 167.

### USB Storage ← General tab

Enables or disables the file transfer using USB storage. See also ["USB storage"](#) on page 168.

### Volatile Mode ← General tab


If enabled, the R&S NRX saves changed settings in the volatile memory. See also ["Non-volatile and volatile memory"](#) on page 169.

**Sanitize ← General tab**

Sanitizes the internal memory. Sanitization requires the security password. For details, see the [Chapter 2.1.3, "Instrument security procedures"](#), on page 16.

**User Interface ← General tab**

Opens a dialog to restrict the manual and remote operation allowed at the R&S NRX. See also [Chapter 10.3.2.3, "Restricting manual and remote operation"](#), on page 169.

"Enabled"	Enables manual operation. The screen and all manual controls are working. Remote operation is also enabled.
"VNC Only"	Disables manual operation. Remote operation remains enabled. The screen remains on. Anyone at the R&S NRX can read the screen contents.
"Display Only"	Disables manual and remote operation. Both remain blocked until you enter the security password. The screen remains on. Anyone at the R&S NRX can read the screen contents.
"Disabled"	Disables manual and remote operation. Both remain blocked until you enter the security password. The screen only displays a padlock symbol  , thus preventing unauthorized reading.

Remote command:

See [Chapter 12.14.5, "Locking"](#), on page 421.

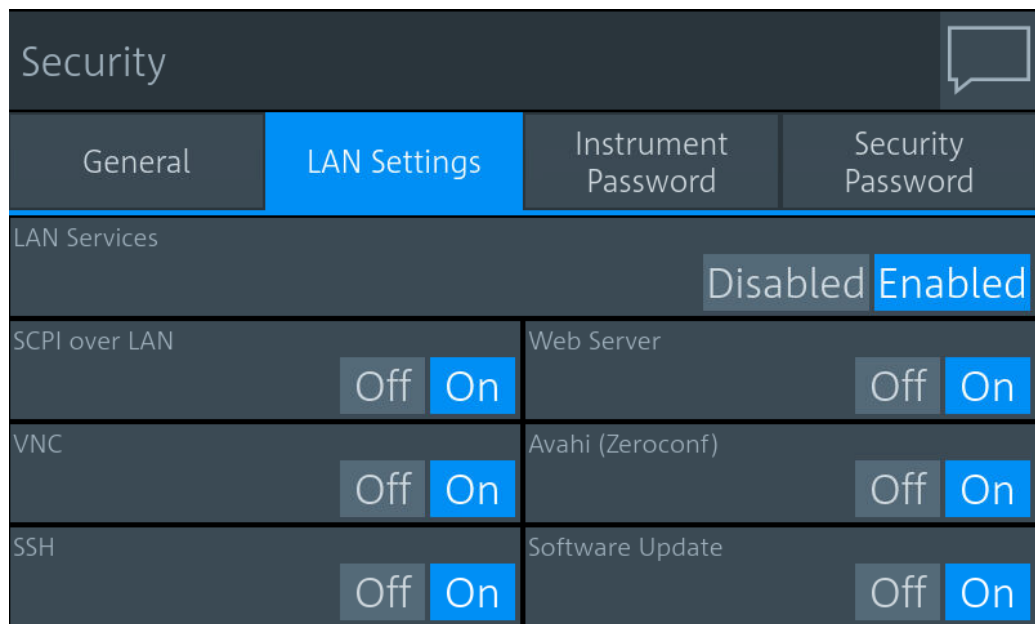
**Secure Update Policy ← General tab**

Allows you to configure the automatic signature verification that is performed before firmware installation. See also [Chapter 10.3.4, "Securing the firmware update"](#), on page 171.

"All Packages"	You can install firmware packages with a valid R&S signature and firmware packages without a signature.
"R&S Signed Packages"	You can install only firmware packages with a valid R&S signature.

**LAN Settings tab**

Configures the LAN services together or individually. See also [Chapter 10.3.3, "Configuring LAN services"](#), on page 170.

**LAN Services ← LAN Settings tab**

Enables or disables the LAN services together. If enabled, it provides remote access via all unlocked services.

**SCPI over LAN ← LAN Settings tab**

Enables or disables the access over LAN to control the R&S NRX remotely by using SCPI (standard commands for programmable instruments) commands. See also [Chapter 4.3, "Remote control"](#), on page 46.

**VNC ← LAN Settings tab**

Enables or disables access using a virtual network computing (VNC) interface, a graphical desktop sharing system that uses RFB protocol to control the R&S NRX remotely. See also [Chapter 4.2, "Remote operation"](#), on page 45.

**SSH ← LAN Settings tab**

Enables or disables copying files using system and communications protections (SCP). Usually, these files are screenshots that you retrieve from the R&S NRX. An interactive shell access using a secure shell (SSH) is not supported.

**Web Server ← LAN Settings tab**

Enables or disables a web server that is required to access using a web application. See also ["To set up a connection using a browser"](#) on page 45.

**Avahi (Zeroconf) ← LAN Settings tab**

Enables or disables Avahi, a service for automatic configuration of the R&S NRX in a network environment.

**Software Update ← LAN Settings tab**

Enables or disables the firmware update over LAN. See also [Chapter 11, "Firmware update"](#), on page 184.

**Instrument Password tab**

Used to change the instrument password. See also [Chapter 10.3.2.1, "Setting the instrument password"](#), on page 168.

The screenshot shows the 'Security' dialog box with the 'Instrument Password' tab selected. The dialog has a title bar 'Security' and a help icon. Below the title bar are four tabs: 'General', 'LAN Settings', 'Instrument Password' (selected), and 'Security Password'. The 'Instrument Password' tab contains three input fields: 'Old Password', 'New Password', and 'Confirm Password'. At the bottom of the tab is a 'Change Password' button.

**Old Password ← Instrument Password tab**

Currently used instrument password.

**New Password ← Instrument Password tab**

New instrument password.

**Confirm Password ← Instrument Password tab**

New instrument password for confirmation.

**Change Password ← Instrument Password tab**

Sets the new password as the instrument password.

Remote command:

`SYSTem:SECurity:PASSword:USER` on page 421

**Security Password tab**

Used to change the security password. The security password is required for changing security settings in the "Security" dialog. See also [Chapter 10.3.1, "Protecting security-relevant settings"](#), on page 167.

The screenshot shows the 'Security' settings menu with the 'Security Password' tab selected. The interface includes a title bar 'Security', a navigation bar with tabs for 'General', 'LAN Settings', 'Instrument Password', and 'Security Password', and three input fields for 'Old Password', 'New Password', and 'Confirm Password'. A 'Change Password' button is located at the bottom of the form.

**Old Password ← Security Password tab**

Currently used security password.

**New Password ← Security Password tab**

New security password.

**Confirm Password ← Security Password tab**

New security password for confirmation.

**Change Password ← Security Password tab**

Sets the new password as a security password.

Remote command:

`SYSTEM:SECURITY:PASSWORD:SECURITY` on page 421

## 10.4 Option management

Optional features are available as options and are part of the firmware package. If you want to use an optional feature, you buy the option and, in return, receive a license key. Using the license key, you can activate the option as described in [Chapter 10.4.1, "Installing a license key"](#), on page 177.

You can also use the license key to deactivate the option but keep in mind that you cannot use the same license key to activate the option again. If you want to reactivate an option, contact the Rohde & Schwarz support center to request a new license key, see [Chapter 14.5, "Contacting customer support"](#), on page 509.

For detailed information on available options, see the specifications document or visit:

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



## 10.4.1 Installing a license key

### Preparatory steps

1. Make sure that the most recent firmware version is installed.
2. Check the "License Keys List" whether the license you have purchased is unregistered. If the license is unregistered, you need to register it before installation. See "Supplement A" how to do that.

### To install the license key

1. Select [System] > "Instrument Info" > "Options".  
The "Options" dialog is displayed.
2. Select the "Manage License Keys" tab.
3. Select "Enter License Key".  
The alphanumeric editor is displayed.
4. Enter the 30-digit license key from "License Keys List" or from the registration print-out, if the license was delivered unregistered.
5. Confirm your entry with the checkmark.
6. Switch the R&S NRX off and on again to reboot it.
7. Check whether the option is active:
  - a) Select [System] > "Instrument Info" > "Options".
  - b) Select the "SW Options" tab.  
If the option is active, it is displayed in the list.

## 10.4.2 Option settings

Access: [System] > "Instrument Info" > "Options"

Displays the installed hardware and software options. Offers an interface to install new software options.

Further information:

- [Chapter 10.2.3, "Hardware configuration"](#), on page 166

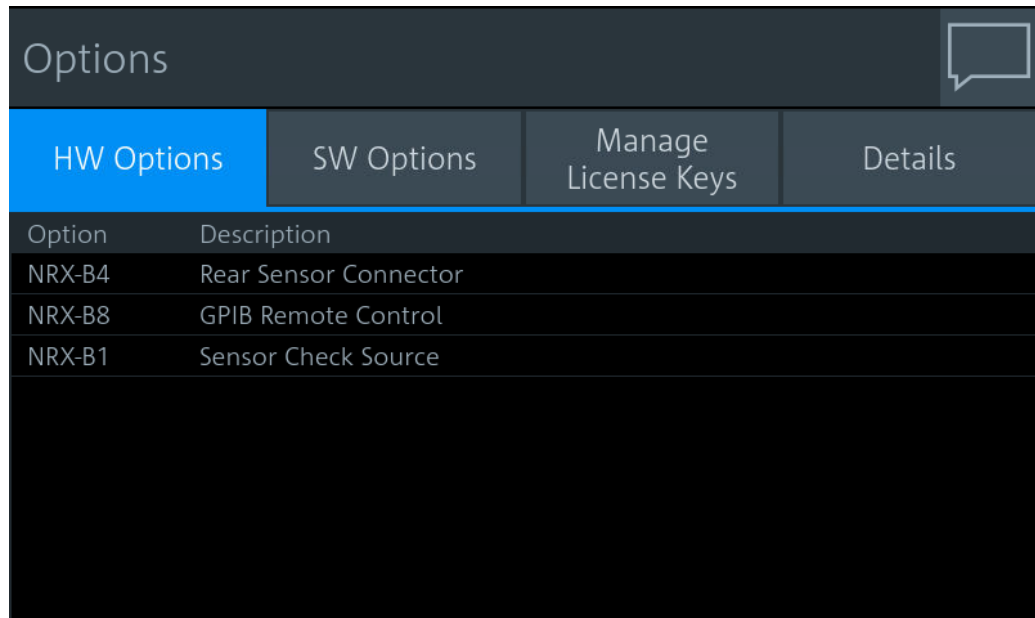
The "Options" dialog contains the following parameters:

<a href="#">HW Options tab</a> .....	178
<a href="#">SW Options tab</a> .....	178
<a href="#">Manage License Keys tab</a> .....	179
L <a href="#">Enter License Key</a> .....	179
L <a href="#">Import</a> .....	179
L <a href="#">Export</a> .....	179
<a href="#">Details tab</a> .....	179

**HW Options tab**

Displays the installed hardware options.

The hardware options on the front panel, you can install yourself. See [Chapter 3.2.1.2, "Module bay"](#), on page 28.



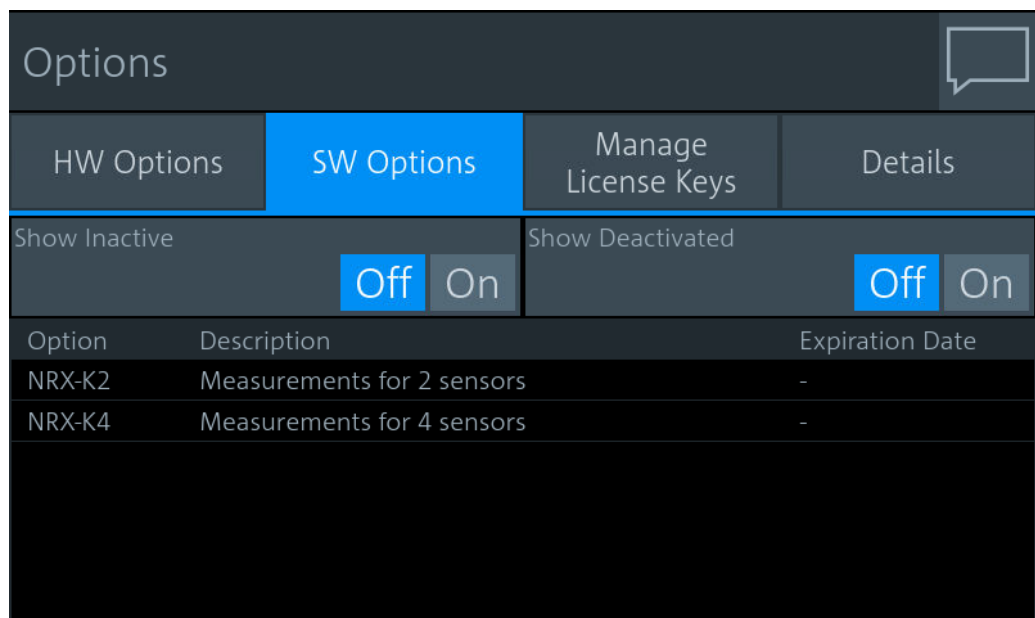
Options	
HW Options	SW Options
Option	Description
NRX-B4	Rear Sensor Connector
NRX-B8	GPIB Remote Control
NRX-B1	Sensor Check Source

Remote command:

\*OPT? on page 196

**SW Options tab**

Displays all software options and their status. For information on installing options, see [Chapter 10.4, "Option management"](#), on page 176.



Options		
HW Options	SW Options	
Show Inactive	Show Deactivated	
<input type="checkbox"/> Off <input type="checkbox"/> On	<input type="checkbox"/> Off <input type="checkbox"/> On	
Option	Description	Expiration Date
NRX-K2	Measurements for 2 sensors	-
NRX-K4	Measurements for 4 sensors	-

You can filter the displayed list by the following criteria:

"Show Inactive On | Off" Shows or hides inactive software options. These software options are available in the firmware version but are not installed.

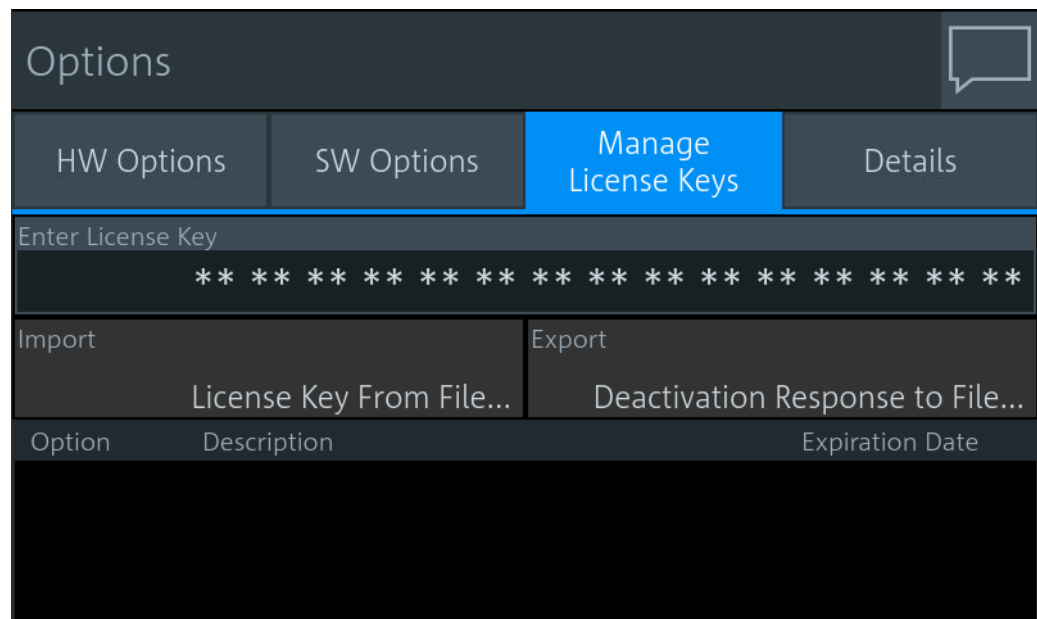
"Show Deactivated On | Off" Shows or hides deactivated software options. These software options have been installed but are not active anymore, for example because the license key is expired.

Remote command:

\*OPT? on page 196

### Manage License Keys tab

Used to install or deinstall software options. See also [Chapter 10.4.1, "Installing a license key"](#), on page 177.



The list gives details on the installed or deinstalled options.

### Enter License Key ← Manage License Keys tab

Enter the license key manually.

### Import ← Manage License Keys tab

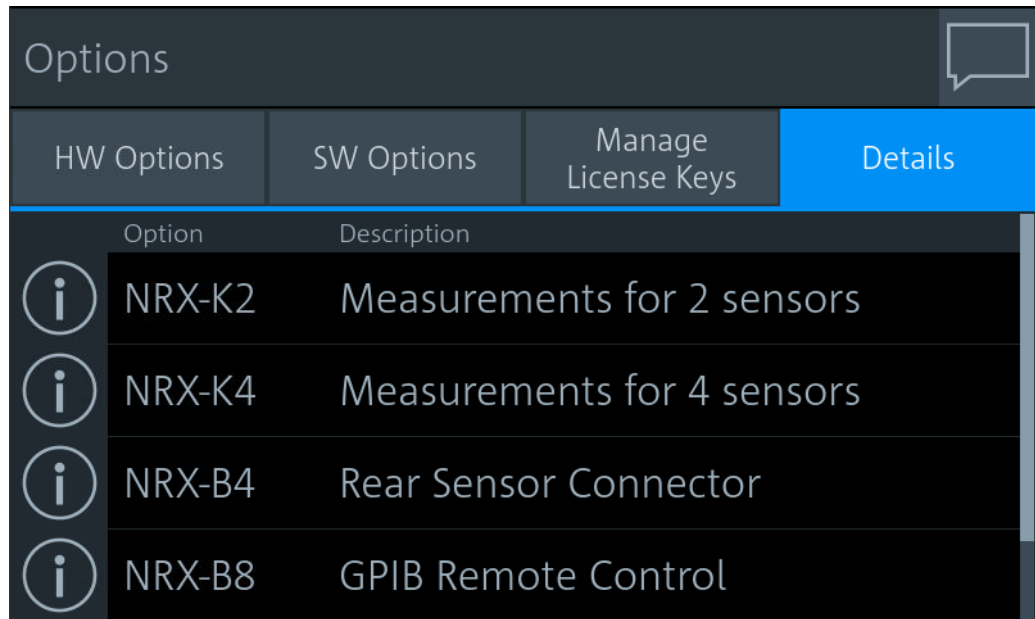
For future use.

### Export ← Manage License Keys tab

For future use.

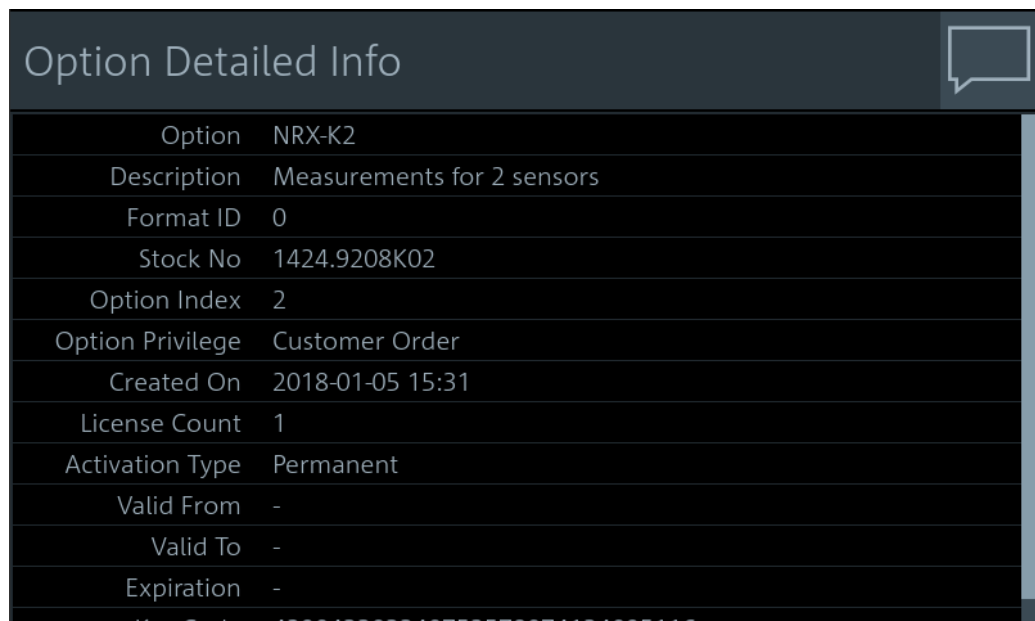
### Details tab

Displays the installed hardware and software options.



Options	
Option	Description
NRX-K2	Measurements for 2 sensors
NRX-K4	Measurements for 4 sensors
NRX-B4	Rear Sensor Connector
NRX-B8	GPIB Remote Control

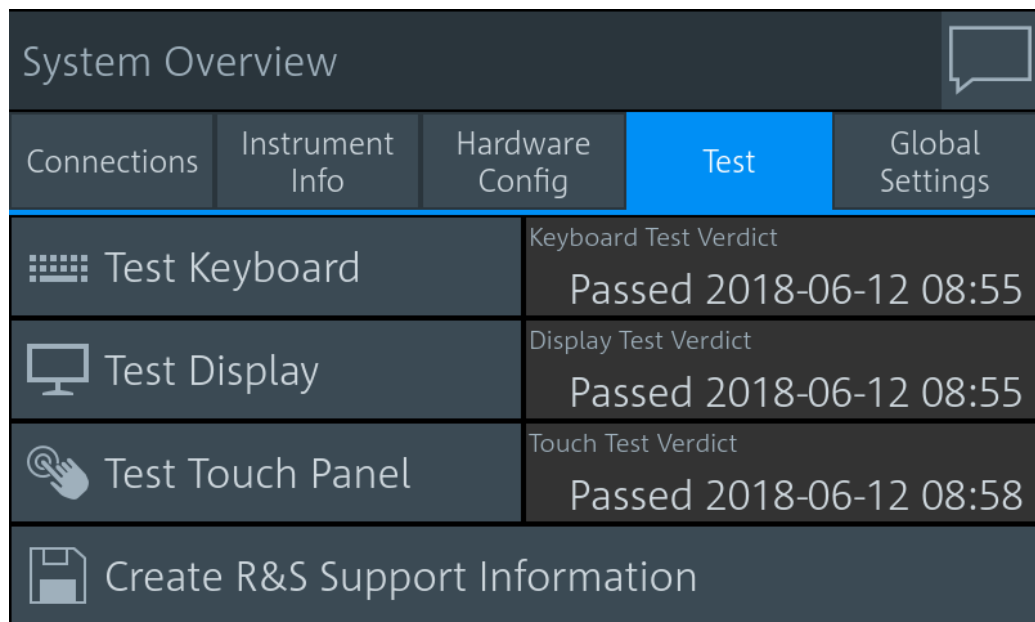
If you want to see more information on a specific option, select .



Option Detailed Info	
Option	NRX-K2
Description	Measurements for 2 sensors
Format ID	0
Stock No	1424.9208K02
Option Index	2
Option Privilege	Customer Order
Created On	2018-01-05 15:31
License Count	1
Activation Type	Permanent
Valid From	-
Valid To	-
Expiration	-

## 10.5 User interface tests

Access: [System] > "Test"



On this tab, you can test whether the user interfaces are in working order and create information useful for troubleshooting.

For testing a connected sensor, see "[Sensor Test](#)" on page 160.

#### Testing the user interfaces

1. Select the test that you want to perform.  
A dialog with detailed test instructions is displayed.
2. Read and follow the instructions.
3. Exit the test.  
**Note:** "Exit with PASS" only becomes available when the test is finished successfully.  
The results, passed or failed, are displayed for each test.

Remote command:

[TEST:DEVIce\[:ALL\]](#) on page 408

[TEST:DEVIce:RESult?](#) on page 408

#### Creating information for troubleshooting

You can save information for troubleshooting on a memory stick.

1. Connect a memory stick to one of the USB interfaces.
2. Select "Create R&S Support Information".  
The created archive file (\*.tar.gz) contains the following information:
  - Software errors
  - Hardware status

- Current device footprint
- Current device settings
- Log files, if available. To create them, enable [Create Extended Support Info](#).

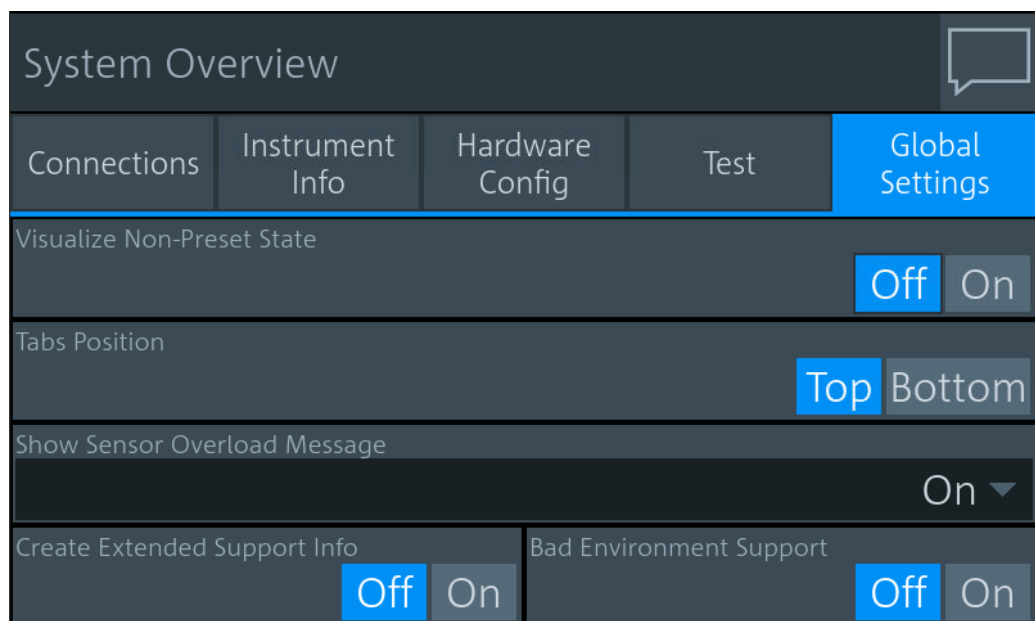
If a memory stick is connected and USB storage is allowed, the archive file is saved there. See also "[USB Storage](#)" on page 172.

Remote command:

`TEST:USB:STORage?` on page 409

## 10.6 Global settings

Access: [System] > "Global Settings"



On this tab, you configure the following settings:

<a href="#">Visualize Non-Preset State</a> .....	182
<a href="#">Tabs Position</a> .....	183
<a href="#">Show Sensor Overload Message</a> .....	183
<a href="#">Create Extended Support Info</a> .....	183
<a href="#">Bad Enviroment Support</a> .....	183

### Visualize Non-Preset State

If enabled, a setting that differs from the preset value is indicated by a pencil symbol.



The control elements in the hierarchies above that are leading to this setting are marked, too. Thus, you can find the setting easily if you want to use a preset value.

**Tabs Position**

Specifies the position of the tabs in dialogs, top or bottom.

**Show Sensor Overload Message**

If enabled, shows the sensor overload message. Overload can damage the sensor, depending on the amount of power and the duration of the overload condition. The maximum power is specified in the specifications document of the sensor.

You can also query the maximum power using `SYSTem:SENSor<Sensor>:INFO?`.

Remote command:

`DISPlay:OVERload[:STATe]` on page 214

**Create Extended Support Info**

If enabled, the R&S NRX creates log files that are saved onto the flash memory. The logging process can slow down the R&S NRX.

The saved log files are used as support information for troubleshooting. See "[Creating information for troubleshooting](#)" on page 181.

**Bad Environment Support**

If enabled, reduces the data rate to the sensor to the basic data rate defined by USB 1.0, 12 Mbit/s. The reduction of the data rate makes the USB connection more stable. We recommend that you enable this feature only after you discussed your problem with our customer support. See also [Chapter 14.5, "Contacting customer support"](#), on page 509.

# 11 Firmware update

This section describes installing or updating the firmware on the R&S NRX.

The latest firmware update files are available on the Rohde & Schwarz product website:

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

## 11.1 Firmware update using a PC

In this procedure, you use a PC connected to the R&S NRX by USB or Ethernet.

Use the Firmware Update program to load new firmware to the R&S NRX. It is part of the R&S NRP-Toolkit.

### 11.1.1 Hardware requirements

Hardware requirements when using a USB connection:

- PC has a free USB port.
- USB cable (USB-A plug to USB-B plug).

Hardware requirements when using an Ethernet connection:

- PC and instrument are connected to an Ethernet network.
- Ethernet cable.

### 11.1.2 Software requirements

Make sure that your PC meets the following software requirements:

- Operating system Microsoft Windows 7, Microsoft Windows 8 or Microsoft Windows 10
- R&S NRP-Toolkit software is installed on your PC. It includes the Firmware Update program.
- *Recent VISA software is installed on your PC.* You can perform a firmware update using the Firmware Update program only if the R&S NRX is recognized as a VISA device.
- Rohde & Schwarz update file (\*.rsu) for the R&S NRX is available.

### 11.1.3 Preparing an update

#### To prepare an update using a USB connection

1. Check the emulation settings to make sure that the R&S NRX is recognized.



The following settings are required:

- Native remote command set of the R&S NRX
- Default identification string
- Default option string

For details and corresponding remote commands, see "[Emulations tab](#)" on page 148.

2. Connect the R&S NRX to the PC using a USB cable. If the instrument is off, switch it on.

The PC identifies the new USB hardware shortly afterwards.

If no recent VISA software is installed, Windows tries in vain to find a USB driver for the R&S NRX. Accordingly, in the Windows device manager, the R&S NRX is highlighted by a yellow exclamation mark. Abort the installation process and install a recent VISA software.

### To prepare an update using a network connection

1. Connect the R&S NRX to the network. If the instrument is off, switch it on. Check that the instrument has an IP address assigned:

- a) Press the [System] hardkey on the front panel.
- b) On the "Connections" tab under "Network", check the "IPv4" status.

See [Figure 10-1](#).

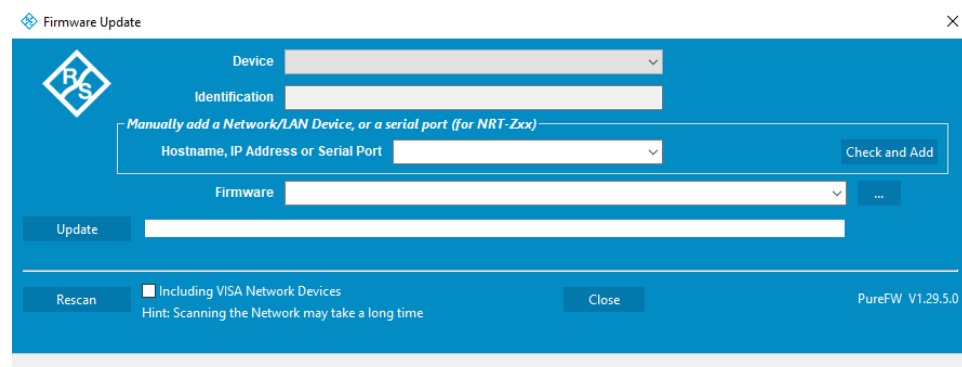
2. If the instrument has no IP address assigned, do the following:

- a) In the "Network" dialog, check whether the network settings are correct.
- b) Check the cable used to connect the instrument to the network.

3. Register the instrument as a VISA device. Refer to the documentation of your VISA software for details.

## 11.1.4 Updating the firmware

1. Start the Firmware Update program via "Start menu" > "NRP-Toolkit" > "Firmware Update".

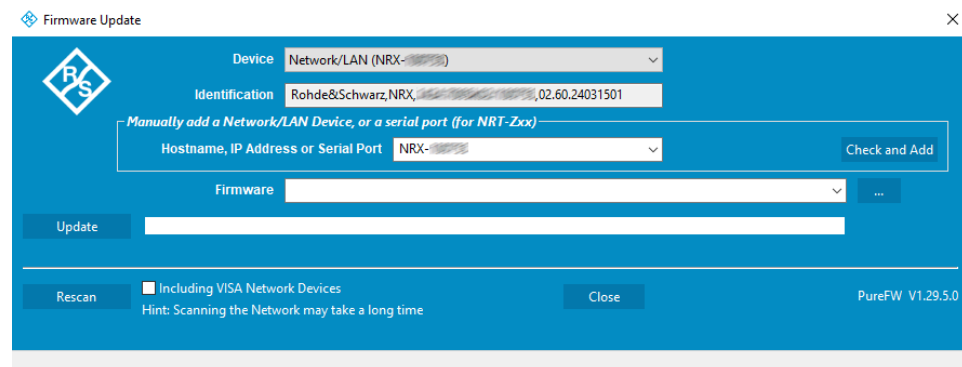


The program automatically scans for R&S power sensors and meters *connected by USB*. When the scan is completed, all recognized instruments are listed in the "Device" list.

2. If the instrument that you want to update is not listed but connected by USB, select "Rescan" to search for R&S power sensors and meters connected by USB.
3. If the instrument is connected to a network, perform the following actions under "Manually add a Raw SCPI Device":
  - a) Enter the hostname or the IP address of the instrument.
  - b) Select "Check and Add".

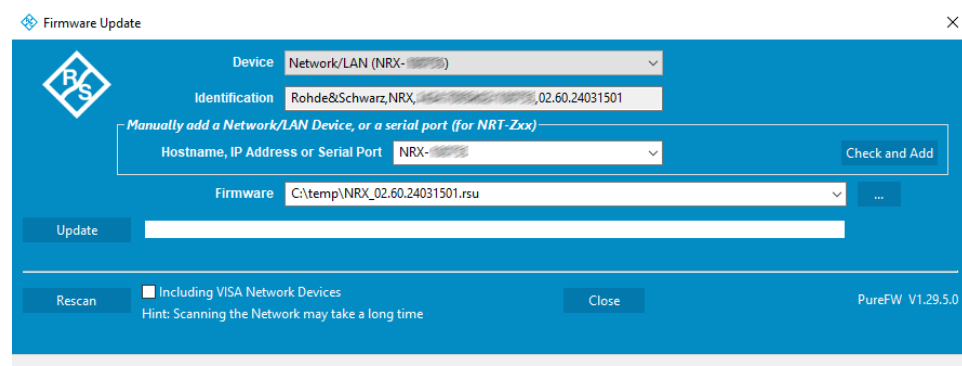
The program searches for the specified instrument on the network and adds it to the "Device" list.

4. If the instrument is still not listed, see "[Troubleshooting: Instrument is not recognized](#)" on page 187.
5. In the "Device" list, select the instrument that you want to update.



6. Under "Firmware", do one of the following:
  - Enter the full path and filename of the update file.
  - Select the "..." button to browse the file system for it.

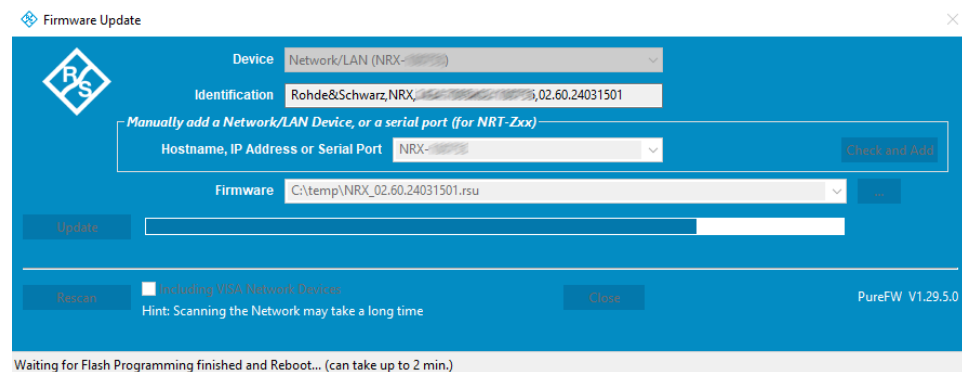
New firmware for the R&S NRX generally has an \*.rsu (Rohde & Schwarz update) extension.



7. **NOTICE!** Do not disconnect the power supply while an update is in progress. Interrupting the power supply during the firmware update will most likely lead to an unusable device which needs to be sent in for maintenance.

Select "Update".

The new firmware is downloaded and installed on the instrument.



During the update process, the progress is shown. The update sequence can take a couple of minutes.

8. Check if the update was successful. If that is the case, the firmware version under "Identification" is the same as the one displayed under "Firmware".

#### Troubleshooting: Instrument is not recognized

- ▶ Scan for VISA network devices automatically. This procedure can be more time-consuming than adding the device manually.
  - a) Enable "Including VISA Network Devices".
  - b) Select "Rescan".
- ▶ Check whether a VISA library is installed on the computer.  
If no VISA library is installed on the computer, no VISA instrument is accessible.
- ▶ If a network connection is used, check whether the instrument is registered as a VISA device.

## 11.2 Firmware update using a memory stick

In this procedure, you use a memory stick to install or update the firmware on the R&S NRX.

### 11.2.1 Hardware and software requirements

Make sure to meet the system requirements when performing a firmware update using a memory stick:

- PC or mobile device with a free USB port running any operating system and software that supports copying files to the memory stick.
- Memory stick (USB 2.0 or 3.0, with USB-A plug, FAT32 file system, and sufficient space for the firmware file)
- Rohde & Schwarz update file (\*.rsu) for the R&S NRX must be available.

### 11.2.2 Preparing an update

1. Check the emulation settings to make sure that the R&S NRX is recognized.

The following settings are required:

- Native remote command set of the R&S NRX
- Default identification string
- Default option string

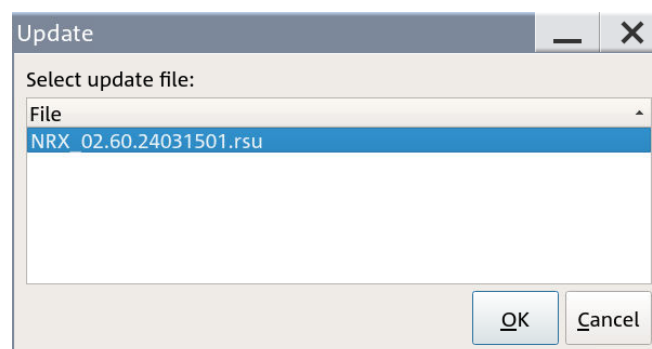
For details and corresponding remote commands, see ["Emulations tab"](#) on page 148.

2. Copy the Rohde & Schwarz update file to the root directory of the memory stick.
3. Disconnect the memory stick from the PC or mobile device. If the instrument is off, switch it on.

### 11.2.3 Updating the firmware

1. Connect the memory stick to the front or rear USB host port of the R&S NRX.

Shortly afterwards, the instrument identifies the memory stick. A dialog displays the Rohde & Schwarz update file stored on the memory stick.



2. If there are more than one available Rohde & Schwarz update files, select the file you want to use for the update.

The latest version is displayed on top of the list.

3. **NOTICE!** Do not disconnect the power supply while an update is in progress. Interrupting the power supply during the firmware update will most likely lead to an unusable device which needs to be sent in for maintenance.

Select "OK" to start the update process.

After copying the Rohde & Schwarz update file to internal memory, a dialog asks you to remove the installation medium (memory stick).

4. Remove the memory stick.  
If you do not remove the memory stick, the firmware update process will start anew after the reboot. In this case, interrupt the second installation by selecting "Cancel" when the "Update" dialog appears.
5. Select "OK" to reboot the instrument.

# 12 Remote control commands

## 12.1 Conventions used in SCPI command descriptions

The following conventions are used in the remote command descriptions:

- *Command usage*  
If not specified otherwise, commands can be used both for setting and for querying parameters.  
If a command can be used for setting or querying only, or if it initiates an event, the usage is stated explicitly.
- *Parameter usage*  
If not specified otherwise, a parameter can be used to set a value, and it is the result of a query.  
Parameters required only for setting are indicated as "Setting parameters".  
Parameters required only to refine a query are indicated as "Query parameters".  
Parameters that are only returned as the result of a query are indicated as "Return values".
- *Conformity*  
Commands that are taken from the SCPI standard are indicated as "SCPI confirmed". All commands used by the R&S NRX follow the SCPI syntax rules.
- *Asynchronous commands*  
A command which does not automatically finish executing before the next command starts executing (overlapping command) is indicated as an "Asynchronous command".
- *Reset values (\*RST)*  
Default parameter values that are used directly after resetting the instrument (\*RST command) are indicated as "\*\*RST" values, if available.
- *Default unit*  
The default unit is used for numeric values if no other unit is provided with the parameter.

### Units

The standard behavior for default units applies to all values that are expressed in a certain unit. Values that can be expressed in more than one unit, show a more complex behavior that is described in [Chapter 12.6.1.3, "Units"](#), on page 229.

Units and prefixes, as defined by the international system of units (SI), are allowed and recognized. If you need decimal multiples and submultiples of a unit, you can use SCPI prefixes. Because SCPI uses only capital letters, it cannot distinguish between upper and lower case characters. Therefore, if SI prefixes use the same letter in upper and lower case, SCPI defines the meaning. An example is milli (m) and mega (M). In SCPI, M means milli for all units except Hz and Ohm - MHz means mega Hz,  $10^6$  Hz.

Table 12-1: SCPI prefixes

Factor	SI name	SI symbol	SCPI prefix
$10^3$	kilo	k	K
$10^6$	mega	M	MA; also allowed are MOHM and MHZ
$10^9$	giga	G	G
$10^{12}$	tera	T	T
$10^{-3}$	milli	m	M Exception: Hz and Ohm
$10^{-6}$	micro	$\mu$	U
$10^{-9}$	nano	n	N
$10^{-12}$	pico	p	P

## 12.2 Common commands

The common commands are taken from the IEEE 488.2 (IEC 625–2) standard. The headers of these commands consist of an asterisk \* followed by three letters.

&ABO.....	192
&DFC.....	192
&GET.....	192
&GTL.....	192
&GTM.....	192
&GTR.....	192
&HFC.....	193
&LLO.....	193
&NREN.....	193
*CLS.....	193
*DEV.....	193
*DMC.....	193
*EMC.....	194
*ESE.....	194
*ESR?.....	194
*GCLS.....	194
*GMC?.....	194
*GOPC?.....	194
*GWAI.....	195
*IDN?.....	195
*IST?.....	195
*LMC?.....	195
*OPC.....	195
*OPT?.....	196
*PMC.....	196
*PRE.....	196

*PSC.....	196
*RCL.....	196
*RMC.....	196
*RST.....	197
*SAV.....	197
*SRE.....	197
*SRQ?.....	197
*STB?.....	198
*TRG.....	198
*TST?.....	198
*WAI.....	198
*XESE.....	198
*XESR?.....	199
*XPRE.....	199
*XSRE.....	199
*XSTB?.....	199

---

**&ABO**

Device clear

**Usage:** Event

---

**&DFC**

Disable flow control

**Usage:** Event

---

**&GET**

Group execute trigger

**Usage:** Event

---

**&GTL**

Go to local

**Usage:** Event

---

**&GTM**

Go to local with remote state

**Usage:** Event

---

**&GTR**

Go to remote



**Usage:** Event

---

### **&HFC**

Hardware flow control

**Usage:** Event

---

### **&LLO**

Local lockout

**Usage:** Event

---

### **&NREN**

Not remote enabled (go to local)

**Usage:** Event

---

### **\*CLS**

Clear status. Resets the following:

- Status byte (STB)
- Standard event register (ESR)
- `EVENT` part of the `QUESTIONABLE` and the `OPERATION` register
- Error/event queue

The command does not change the `ENABLE` and `TRANSITION` parts of the registers.

**Usage:** Event

---

### **\*DEV [<instrument\_no>]**

Fixed value.

**Parameters:**

<instrument\_no> 0

---

### **\*DMC <Label>, <Macro>**

#### **\*DMC? <Label>**

Defines a macro command.

**Parameters:**

<Macro>

**Parameters for setting and query:**

<Label>

---

**\*EMC** <Enable>

Enables a macro command.

**Parameters:**

<Enable>

---

**\*ESE** <register>

Event status enable

Sets the event status enable register to the specified value. The query returns the contents of the event status enable register in decimal form.

**Parameters:**

<register>	Range:	0 to 255
	*RST:	0

---

**\*ESR?**

Event status read

Returns the contents of the event status register in decimal form (0 to 255) and then sets the register to zero.

**Usage:** Query only

---

**\*GCLS**

Clears all status information in all internal "instruments".

**Usage:** Event

---

**\*GMC?** <Label>

Get macro content.

**Query parameters:**

<Label>

**Return values:**

<Macro>	<dblock>
---------	----------

**Usage:** Query only

---

**\*GOPC?**

Analog of \*OPC? for all instruments in multichannel device.

**Return values:**

<gopc>	1 is return if all pending operations in all internal instruments are finished.
--------	---

**Usage:** Query only

---

#### **\*GWAI**

Waits for all pending operations in all internal "instruments".

**Usage:** Event

---

#### **\*IDN?**

Identification

Returns a string containing information on the identity of the sensor (device identification code). In addition, the version number of the installed firmware is indicated.

**Usage:** Query only

---

#### **\*IST?**

Individual status

Returns the current value of the IST flag in decimal form. The IST flag is the status bit which is sent during a parallel poll.

**Usage:** Query only

---

#### **\*LMC?**

List macro commands.

**Return values:**

<Label>

**Usage:** Query only

---

#### **\*OPC**

Operation complete

Sets bit 0 in the event status register when all preceding commands have been executed. Send this command at the end of a program message. It is important that the read timeout is set sufficiently long.

The query always returns 1 because the query waits until all previous commands are executed.

\*OPC? basically functions like \*WAI, but also returns a response. The response is an advantage, because you can query the execution of commands from a controller program before sending new commands. Thus preventing overflow of the input queue when too many commands are sent that cannot be executed.

---

**\*OPT?**

Option identification

Returns a comma-separated list of installed options.

**Usage:** Query only**Manual operation:** See "[HW Options tab](#)" on page 178  
See "[SW Options tab](#)" on page 178

---

**\*PMC**

Purge macro command.

**Usage:** Event

---

**\*PRE <register>**

Parallel poll register enable

Sets the parallel poll enable register to the specified value or queries the current value.

**Parameters:**

<register>	Range:	0 to 255
	*RST:	0

---

**\*PSC <psc>**

Writes/reads the power on status clear flag (PSC).

**Parameters:**

<psc>	Power on status clear flag.
-------	-----------------------------

---

**\*RCL <num>**

ReCaLI

Recalls the instrument settings from the specified intermediate memory.

**Setting parameters:**

<number>	Number of the intermediate memory
	Range: 0 to 19
	*RST: 0

**Usage:** Setting only**Manual operation:** See "[Recall](#)" on page 139

---

**\*RMC <Label>**

Remove macro content.

**Setting parameters:**

&lt;Label&gt;

**Usage:** Setting only**\*RST**

Sets the instrument to a defined initial state, a so-called reset. The default settings are indicated in the description of commands as \*RST value.

With the exceptions listed in [Table 12-18](#), this command corresponds to `SYSTem:PRESet`.

**Usage:** Event**Manual operation:** See "[Preset](#)" on page 139**\*SAV <num>**

SAVe

Saves the current instrument settings in the specified intermediate memory.

**Setting parameters:**

&lt;number&gt; Number of the intermediate memory

Range: 0 to 19

\*RST: 0

**Usage:** Setting only**Manual operation:** See "[Save](#)" on page 139**\*SRE <register>**

Service request enable

Sets the service request enable register to the specified value. This command determines under which conditions a service request is triggered.

**Parameters:**

&lt;register&gt; Range: 0 to 255

\*RST: 0

**\*SRQ? [<timeout>]**

A generic `srq wait` command to be used without `srq event transport`. It is read from the interface.

**Query parameters:**

&lt;timeout&gt;

**Return values:**

&lt;srq&gt;

**Usage:** Query only

---

#### **\*STB?**

Status byte

Returns the contents of the status byte in decimal form.

**Usage:** Query only

---

#### **\*TRG**

Trigger

Triggers a measurement if the following conditions are met:

- Sensor is in the waiting for trigger state.
- Trigger source is set to BUS.

See [TRIGger<Measurement>\[:CHANnel<Channel>\]:SOURce](#) on page 249

**Usage:** Event

---

#### **\*TST?**

Self-test

Triggers a self-test of the sensor and outputs the result. 0 indicates that no errors have occurred.

**Usage:** Query only

---

#### **\*WAI**

Wait to continue

Prevents the execution of the subsequent commands until all preceding commands have been executed and all signals have settled.

**Usage:** Event

---

#### **\*XESE <xese>**

Specifies the standard event status enable register (ESE). This register determines which events from the standard event status register (ESR) are summarized in bit 5 (the event summary bit ESB) of the status byte.

#### **Parameters:**

<xese>                      <expr>

---

**\*XESR?**

Reads and clears the standard event status register (ESR).

**Return values:**

<xesr>                      <expr>

**Usage:**                      Query only

---

**\*XPRES <xpre>**

Reads or writes the parallel PLL enable register (PRE).

**Parameters:**

<xpre>                      <expr>  
Parallel poll enable register.

---

**\*XSRES <xsre>**

Reads or writes the service request enable register. Used to enable service requests.

**Parameters:**

<xsre>                      <expr>  
Service request enable register (SRE).

---

**\*XSTB?**

Reads the status byte.

**Return values:**

<xstb>                      <expr>  
Status byte (STB).

**Usage:**                      Query only

---

## 12.3 Addressing measurements and sensors

**<Measurement> suffix**

The <Measurement> suffix has the range 1 to 8. [Table 12-3](#) shows how the measurement panes are assigned.

The R&S NRX memorizes sensor assignments. Thus, a sensor type that has been connected before is assigned to the same measurement type when it is connected again. See also [Chapter 5, "Measurement basics"](#), on page 48.

The sensor assignment is deleted by a preset, reset or sanitization. If the sensor has no memory of a previous sensor assignment, the sensor assigns the measurements according to the port to which the sensors are connected. The number of measurement panes is adapted automatically.

**Example:**

For configuring measurements, the `CALCulate<Measurement>` commands are used.

The first sensor is connected to port A. It is assigned to the first measurement, addressed by `CALC1`.

The second sensor is connected to port C. It is assigned to the third measurement, addressed by `CALC3`.

The third sensor is connected to port B. It is assigned to the second measurement, addressed by `CALC2`.

All three sensors are the primary sensor in the assigned measurement.

**[ :CHANnel<Channel> ] suffix**

If there is only one sensor assigned to a measurement, you can omit `[ :CHANnel<Channel> ]`. Otherwise, the primary sensor is always addressed by `CHAN1`, and the secondary sensor is always addressed by `CHAN2`.

If you use calculation functions that process the results of two sensors, you assign a primary sensor and a secondary sensor. In `CALCulate<Measurement>:MATH[:EXPRession]`, the position of the sensor in the expression defines the sensor as a primary or secondary sensor.

**Example:**

For calculating the standing wave ratio (SWR), you use `CALC1:MATH:EXPR "SWR (SENS3, SENS1) "`.

Thus, the sensor at port C from the example above is assigned as primary sensor, and the sensor at port A as secondary sensor.

This behavior saves you assigning the sensors using `CALCulate<Measurement>[:CHANnel<Channel>]:SENSe:INDEX`.

Further information:

- ["Primary Sensor, Secondary Sensor"](#) on page 72
- ["Channel Calculation Function"](#) on page 73
- Assigning measurement panes and traces, see [Chapter 12.6, "Measurement settings and results"](#), on page 208.

## 12.4 Making measurements

Combining commands, also called high-level commands, simplifies the programming of the R&S NRX for measurements. You can configure the parameters that are part of



the parameter list. The other parameters are set to their default values. For details on the command syntax, see [Chapter 12.4.5, "Structure of combining commands"](#), on page 203.

If you need more precise control of the R&S NRX, you can use the commands that configure only one setting, here called lower-level commands, or combining commands that include fewer functions. This way allows you to make specific modifications between the individual steps and configure parameters that are not part of the parameter list. [Figure 12-1](#) shows the relationship of the commands.



*Figure 12-1: Relationship*

### 12.4.1 Using MEASure?

The simplest way to program the R&S NRX for measurements is by using `MEASure?`. But this method does not offer much flexibility. You can configure the parameters that are part of the parameter list but nothing else; see also "[parameter\\_list](#)" on page 203.

When you send a `MEASure?` query, the R&S NRX performs the following steps:

1. Configures according to the parameter list.
2. Starts a measurement.
3. Returns the result.

Thus, this command combines `CONFigure` and `READ?`. To make more flexible and accurate measurements, use the `CONFigure` commands. See [Chapter 12.4.2, "Using CONFigure and READ?"](#), on page 202.

#### **Example: Measuring average power with one power sensor**

You can set the expected power level, resolution and calculation function, and select the sensor you want to address, all in one command.

```
MEAS1? -50, 3, (@1)
```

- `MEAS1` specifies the continuous average measurement
- `-50` optimizes the sensor settings, if applicable
- `3` specifies resolution setting; 0.01
- `(@1)` specifies the sensor; connected to port A

#### **Querying the parameters transferred previously**

```
MEAS1?
```

Returns the parameters that were transferred for measurement 1 the last time.

### 12.4.2 Using CONFigure and READ?

When you send the CONFigure commands, the R&S NRX performs step [step 1](#) of the MEASure? queries, but does not start the measurement automatically. Thus, you can change the measurement parameters before making measurements.

For steps [step 2](#) and [step 3](#), you use the READ? queries. They compare the parameter list to the current settings, start a measurement and return the result. If the parameter list does not match, a SCPI error is returned, and the command is aborted.

#### Example: Measuring average power with one power sensor

```
CONF1 -50,3,(@1)
```

- CONF1 specifies the continuous average measurement
- -50 optimizes the sensor settings, if applicable
- 3 specifies resolution setting; 0.01
- (@1) specifies the sensor; connected to port A

```
FREQ 0.5e9
```

- Sets the carrier frequency of the applied signal as 0.5 GHz. The combining commands do not set the frequency or check its setting.

```
READ1?
```

- Starts a measurement and returns the measured value without checking the current settings.  
If you want to have the current settings checked before the measurement, use READ1? -50,3,(@1) instead. But this check only includes the settings made by the combining commands. Other settings, like the frequency setting, are not included.

#### Querying the parameters transferred previously

```
CONF1?
```

Returns the parameters that were transferred for measurement 1 the last time.

### 12.4.3 Using CONFigure, INITiate and FETCH?

Instead of the READ? queries, you can use the INITiate commands and the FETCH? queries.

For step [step 2](#), use the INITiate commands. See also [Chapter 12.5, "Starting and ending a measurement"](#), on page 205.

For step [step 3](#), use the FETCH? queries.

#### Querying the current measured value

```
FETCH?
```

Returns the current measured value if it is valid. If a measured value is not yet available, processing is suspended until a valid result is available.

#### 12.4.4 Configuring one setting at a time

The lower-level commands give you more precise control of the R&S NRX. You can use them together with combining commands for fine-tuning, as shown in [Example "Measuring average power with one power sensor"](#) on page 202, or configure all settings individually.

#### 12.4.5 Structure of combining commands

SCPI commands consist of a so-called header and, usually, one or more parameters. The header of combining commands consists of:

```
<subsystem><meas_type>[<calc_function>][?]
```

The header is followed by the parameter list, so that the following syntax results:

```
<subsystem><meas_type>[<calc_function>][?] <parameter_list>
```

##### <subsystem>

The header starts with the subsystem, also called root-level command. The subsystems of combining commands are:

- CONFigure<Measurement>
- FETCh<Measurement>
- READ<Measurement>
- MEASure<Measurement>

The <Measurement> suffix selects the measurement, see also [Chapter 12.6, "Measurement settings and results"](#), on page 208.

##### <meas\_type>

This mnemonic selects the measurement type. For example, [ :SCALar ] [ :POWer ] [ :AVG ] selects the continuous average measurement.

##### <calc\_function>

This mnemonic is optional and selects the calculation function. The lower-level command for calculation functions is [CALCulate<Measurement>:MATH\[:EXPRession\]](#) on page 344. If the calculation function is not specified, the measured value of the primary channel is output.

##### <parameter\_list>

The parameter list differs from measurement type to measurement type. Combining commands of the same measurement type have the same parameter list.

Parameters in square brackets can be omitted. If omitted, they are kept unchanged. If you want to make sure that the default values of these parameters are used, perform a reset (*\*RST*) before sending the high-level command.

**Table 12-2: Alphabetical parameter overview**

Parameter	Description
<buffered_size>	Mandatory. Number of requested measured values. Corresponds to <code>[SENSe&lt;Sensor&gt;:] [POWer:] [AVG:]BUFFer:SIZE</code> .
<capture_time>	Mandatory. Period within which measured data are captured in the trace measurements. Corresponds to <code>[SENSe&lt;Sensor&gt;:] TRACe:TIME</code> on page 228.
<dtolerance>	Mandatory. Length of a time interval during that the power level can drop below the trigger level without being interpreted as the end of the power pulse. Corresponds to <code>[SENSe&lt;Sensor&gt;:] [POWer:] BURSt:DTOLerance</code> .
<end_exclude>	Mandatory. Amount of time at the end of a timeslot or integration period that is not evaluated. Corresponds to <code>[SENSe&lt;Sensor&gt;:] TIMing:EXCLude:STOP</code> .
<expected_value>	Optional. Value that is expected for the measurement.
<no_slots>	Mandatory. Number of timeslots to be measured. Corresponds to <code>[SENSe&lt;Sensor&gt;:] [POWer:] TSLot [:AVG]:COUNT</code> on page 465.
<resolution>	Optional. Limit up to which the measurement result probably is free of noise. Corresponds to <code>[SENSe&lt;Sensor&gt;:] AVERAge:COUNT:AUTO:RESolution</code> .
<scope_size>	Mandatory. Number of test points on the time axis. Corresponds to <code>[SENSe&lt;Sensor&gt;:] TRACe:POINts</code> on page 481.
<source_list>	Mandatory. Primary and secondary sensor. The number for each sensor is preceded by the character @. The entire expression is enclosed in parentheses. Example: <code>(@3),(@2)</code> Sensor C is the primary sensor, and sensor B is the secondary sensor.
<start_exclude>	Mandatory. Amount of time at the beginning of a timeslot or integration period that is not evaluated. Corresponds to <code>[SENSe&lt;Sensor&gt;:] TIMing:EXCLude:START</code> .
<statistics_size>	Mandatory. Number of test points on the time axis. Corresponds to <code>[SENSe&lt;Sensor&gt;:] STATistics:SCALE:X:POINts</code> on page 470.
<tslot_width>	Mandatory. Width of a timeslot. Corresponds to <code>[SENSe&lt;Sensor&gt;:] [POWer:] TSLot [:AVG]:WIDTh</code> on page 465.

**Further information**

- [Chapter 12.6.6.1, "Combining commands for continuous average measurements"](#), on page 257
- [Chapter 12.6.6.2, "Combining continuous average commands with buffering"](#), on page 265
- [Chapter 12.6.8.1, "Combining commands for trace measurements"](#), on page 283
- [Chapter 12.6.7, "Burst average measurements"](#), on page 274
- [Chapter 12.6.11.1, "Combining commands for timeslot measurements"](#), on page 313
- [Chapter 12.6.12.1, "Combining commands for statistics measurements"](#), on page 325

## 12.5 Starting and ending a measurement

In a basic scenario, the measurement is started immediately after the measurement mode is enabled.

If you want to start the measurement only if a specific condition is fulfilled, define a trigger.

Further information:

- [Chapter 6.1.3, "Triggering"](#), on page 65
- [Chapter 12.6.2, "Configuring the trigger"](#), on page 241

<a href="#">ABORt&lt;Measurement&gt;</a> .....	205
<a href="#">ABORt&lt;undef&gt;:ALL</a> .....	206
<a href="#">INITiate&lt;Measurement&gt;:CONTInuous</a> .....	206
<a href="#">INITiate:ALL:CONTInuous</a> .....	206
<a href="#">INITiate&lt;Measurement&gt;:DISable</a> .....	207
<a href="#">INITiate:ALL:DISable</a> .....	207
<a href="#">INITiate&lt;Measurement&gt;[:IMMediate]</a> .....	207
<a href="#">INITiate:ALL[:IMMediate]</a> .....	208

### **ABORt<Measurement>**

Immediately interrupts the current measurement. The subsequent behavior depends on the measurement that has been running:

- If it was a single measurement, the sensor trigger system goes into the idle state. A single measurement is started by [INITiate<Measurement>\[:IMMediate\]](#).
- If it was a continuous measurement, the sensor trigger system goes into the waiting for trigger state, and if the trigger condition is met, a new measurement is immediately started. A continuous measurement is started by [INITiate<Measurement>:CONTInuous](#).

The command is not fully R&S NRP2 compatible. If port 1 is assigned to measurement 1, and so on, the command works. If port 1 is assigned to measurement 2, for example, enable the R&S NRP2 emulation by using [SYSTem:LANGuage "NRP2"](#).

**Suffix:**  
 <Measurement> 1 to 8  
 Measurement

**Usage:** Event

**ABORt<undef>:ALL**

Applies to all connected sensors. See [ABORt<Measurement>](#) on page 205.

**Suffix:**  
 <undef> 1 to n  
 No suffix required.

**Usage:** Event

**INITiate<Measurement>:CONTInuous <state>**

Enables or disables the continuous measurement mode. In continuous measurement mode, the sensor does not go into the idle state after a measurement has been completed, but immediately executes another measurement cycle.

The command is not fully R&S NRP2 compatible. If port 1 is assigned to measurement 1, and so on, the command works. If port 1 is assigned to measurement 2, for example, enable the R&S NRP2 emulation by using [SYSTem:LANGuage](#) "NRP2".

**Suffix:**  
 <Measurement> 1 to 8  
 Measurement

**Parameters:**

<state> If you use [SYSTem:PRESet](#) instead of [\\*RST](#), the RST value differs. See [Table 12-18](#).

**ON**

Measurements are performed continuously. If a measurement is completed, the sensor does not return to the idle state but enters the waiting for trigger state again.

**OFF**

Ends the continuous measurement mode, and sets the sensor to the idle state.

\*RST: 0

**INITiate:ALL:CONTInuous <state>**

Applies to all connected sensors. See [INITiate<Measurement>:CONTInuous](#) on page 206.

**Setting parameters:**

<state> \*RST: 0

**Usage:** Setting only

**INITiate<Measurement>:DISable <state>**

Prevents the execution of `INITiate<Measurement>[:IMMediate]`. Thus you can prevent that the specified sensor starts a measurement if `INITiate:ALL[:IMMediate]` is used.

The command is not fully R&S NRP2 compatible. If port 1 is assigned to measurement 1, and so on, the command works. If port 1 is assigned to measurement 2, for example, enable the R&S NRP2 emulation by using `SYSTEM:LANGuage "NRP2"`.

**Suffix:**

<Measurement>      1 to 8  
                         Measurement

**Parameters:**

<state>                \*RST:      0

**INITiate:ALL:DISable <state>**

Applies to all connected sensors. See `INITiate<Measurement>:DISable` on page 207.

**Setting parameters:**

<state>

**Usage:**                Setting only

**INITiate<Measurement>[:IMMediate]**

Starts a single measurement cycle. The sensor changes from the idle state to the waiting for trigger state. When the trigger condition is fulfilled, the sensor begins the measurement. Depending on the number of trigger events that are required, e.g. for averaging, the sensor enters the waiting for trigger state several times. Once the entire measurement is completed, a measurement result is available, and the sensor enters the idle state again.

Use the command only after the continuous measurement mode has been disabled using `INITiate<Measurement>:CONTinuous OFF`.

The command is not fully R&S NRP2 compatible. If port 1 is assigned to measurement 1, and so on, the command works. If port 1 is assigned to measurement 2, for example, enable the R&S NRP2 emulation by using `SYSTEM:LANGuage "NRP2"`.

**Suffix:**

<Measurement>      1 to 8  
                         Measurement

**Example:** If you work in a sender/receiver setup, you need to trigger the receiver before triggering the sender. To prevent overlapping execution, use `*WAI`. In this example, sensor 2 is the receiver, sensor 1 is the sender:

```
INIT2
*WAI
INIT1
```

**Usage:** Event

---

### **INITiate:ALL[:IMMediate]**

Applies to all connected sensors. See `INITiate<Measurement>[:IMMediate]` on page 207.

**Usage:** Event

## 12.6 Measurement settings and results

The R&S NRX supports up to 4 measurement channels. The number of different measurement results depends on the type of measurement.

If a measurement type provides single measured values, each measurement channel has 1 measurement, adding up to 4 different measurement results.

If a measurement type provides measured values as measurement sequence or function, each measurement channel has 2 separate measurements presented as traces, adding up to 8 different measurement results.

The measurement results are configured using the commands of the `CALCulate<Measurement>` subsystem.

**Table 12-3: Assigned measurement panes and traces**

Measurement suffix	Assigned measurement panes	Max. number of different measurement results	Supported by
<code>CALCulate&lt;Measurement&gt;</code>	<code>WINDow&lt;Window&gt;</code>		
<code>CALC1</code> to <code>CALC4</code>	<code>WIND1</code> to <code>WIND4</code>	4, see <a href="#">Figure 12-2</a>	all measurements
<code>CALC5</code> to <code>CALC8</code>	<code>WIND1</code> to <code>WIND4</code>	8, see <a href="#">Figure 12-3</a>	trace, pulse analysis, statistics measurements only



Measurement pane 1 CALC1	Measurement pane 2 CALC2
Measurement pane 3 CALC3	Measurement pane 4 CALC4

Figure 12-2: Measurement types supporting 4 different measurement results

Measurement pane 1 Trace 1 CALC1	Trace 2 CALC5	Measurement pane 2 Trace 1 CALC2	Trace 2 CALC6
Measurement pane 3 Trace 1 CALC3	Trace 2 CALC7	Measurement pane 4 Trace 1 CALC4	Trace 2 CALC8

Figure 12-3: Measurement types supporting 8 different measurement results

Only for measurement functions that support two sensors, you can define two sensor configurations in parallel, a primary and a secondary sensor configuration. But these separate configurations are rarely necessary.

Further information:

- [Chapter 5.1, "Parallel measurements"](#), on page 48
- [Chapter 12.7, "Calculation functions"](#), on page 344

## 12.6.1 Configuring display and results

Further information:

- [Chapter 6.1.1, "Display settings"](#), on page 54

### 12.6.1.1 General settings

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CALCulate<Measurement>:DMODE.....	210
CALCulate<Measurement>:EXTRemes:RESet.....	211
CALCulate<Measurement>:HOLD:FUNCTion.....	211
CALCulate<Measurement>:HOLD[:STATe].....	212
CALCulate<Measurement>:LIMit<undef>:TYPE.....	212
CALCulate<Measurement>:LIMit<undef>[:STATe].....	212

CALCulate<Measurement>:RESolution.....	212
DISPlay:BRIGhtness.....	213
DISPlay:ERRorlist.....	213
DISPlay:LAYout.....	213
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DISPlay:MESSage:TYPE.....	214
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DISPlay:UPDate.....	215
DISPlay[:WINDow<Window>][:STATe].....	215
DISPlay[:WINDow<Window>]:POSition.....	215
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---

### CALCulate<Measurement>:AVALue <value>

Determines which additional information about the measured values is shown in the display.

#### Suffix:

<Measurement>      1 to 8  
Measurement

#### Parameters:

<value>              NONE | EXTRemes | STATistics  
\*RST:                NONE

**Manual operation:** See "[Auxiliary Values](#)" on page 56

---

### CALCulate<Measurement>:DMODE <mode>

Specifies the display format of the measured values.

#### Suffix:

<Measurement>      1 to 8  
Measurement

#### Parameters:

<mode>                SDIGital | SANalog | GRAPHical | MARKer | GRID | INFO |  
STATistics | TABLE

#### **SDIGital | SANalog**

For continuous average, burst average, NRT measurements  
Numeric format without/with bar chart

#### **SDIGital | SANalog | GRAPHical**

For time gate, timeslot measurements  
Numeric format without/with bar chart or measured values plotted over time

#### **MARKer | GRID | INFO**

For trace measurements  
Shows or hides additional information below the graph.

**STATistics | TABLE**

For statistics measurements

Waveform or tabular format

\*RST: SDIGital

**Manual operation:** See ["Display Format"](#) on page 56  
 See ["Info / Marker"](#) on page 80  
 See ["Graph / Table"](#) on page 106

**CALCulate<Measurement>:EXTRemes:RESet**

Saves the currently measured value as the new minimum and maximum values.

You can query the minimum and maximum values using:

- `CALCulate<Measurement>:MAXimum:DATA?`
- `CALCulate<Measurement>:MINimum:DATA?`

**Suffix:**

<Measurement> 1 to 8  
 Measurement

**Usage:** Event

**CALCulate<Measurement>:HOLD:FUNCTION <function>**

For all measurement functions, the R&amp;S NRX stores the maximum and minimum values and the calculated differences between these values.

The selected setting applies to both power and reflection indication. You can change at any time.

Alias: `CALCulate<Measurement>:LIMit<undef>:TYPE`**Suffix:**

<Measurement> 1 to 8  
 Measurement

**Parameters:**

<function> MAX | MIN | DIFFerence

**MAXimum**  
 Maximum value

**MINimum**  
 Minimum value

**DIFFerence**  
 Difference between maximum and minimum value

\*RST: MAX

**Manual operation:** See ["Max Hold Function"](#) on page 63

**CALCulate<Measurement>:HOLD[:STATe] <state>**

If enabled, displays the highest value measured for each point (pixel) of the selected display type.

Alias: [CALCulate<Measurement>:LIMit<undef>\[:STATe\]](#)

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Parameters:**

<state> OFF | ON | RESet  
\*RST: OFF

**Manual operation:** See "[Max Hold](#)" on page 63

**CALCulate<Measurement>:LIMit<undef>:TYPE <type>**

Alias for [CALCulate<Measurement>:HOLD:FUNction](#) on page 211.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<undef> 1 to n  
No suffix required.

**Parameters:**

<type> MAX | MIN | DIFFerence  
\*RST: MAX

**CALCulate<Measurement>:LIMit<undef>[:STATe] <state>**

Alias for [CALCulate<Measurement>:HOLD\[:STATe\]](#).

**Suffix:**

<Measurement> 1 to 8  
Measurement

<undef> 1 to n  
No suffix required.

**Parameters:**

<state> OFF | ON  
\*RST: OFF

**CALCulate<Measurement>:RESolution <resolution>**

Configures the resolution of the measurement.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Parameters:**

<resolution> I | OI | OOI | OOOI  
I  
No decimal places, e.g. 1 dBm  
OI  
1 decimal place, e.g. 0.1 dBm  
OOI  
2 decimal places, e.g. 0.01 dBm  
OOOI  
3 decimal places, e.g. 0.001 dBm  
\*RST: OOI

**Manual operation:** See "[Resolution](#)" on page 56

**DISPlay:BRIGhtness** <brightness>

Enables or disables the display backlight.

**Parameters:**

<brightness> Range: 0.0 to 1.0  
\*RST: 1.0

**DISPlay:ERRorlist** <state>

If enabled, displays a dialog containing the SCPI error queue. You can delete the queue using [SYSTem:ERRor:ALL?](#).

**Parameters:**

<state>

**DISPlay:LAYout** <layout>

Splits the measurement display into panes. A maximum number of 4 panes is possible, one for each measurement. See also [Chapter 4.1.5, "Selecting the display layout"](#), on page 40.

**Parameters:**

<layout> L1 | L2 | L3 | L4  
\*RST: L1

**DISPlay:MESSage:TEXT:CLEar**

Deletes the text for user-defined messages.

Define the message text by using [DISPlay:MESSage:TEXT\[:DATA\]](#).

**Usage:** Event

---

**DISPlay:MESSAge:TEXT[:DATA]** <string>

Defines the text for user-defined messages.

**Parameters:**

<string> ASCII characters  
 String "\n" causes a line break. The max. number of lines depends on the message type: 9 lines for messages and 7 lines for queries.  
 The length of a line depends on the characters used. Too long lines are cut off.

---

**DISPlay:MESSAge:TYPE** <type>

Sets the message type for the user-defined messages.

**Parameters:**

<type> QUERy | MESSAge  
**QUERy**  
 The execution of remote control commands is blocked, until the dialog containing the query is closed.  
**MESSAge**  
 Remote control command processing is immediately continued. Close the dialog containing the message by pressing [Esc] or using [DISPlay:MESSAge\[:STATe\] OFF](#).  
 \*RST: MESSAge

---

**DISPlay:MESSAge[:STATe]** <state>

If enabled, displays a dialog containing a user-defined message.

Define the message text by using [DISPlay:MESSAge:TEXT\[:DATA\]](#).

**Parameters:**

<state>

---

**DISPlay:OVERload[:STATe]** <state>

If enabled, hides the sensor overload message. But keep in mind that overload can damage the sensor, depending on the amount of power and the duration of the overload condition.

You can query the allowed maximum power using [SYSTem:SENSor<Sensor>:INFO?](#), or look it up in the specifications document of the sensor.

Replaces the following R&S NRP2 command: [SERvice:DISPlay:OVERload](#)

**Parameters:**

<state> OFF | ON | NEVer  
 \*RST: ON; but does not apply if NEVer is set.

**Manual operation:** See ["Show Sensor Overload Message"](#) on page 183

**DISPlay:PIXMap?**

Queries the display content. The return value is a binary block data, for example:

```
#577110xxxxxx...x
```

#577110 = block data header

xxxxxx...x = binary format comprising an 8-bit BMP bitmap of the display content.

**Usage:** Query only

**DISPlay:UPDate <mode>**

Sets the update frequency of the measured values in the display.

**Parameters:**

<mode> NORMal | SLOW | FREeze  
 FREeze is useful if discontinuities in the voltage progress at the analog outputs occur. In this state, the display does not consume CPU time.  
 \*RST: NORMal

**DISPlay[:WINDow<Window>][:STATe] <state>**

Opens or closes a measurement pane. This action also changes the total number of measurement panes set by [DISPlay:LAYout](#) and vice versa. See also [Chapter 4.1.5, "Selecting the display layout"](#), on page 40.

**Suffix:**

<Window> 1 to 4  
 Measurement pane

**Parameters:**

<state> OFF | ON

**DISPlay[:WINDow<Window>]:POSition <position>**

Swaps the position of measurement panes in the user interface. The numbering of the panes is not changed. See also [Chapter 4.1.6, "Swapping measurement panes"](#), on page 42.

**Suffix:**

<Window> 1 to 4  
 Measurement pane

**Parameters:**

<position>                   Range:     0 to 3  
                                   \*RST:     0

**SYSTem:SPEEd** <mode>

Changes the data processing speed.

**Parameters:**

<mode>                    NORMal | FAST | SLOW | FREeze

**FAST**

The display is switched off and the measured values are no longer displayed, since the continuous update of the screen content requires computation time.

\*RST:                    NORMal

**12.6.1.2 Scaling**

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[SENSe<Sensor>:]TRACe:OFFSet:TIME.....	228
[SENSe<Sensor>:]TRACe:TIME.....	228

---

**CALCulate<Measurement>:METer<DirectionalChannel>:LOWer[:DATA]:CCDF**  
 <value>

Sets the lower limit for the CCDF bargraph display.

**Suffix:**

<Measurement> 1 to 8  
 Measurement

<DirectionalChannel> 1 to 2  
 1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value> Range: 0.0 pct to 100.0 pct  
 \*RST: 0.0 pct  
 Default unit: pct

**Manual operation:** See "[Forward Scale Lower Limit, Reflection Scale Lower Limit](#)" on page 58

---

**CALCulate<Measurement>:METer<DirectionalChannel>:LOWer[:DATA]:RATio:**  
**RCoefficient** <value>

Sets the lower limit for the reflection coefficient bargraph display.

**Suffix:**

<Measurement> 1 to 8  
 Measurement

<DirectionalChannel> 1 to 2  
 1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value> Range: -1e18 to 1e18  
 \*RST: 1.0  
 Default unit: -

**Manual operation:** See "[Scale Lower Limit](#)" on page 57  
 See "[Forward Scale Lower Limit, Reflection Scale Lower Limit](#)" on page 58

---

**CALCulate<Measurement>:METer<DirectionalChannel>:LOWer[:DATA]:RATio:**  
**RFRatio** <value>

Sets the lower limit for the ratio of the forward/reverse power bargraph display.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<DirectionalChannel> 1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value> Range: 0.0 pct to 100.0 pct  
\*RST: 0.0 pct  
Default unit: pct

**Manual operation:** See ["Scale Lower Limit"](#) on page 57  
See ["Forward Scale Lower Limit, Reflection Scale Lower Limit"](#) on page 58

**CALCulate<Measurement>:METer<DirectionalChannel>:LOWer[:DATA]:RATio:  
RLOSs <value>**

Sets the lower limit for the return loss bargraph display.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<DirectionalChannel> 1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value> Range: -200.0 dB to 200.0 dB  
\*RST: -200.0 dB  
Default unit: dB

**Manual operation:** See ["Scale Lower Limit"](#) on page 57  
See ["Forward Scale Lower Limit, Reflection Scale Lower Limit"](#) on page 58

**CALCulate<Measurement>:METer<DirectionalChannel>:LOWer[:DATA]:RATio:  
SWR <value>**

Sets the lower limit for the standing wave ratio (SWR) bargraph display.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<DirectionalChannel> 1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value> Range: 0.0 to 1e18  
 \*RST: 1.0  
 Default unit: -

**Manual operation:** See ["Scale Lower Limit"](#) on page 57  
 See ["Forward Scale Lower Limit, Reflection Scale Lower Limit"](#)  
 on page 58

**CALCulate<Measurement>:METer<DirectionalChannel>:LOWer[:DATA]:RATio[:  
 VALue] <value>**

Sets the lower limit for the power ratio bargraph display.

If you enter a value without unit, the unit is defined by [UNIT<Measurement>:POWER:RATio](#). For further information, see [Chapter 12.6.1.3, "Units"](#), on page 229.

**Suffix:**

<Measurement> 1 to 8  
 Measurement

<DirectionalChannel> 1 to 2  
 1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 =  
 reflection (reverse)

**Parameters:**

<value> Range: -180.0 dB to +180.0 dB  
 \*RST: -20.0 dB  
 Default unit: dB

**Manual operation:** See ["Scale Lower Limit"](#) on page 57  
 See ["Forward Scale Lower Limit, Reflection Scale Lower Limit"](#)  
 on page 58

**CALCulate<Measurement>:METer<DirectionalChannel>:LOWer[:DATA][:POWER]  
 <value>**

Sets the lower limit for the power value bargraph display.

If you enter a value without unit, the unit is defined by [UNIT<Measurement>:POWER\[:VALue\]](#). For further information, see [Chapter 12.6.1.3, "Units"](#), on page 229.

**Suffix:**

<Measurement> 1 to 8  
 Measurement

<DirectionalChannel> 1 to 2  
 1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 =  
 reflection (reverse)

**Parameters:**

<value> Range: -120.0 dBm to +150.0 dBm  
 \*RST: -60.0 dBm  
 Default unit: dBm

**Manual operation:** See ["Scale Lower Limit"](#) on page 57  
 See ["Forward Scale Lower Limit, Reflection Scale Lower Limit"](#)  
 on page 58

**CALCulate<Measurement>:METer<DirectionalChannel>:UPPer[:DATA]:CCDF**  
 <value>

Sets the upper limit for the CCDF bargraph display.

**Suffix:**

<Measurement> 1 to 8  
 Measurement

<DirectionalChannel> 1 to 2  
 1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 =  
 reflection (reverse)

**Parameters:**

<value> Range: 0.0 pct to 100.0 pct  
 \*RST: 100.0 pct  
 Default unit: pct

**Manual operation:** See ["Forward Scale Upper Limit, Reflection Scale Upper Limit"](#)  
 on page 58

**CALCulate<Measurement>:METer<DirectionalChannel>:UPPer[:DATA]:RATio:**  
**RCoefficient** <value>

Sets the upper limit for the reflection coefficient bargraph display.

**Suffix:**

<Measurement> 1 to 8  
 Measurement

<DirectionalChannel> 1 to 2  
 1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 =  
 reflection (reverse)

**Parameters:**

<value> Range: -1e18 to 1e18  
 \*RST: 5.0  
 Default unit: -

**Manual operation:** See ["Scale Upper Limit"](#) on page 57  
 See ["Forward Scale Upper Limit, Reflection Scale Upper Limit"](#)  
 on page 58

**CALCulate<Measurement>:METer<DirectionalChannel>:UPPer[:DATA]:RATio:**  
**RFRatio** <value>

Sets the upper limit for the ratio of the forward/reverse power bargraph display.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<DirectionalChannel> 1 to 2  
1 = primary sensor, 2 = secondary sensor or

**Parameters:**

<value> Range: 0.0 pct to 100.0 pct  
\*RST: 100.0 pct  
Default unit: pct

**Manual operation:** See ["Scale Upper Limit"](#) on page 57  
See ["Forward Scale Upper Limit, Reflection Scale Upper Limit"](#)  
on page 58

**CALCulate<Measurement>:METer<DirectionalChannel>:UPPer[:DATA]:RATio:  
RLOSs <value>**

Sets the upper limit for the return loss bargraph display.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<DirectionalChannel> 1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 =  
reflection (reverse)

**Parameters:**

<value> Range: -200.0 dB to 200.0 dB  
\*RST: 200.0 dB  
Default unit: dB

**Manual operation:** See ["Scale Upper Limit"](#) on page 57  
See ["Forward Scale Upper Limit, Reflection Scale Upper Limit"](#)  
on page 58

**CALCulate<Measurement>:METer<DirectionalChannel>:UPPer[:DATA]:RATio:  
SWR <value>**

Sets the upper limit for the standing wave ratio (SWR) bargraph display.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<DirectionalChannel> 1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 =  
reflection (reverse)

**Parameters:**

<value> Range: 0.0 to 1e18  
 \*RST: 2.0  
 Default unit: -

**Manual operation:** See ["Scale Upper Limit"](#) on page 57  
 See ["Forward Scale Upper Limit, Reflection Scale Upper Limit"](#)  
 on page 58

**CALCulate<Measurement>:METer<DirectionalChannel>:UPPer[:DATA]:RATio[:  
 VALue] <value>**

Sets the upper limit for the power ratio bargraph display.

If you enter a value without unit, the unit is defined by [UNIT<Measurement>:POWER:RATio](#). For further information, see [Chapter 12.6.1.3, "Units"](#), on page 229.

**Suffix:**

<Measurement> 1 to 8  
 Measurement

<DirectionalChannel> 1 to 2  
 1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 =  
 reflection (reverse)

**Parameters:**

<value> Range: -180.0 dB to +180.0 dB  
 \*RST: +20.0 dB  
 Default unit: dB

**Manual operation:** See ["Scale Upper Limit"](#) on page 57  
 See ["Forward Scale Upper Limit, Reflection Scale Upper Limit"](#)  
 on page 58

**CALCulate<Measurement>:METer<DirectionalChannel>:UPPer[:DATA][:POWER]  
 <value>**

Sets the upper limit for the power value bargraph display.

If you enter a value without unit, the unit is defined by [UNIT<Measurement>:POWER\[:VALue\]](#). For further information, see [Chapter 12.6.1.3, "Units"](#), on page 229.

**Suffix:**

<Measurement> 1 to 8  
 Measurement

<DirectionalChannel> 1 to 2  
 1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 =  
 reflection (reverse)

**Parameters:**

<value> Range: -120.0 dBm to +150.0 dBm  
 \*RST: +10.0 dBm  
 Default unit: dBm

**Manual operation:** See ["Scale Upper Limit"](#) on page 57  
 See ["Forward Scale Upper Limit, Reflection Scale Upper Limit"](#)  
 on page 58

#### **CALCulate<Measurement>:TRACe:X[:SCALe]:LEFT <value>**

Defines the position of the left screen edge relative to the delayed trigger. The value can be negative so that signal components are displayed before the trigger event.

**Suffix:**

<Measurement> 1 to 8  
 Measurement

**Parameters:**

<value> Range: -15.0 s to 15.0 s  
 \*RST: 0.0 s  
 Default unit: s

**Manual operation:** See ["Start Time"](#) on page 59

#### **CALCulate<Measurement>:TRACe:X[:SCALe]:LENGth <value>**

Sets the duration of the trace.

**Suffix:**

<Measurement> 1 to 8  
 Measurement

**Parameters:**

<value> Range: 8.3e-9 s to 30.0 s  
 \*RST: 0.01 s  
 Default unit: s

**Manual operation:** See ["Trace Length"](#) on page 59

#### **CALCulate<Measurement>:TRACe:Y[:SCALe]:SPAN:DB <value>**

Effective for trace, pulse analysis, time gate, timeslot measurements.

Sets the power level range.

**Suffix:**

<Measurement> 1 to 8  
 Measurement

**Parameters:**

<value> Range: 0.005 dB to 400.0 dB  
 \*RST: 50.0 dB  
 Default unit: dB

**Manual operation:** See ["Power Span"](#) on page 59

---

**CALCulate<Measurement>:TRACe:Y[:SCALe]:SPAN:DBM <value>**

Effective for trace, pulse analysis, time gate, timeslot measurements.

Sets the power level range.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Parameters:**

<value> Range: 0.005 dB to 400.0 dB  
\*RST: 50.0 dB  
Default unit: dBm

**Manual operation:** See "[Power Span](#)" on page 59

---

**CALCulate<Measurement>:TRACe:Y[:SCALe]:SPAN:DBUV <value>**

Effective for trace, pulse analysis, time gate, timeslot measurements.

Sets the power level range.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Parameters:**

<value> Range: 0.005 dB to 400.0 dB  
\*RST: 100.0 dB  
Default unit: dB $\mu$ V

**Manual operation:** See "[Power Span](#)" on page 59

---

**CALCulate<Measurement>:TRACe:Y[:SCALe]:SPAN:DPCT <value>**

Effective for trace, pulse analysis, time gate, timeslot measurements.

Sets the power level range.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Parameters:**

<value> Range: 0.005 dpct to 2e18 dpct  
\*RST: 200.0 dpct  
Default unit: dpct

**Manual operation:** See "[Power Span](#)" on page 59

---

**CALCulate<Measurement>:TRACe:Y[:SCALe]:SPAN:ONE <value>**

Effective for trace, pulse analysis, time gate, timeslot measurements.



Sets the power level range without unit.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Parameters:**

<value> Range: 0.005 to 2e18  
\*RST: 10.0  
Default unit: -

**Manual operation:** See "[Power Span](#)" on page 59

**CALCulate<Measurement>:TRACe:Y[:SCALe]:SPAN:WATT <value>**

Effective for trace, pulse analysis, time gate, timeslot measurements.

Sets the power level range.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Parameters:**

<value> Range: 1e-12 W to 2e9 W  
\*RST: 1e-3 W  
Default unit: W

**Manual operation:** See "[Power Span](#)" on page 59

**CALCulate<Measurement>:TRACe:Y[:SCALe]:TOP:DB <value>**

Effective for trace, pulse analysis, time gate, timeslot measurements.

Sets the power reference value. The reference value is assigned to the top line of the grid.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Parameters:**

<value> Range: -200.0 dB to 200.0 dB  
\*RST: 25.0 dB  
Default unit: dB

**Manual operation:** See "[Power Reference](#)" on page 59

**CALCulate<Measurement>:TRACe:Y[:SCALe]:TOP:DBM <value>**

Effective for trace, pulse analysis, time gate, timeslot measurements.

Sets the power reference value. The reference value is assigned to the top line of the grid.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Parameters:**

<value> Range: -200.0 dBm to 200.0 dBm  
\*RST: 0.0 dBm  
Default unit: dBm

**Manual operation:** See "[Power Reference](#)" on page 59

**CALCulate<Measurement>:TRACe:Y[:SCALe]:TOP:DBUV <value>**

Effective for trace, pulse analysis, time gate, timeslot measurements.

Sets the power reference value. The reference value is assigned to the top line of the grid.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Parameters:**

<value> Range: -100.0 dBuV to 300.0 dBuV  
\*RST: 150.0 dBuV  
Default unit: dBuV

**Manual operation:** See "[Power Reference](#)" on page 59

**CALCulate<Measurement>:TRACe:Y[:SCALe]:TOP:DPCT <value>**

Effective for trace, pulse analysis, time gate, timeslot measurements.

Sets the power reference value. The reference value is assigned to the top line of the grid.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Parameters:**

<value> Range: -1e18 dpct to 1e18 dpct  
\*RST: 100.0 dpct  
Default unit: dpct

**Manual operation:** See "[Power Reference](#)" on page 59

**CALCulate<Measurement>:TRACe:Y[:SCALe]:TOP:ONE <value>**

Effective for trace, pulse analysis, time gate, timeslot measurements.

Sets the power reference value without unit. The reference value is assigned to the top line of the grid.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Parameters:**

<value> Range: -1e18 to 1e18  
\*RST: 10.0  
Default unit: -

**Manual operation:** See "[Power Reference](#)" on page 59

**CALCulate<Measurement>:TRACe:Y[:SCALe]:TOP:WATT <value>**

Effective for trace, pulse analysis, time gate, timeslot measurements.

Sets the power reference value. The reference value is assigned to the top line of the grid.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Parameters:**

<value> Range: -1e9 W to 1e9 W  
\*RST: 1e-3 W  
Default unit: W

**Manual operation:** See "[Power Reference](#)" on page 59

**DISPlay[:WINDow<Window>]:ANALog:AUTO <state>**

**DISPlay[:WINDow<Window>]:METer:AUTO <state>**

Automatically determines the scaling for the analog display. The upper and the lower limit value are set depending on the current measurement data.

**Suffix:**

<Window> 1 to 4  
Measurement pane

**Parameters:**

<state> ONCE | OFF  
\*RST: OFF

**DISPlay[:WINDow<Window>]:ANALog:LOWer <value>**

**DISPlay[:WINDow<Window>]:METer:LOWer <value>**

Sets the lower limit value of the analog scale.

**Suffix:**

<Window> 1 to 4  
Measurement pane

**Parameters:**

<value> Depends on the current output unit of the measured value.  
 Range: 1e-18 W to 1e18 W; -150 DBM to 210 DBM; PCT:  
 1e-18 PCT to 1e22 PCT; -200 DB to 200 DB

**DISPlay[:WINDow<Window>]:ANALog:UPPer** <value>

**DISPlay[:WINDow<Window>]:METer:UPPer** <value>

Sets the upper limit value of the analog scale.

**Suffix:**

<Window> 1 to 4  
 Measurement pane

**Parameters:**

<value> See [DISPlay\[:WINDow<Window>\]:METer:LOWer](#)  
 on page 227.

**[SENSe<Sensor>:]TRACe:OFFSet:TIME** <time>

Adds an offset to the beginning of the trace sequence. Thus, the trace in the result display is moved in positive or negative x-direction. If you measure with more than one sensor, you can use this offset to arrange the traces to each other. The start of recording relative to the trigger event is set using [TRIGger<Measurement>\[:CHANnel<Channel>\]:DELay\[:VALue\]](#).

**Suffix:**

<Sensor> 1 to 128  
 Configured sensor connected at: port A = 1, ... , port D = 4, R&S  
 NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<time> Range: -15.0 s to 15.0 s  
 \*RST: 0.0 s  
 Default unit: s

**[SENSe<Sensor>:]TRACe:TIME** <time>

Sets the duration of the trace.

**Suffix:**

<Sensor> 1 to 128  
 Configured sensor connected at: port A = 1, ... , port D = 4, R&S  
 NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<time> Range: 8.3e-9 s to 30.0 s  
 \*RST: 0.01 s  
 Default unit: s

**Manual operation:** See "[Power / Div](#)" on page 59

### 12.6.1.3 Units

If you enter a value that is expressed in a certain unit, for example Hz, you can omit the unit. Then, the default unit provided in the remote command description is used. If you need decimal multiples and submultiples of a unit, you can use SCPI prefixes, see "Units" on page 190.

If you enter a power value or power ratio that can be expressed in more than one unit, you can enter the value together with the unit, and the unit is recognized. If you enter a value without unit, the unit defined by one of the following commands is used:

- `UNIT<Measurement>:POWer[:VALue]`
- `UNIT<Measurement>:POWer:RATio`

After a reset, the default unit is used.

<code>SENSe&lt;Sensor&gt;:UNIT:POWer[:VALue]</code> .....	229
<code>SOURce:UNIT:POWer</code> .....	229
<code>UNIT&lt;Measurement&gt;:POWer:RATio</code> .....	230
<code>UNIT&lt;Measurement&gt;:POWer:REFlection</code> .....	230
<code>UNIT&lt;Measurement&gt;:POWer:RELative:STATe</code> .....	230
<code>UNIT&lt;Measurement&gt;:POWer[:VALue]</code> .....	231

---

#### `SENSe<Sensor>:UNIT:POWer[:VALue] <unit>`

Sets the unit for power-related `SENSe` parameters if you enter a value without unit.

Information whether this command applies is given in the description of the affected command.

##### Suffix:

<Sensor>                    1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

##### Parameters:

<unit>                    DBM | DBUV | W  
Available units.  
If the R&S NRP2 emulation is enabled using `SYSTem:LANGuage`, the unit is fixed to W.  
\*RST:                    DBM

---

#### `SOURce:UNIT:POWer <power>`

Requires the R&S NRX-B1 sensor check source.

Sets the unit of the power level for the output signal.

##### Parameters:

<power>                    DBM | DBUV | W  
\*RST:                    DBM

**Manual operation:** See "Power Level" on page 151

---

**UNIT<Measurement>:POWer:RATio <unit>**

Sets the output unit for the measured power ratio values. For NRT measurements, sets the unit of the relative forward power measurement.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Parameters:**

<unit> DB | DPCT | O  
The character o stands for One (x1).  
\*RST: DB

**Manual operation:** See ["Unit"](#) on page 56  
See ["Forward Unit"](#) on page 61

---

**UNIT<Measurement>:POWer:REFLection <unit>**

Effective if [CALCulate<Measurement>\[:CHANnel<Channel>\]:FEED<Channel>](#)  
"POWer:REVerse" is set.

Sets how the ratio of forward and reflected power is expressed.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Parameters:**

<unit> RCO | RL | SWR | RFR  
**RCO**  
Reflection coefficient; 0 to 1, no unit  
**RL**  
Return loss in dB  
**SWR**  
Standing wave ratio; 1 to ∞, no unit  
**RFR**  
Ratio between forward and reflected power; 0 % to 100 %  
\*RST: SWR

**Manual operation:** See ["Standing Wave Ratio \(SWR\)"](#) on page 115  
See ["Return Loss"](#) on page 115  
See ["Reflection Coefficient"](#) on page 115  
See ["Reflection Ratio"](#) on page 116

---

**UNIT<Measurement>:POWer:RELative:STATe <state>**

Alias for [CALCulate<Measurement>:RELative<DirectionalChannel>:STATe](#)  
on page 256.

ON corresponds to ON and SET.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Parameters:**

<state> OFF | ON  
\*RST: 0

**UNIT<Measurement>:POWer[:VALue] <unit>**

Sets the output unit for the measured power values. For NRT measurements, sets the unit of the absolute forward power measurement.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Parameters:**

<unit> DBM | DBUV | W  
\*RST: DBM

**Manual operation:** See "Unit" on page 56  
See "Forward Unit" on page 61

**12.6.1.4 Limits**

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**CALCulate<Measurement>:LIMit<undef>:CLEar:AUTO <mode>**

If enabled, automatically resets the limit monitoring state and the internal counter for limit violations if one of the following commands is executed:

- INITiate<Measurement>[:IMMediate]
- INITiate<Measurement>:CONTInuous ON
- MEASure<Measurement>... query
- READ<Measurement>... query

**Suffix:**

<Measurement>	1 to 8 Measurement
<undef>	1 to n No suffix required.

**Parameters:**

<mode>	OFF   ON   ONCE
--------	-----------------

**CALCulate<Measurement>:LIMit<undef>:CLEar[:IMMediate]**

Resets the limit monitoring state and the internal counter for limit violations.

**Suffix:**

<Measurement>	1 to 8 Measurement
<undef>	1 to n No suffix required.

**Usage:** Event

**CALCulate<Measurement>:LIMit<undef>:FAIL?**

Queries whether upper or lower limits have been violated. If one of the following events occurs, the status is reset:

- R&S NRX is switched on.
- Reset is performed (\*RST).
- CALCulate<Measurement>:LIMit<undef>:CLEar[:IMMediate] is executed.

**Suffix:**

<Measurement>	1 to 8 Measurement
<undef>	1 to n No suffix required.

**Usage:** Query only



**CALCulate<Measurement>:LIMit<undef>:FCOut?**

Queries the number of limit violations. The counter is reset if one of the following events occurs:

- R&S NRX is switched on.
- Reset is performed (\*RST).
- `CALCulate<Measurement>:LIMit<undef>:CLEar[:IMMEDIATE]` is executed.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<undef> 1 to n  
No suffix required.

**Usage:** Query only

**CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer[:DATA] <value>**

Sets the lower limit for the measured values.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<DirectionalChannel> 1 to 2  
1 = forward, 2 = reflection (reverse)

**Parameters:**

<value>

**Manual operation:** See "[Lower Limit](#)" on page 61  
See "[Forward Lower Limit, Reflection Lower Limit](#)" on page 62

**CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer[:DATA]:CCDF <value>**

Sets the lower limit for the complementary cumulative distribution function (CCDF).

**Suffix:**

<Measurement> 1 to 8  
Measurement

<DirectionalChannel> 1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value> Range: 0.0 pct to 100.0 pct  
\*RST: 0.0 pct  
Default unit: pct

**Manual operation:** See "[Forward Lower Limit, Reflection Lower Limit](#)" on page 62

---

**CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer[:DATA]:RATio:  
RCOefficient <value>**

Sets the lower limit for the reflection coefficient.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<DirectionalChannel> 1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value> Range: -1e18 to 1e18  
\*RST: 1.0  
Default unit: -

**Manual operation:** See "[Lower Limit](#)" on page 61  
See "[Forward Lower Limit, Reflection Lower Limit](#)" on page 62

---

**CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer[:DATA]:RATio:  
RFRatio <value>**

Sets the lower limit for the ratio of forward/reverse power.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<DirectionalChannel> 1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value> Range: 0.0 pct to 100.0 pct  
\*RST: 0.0 pct  
Default unit: pct

**Manual operation:** See "[Lower Limit](#)" on page 61  
See "[Forward Lower Limit, Reflection Lower Limit](#)" on page 62

---

**CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer[:DATA]:RATio:  
RLOSS <value>**

Sets the lower limit for the return loss.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<DirectionalChannel> 1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value> Range: -200.0 dB to 200.0 dB  
 \*RST: -200.0 dB  
 Default unit: dB

**Manual operation:** See "[Lower Limit](#)" on page 61  
 See "[Forward Lower Limit, Reflection Lower Limit](#)" on page 62

**CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer[:DATA]:RATio:  
 SWR <value>**

Sets the lower limit for the standing wave ratio (SWR).

**Suffix:**

<Measurement> 1 to 8  
 Measurement

<DirectionalChannel> 1 to 2  
 1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value> Range: 0.0 to 1e18  
 \*RST: 1.0  
 Default unit: -

**Manual operation:** See "[Lower Limit](#)" on page 61  
 See "[Forward Lower Limit, Reflection Lower Limit](#)" on page 62

**CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer[:DATA]:RATio[:  
 VALue] <value>**

Sets the lower limit for the measured power ratios.

If you enter a value without unit, the unit is defined by [UNIT<Measurement>:POWER:RATio](#). For further information, see [Chapter 12.6.1.3, "Units"](#), on page 229.

**Suffix:**

<Measurement> 1 to 8  
 Measurement

<DirectionalChannel> 1 to 2  
 1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value> Range: -180.0 dB to +180.0 dB  
 \*RST: -20.0 dB  
 Default unit: dB

**Manual operation:** See "[Lower Limit](#)" on page 61  
 See "[Forward Lower Limit, Reflection Lower Limit](#)" on page 62

---

**CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer[:DATA]:POWER**  
<value>

Sets the lower limit for the measured power values.

If you enter a value without unit, the unit is defined by **UNIT<Measurement>:POWER[:VALue]**. For further information, see [Chapter 12.6.1.3, "Units"](#), on page 229.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<DirectionalChannel> 1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value> Range: -120.0 dBm to +150.0 dBm  
\*RST: -60.0 dBm  
Default unit: dBm

**Manual operation:** See ["Lower Limit"](#) on page 61  
See ["Forward Lower Limit, Reflection Lower Limit"](#) on page 62

---

**CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer:STATE** <state>

Enables or disables the monitoring function for the lower limit.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<DirectionalChannel> 1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<state> \*RST: OFF

**Manual operation:** See ["Lower Limit State"](#) on page 61  
See ["Forward Lower Limit State, Reflection Lower Limit State"](#) on page 62

---

**CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer[:DATA]** <value>

Sets the upper limit for the measured values.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<DirectionalChannel> 1 to 2  
1 = forward, 2 = reflection (reverse)

**Parameters:**

&lt;value&gt;

**Manual operation:** See ["Upper Limit"](#) on page 62  
 See ["Forward Upper Limit, Reflection Upper Limit"](#) on page 63

**CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer[:DATA]:CCDF**  
 <value>

Sets the upper limit for the complementary cumulative distribution function (CCDF).

**Suffix:**

<Measurement> 1 to 8  
 Measurement

<DirectionalChannel> 1 to 2  
 1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value> Range: 0.0 pct to 100.0 pct  
 \*RST: 100.0 pct  
 Default unit: pct

**Manual operation:** See ["Forward Upper Limit, Reflection Upper Limit"](#) on page 63

**CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer[:DATA]:RATio:**  
**RCoefficient** <value>

Sets the upper limit for the reflection coefficient.

**Suffix:**

<Measurement> 1 to 8  
 Measurement

<DirectionalChannel> 1 to 2  
 1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value> Range: -1e18 to 1e18  
 \*RST: 5.0  
 Default unit: -

**Manual operation:** See ["Upper Limit"](#) on page 62  
 See ["Forward Upper Limit, Reflection Upper Limit"](#) on page 63

**CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer[:DATA]:RATio:**  
**RFRatio** <value>

Sets the upper limit for the ratio of forward/reverse power.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<DirectionalChannel> 1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value> Range: 0.0 pct to 100.0 pct  
\*RST: 100.0 pct  
Default unit: pct

**Manual operation:** See ["Upper Limit"](#) on page 62  
See ["Forward Upper Limit, Reflection Upper Limit"](#) on page 63

**CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer[:DATA]:RATio:  
RLOs <value>**

Sets the upper limit for the return loss.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<DirectionalChannel> 1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value> Range: -200.0 dB to 200.0 dB  
\*RST: 200.0 dB  
Default unit: dB

**Manual operation:** See ["Upper Limit"](#) on page 62  
See ["Forward Upper Limit, Reflection Upper Limit"](#) on page 63

**CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer[:DATA]:RATio:SWR  
<value>**

Sets the upper limit for the standing wave ratio (SWR).

**Suffix:**

<Measurement> 1 to 8  
Measurement

<DirectionalChannel> 1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value> Range: 0.0 to 1e18  
\*RST: 2.0  
Default unit: -

**Manual operation:** See ["Upper Limit"](#) on page 62  
See ["Forward Upper Limit, Reflection Upper Limit"](#) on page 63

**CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer[:DATA]:RATio[:VALue] <value>**

Sets the upper limit for the measured power ratios.

If you enter a value without unit, the unit is defined by `UNIT<Measurement>:POWER:RATio`. For further information, see [Chapter 12.6.1.3, "Units"](#), on page 229.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<DirectionalChannel> 1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value> Range: -180.0 dB to +180.0 dB  
\*RST: +20.0 dB  
Default unit: dB

**Manual operation:** See ["Upper Limit"](#) on page 62  
See ["Forward Upper Limit, Reflection Upper Limit"](#) on page 63

**CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer[:DATA]:POWER <value>**

Sets the upper limit for the measured power values.

If you enter a value without unit, the unit is defined by `UNIT<Measurement>:POWER[:VALue]`. For further information, see [Chapter 12.6.1.3, "Units"](#), on page 229.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<DirectionalChannel> 1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value> Range: -120.0 dBm to +150.0 dBm  
\*RST: +10.0 dBm  
Default unit: dBm

**Manual operation:** See ["Upper Limit"](#) on page 62  
See ["Forward Upper Limit, Reflection Upper Limit"](#) on page 63

---

**CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer:STATe** <state>

Enables or disables the monitoring function for the upper limit.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<DirectionalChannel> 1 to 2  
1 = primary sensor, 2 = secondary sensor or

**Parameters:**

<state> \*RST: OFF

**Manual operation:** See "Upper Limit State" on page 62  
See "Forward Upper Limit State, Reflection Upper Limit State" on page 63

### 12.6.1.5 Result formats and screenshots

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---

**FORMat:SREGister** <sregister>

Specifies the format that is used for the return value of \*STB?.

**Parameters:**

<sregister> ASCii | BINary | HEXadecimal | OCTal  
\*RST: ASCii

---

**FORMat[:READings][:DATA]** [<data,length>, <arg1>]

Specifies how the controller expects numeric data from the R&S NRX.

**Parameters:**

<data,length> <REAL,32 | 64>  
Floating point numbers as standardized in IEEE 754, 32-bit or 64-bit. If you omit the length, the R&S NRX uses the last used length.  
Example for REAL, 32 format:  
#14....<binary float value>....  
Example for REAL, 64 format:  
#18....<binary float value>....



<arg1> <ASCIi[,0 to 12]>  
 Readable value. The digit defines the number of decimal places.  
 If more values are output, they are separated by commas.  
 Example: -2.279610E+01  
 \*RST: ASCIi,0  
 The reset value 0 does not restrict the number of decimal places.

---

#### FORMat[:READings]:BORDER <border>

Selects the order of bytes in 64-bit binary data.

##### Parameters:

<border> NORMal | SWAPped

##### **NORMal**

The 1st byte is the least significant byte, the 4th/8th byte the most significant byte.

Fulfills the Little Endian (little end comes first) convention, used by x86/x64 CPUs, for example.

##### **SWAPped**

The 1st byte is the most significant byte, the 4th/8th byte the least significant byte.

Fulfills the Big Endian (big end comes first) convention.

\*RST: NORMal

**Example:** FORM:BORD NORM

---

#### SYSTem:HCOPY [<filename>]

Creates a screenshot of the current display. If you supply a filename with the command, this filename is used for the target file. Otherwise, an internal name is generated that you can query using this command.

See also [Chapter 4.1.8, "Creating and saving screenshots"](#), on page 44.

##### Parameters:

<filename>

**Manual operation:** See "[Screenshot](#)" on page 29

## 12.6.2 Configuring the trigger

Further information:

- [Chapter 6.1.3, "Triggering"](#), on page 65

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---

**TRIGger<undef>:ALL:ATRigger[:STATe] <stat>**
**TRIGger<Measurement>[:CHANnel<Channel>]:ATRigger[:STATe] <stat>**

Controls the automatic trigger function. If enabled, an artificial trigger is generated if the delay time has elapsed after the measurement start, and no trigger event has occurred.

The auto delay is set using `TRIGger<Measurement>[:CHANnel<Channel>]:DELay:AUTO` on page 243.

The command is not fully R&S NRP2 compatible. If port 1 is assigned to measurement 1, and so on, the command works. If port 1 is assigned to measurement 2, for example, enable the R&S NRP2 emulation by using `SYSTEM:LANGUage "NRP2"`.

**Suffix:**

<Measurement>	1 to 8 Measurement
<Channel>	1 to 2 1 = primary sensor, 2 = secondary sensor

**Parameters:**

<stat>	ON   OFF
*RST:	ON

---

**TRIGger<undef>:ALL:COUNT <count>**

**TRIGger<Measurement>[:CHANnel<Channel>]:COUNT <count>**

Sets the number of measurement cycles to be performed when the measurement is started using `INITiate<Measurement>[:IMMediate]`.

This number equals the number of results that can be obtained from the sensor after a single measurement. As long as the defined number of measurements is not executed, the sensor automatically initiates another measurement internally when the current result is available.

This command is particularly useful for measurements with buffering. For example, to fill a buffer with a predefined size with measurements that have been triggered externally or by `*TRG` without having to start the measurement multiple times.

The command is not fully R&S NRP2 compatible. If port 1 is assigned to measurement 1, and so on, the command works. If port 1 is assigned to measurement 2, for example, enable the R&S NRP2 emulation by using `SYSTEM:LANGuage "NRP2"`.

**Suffix:**

<Measurement>      1 to 8  
                         Measurement

<Channel>            1 to 2  
                         1 = primary sensor, 2 = secondary sensor

**Parameters:**

<count>              Range:      Depends on sensor  
                         \*RST:        1

---

**TRIGger<undef>:ALL:DElay:AUTO <stat>**

**TRIGger<Measurement>[:CHANnel<Channel>]:DElay:AUTO <stat>**

If enabled, no measurement is started until the sensor has settled. For this purpose, the delay value is automatically determined.

If a longer period is set using `TRIGger<Measurement>[:CHANnel<Channel>]:DElay[:VALue]`, the automatically determined delay is ignored.

The command is not fully R&S NRP2 compatible. If port 1 is assigned to measurement 1, and so on, the command works. If port 1 is assigned to measurement 2, for example, enable the R&S NRP2 emulation by using `SYSTEM:LANGuage "NRP2"`.

**Suffix:**

<Measurement>      1 to 8  
                         Measurement

<Channel>            1 to 2  
                         1 = primary sensor, 2 = secondary sensor

**Parameters:**

<stat>                ON | OFF  
                         \*RST:        OFF

---

**TRIGger<undef>:ALL:DELAy[:VALue] <delay>**

**TRIGger<Measurement>[:CHANnel<Channel>]:DELAy[:VALue] <delay>**

Sets the delay between the trigger event and the beginning of the actual measurement.

The command is not fully R&S NRP2 compatible. If port 1 is assigned to measurement 1, and so on, the command works. If port 1 is assigned to measurement 2, for example, enable the R&S NRP2 emulation by using `SYSTem:LANGuage "NRP2"`.

**Suffix:**

<Measurement>      1 to 8  
Measurement

<Channel>            1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<delay>              Range:      -5.0 s to 10.0 s  
                         \*RST:      0.0 s  
                         Default unit: s

**Manual operation:** See "[Delay](#)" on page 69

---

**TRIGger<undef>:ALL:DTIME <dropout>**

**TRIGger<Measurement>[:CHANnel<Channel>]:DTIME <dropout>**

If the trigger level has been underrun with internal triggering, it is sometimes useful to wait some time (dropout time) before retriggering. The measurement of unwanted signal components can thus be suppressed. See [Chapter 6.1.3.3, "Dropout time"](#), on page 66.

The command is not fully R&S NRP2 compatible. If port 1 is assigned to measurement 1, and so on, the command works. If port 1 is assigned to measurement 2, for example, enable the R&S NRP2 emulation by using `SYSTem:LANGuage "NRP2"`.

**Suffix:**

<Measurement>      Measurement

<Channel>            1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<dropout>            Range:      0.0 s to 10.0 s  
                         \*RST:      0.0 s  
                         Default unit: s

**Manual operation:** See "[Dropout](#)" on page 70

---

**TRIGger<Measurement>[:CHANnel<Channel>]:EXTernal<Port>:IMPedance <impedance>**

Requires a power sensor with a trigger input.

Sets the termination resistance of the external trigger signal that is supplied at the trigger input/output of the sensor. Choose a setting that fits the impedance of the trigger source to minimize reflections on the trigger signals.

**Suffix:**

<Measurement>	1 to 8 Measurement
<Channel>	1 to 2 1 = primary sensor, 2 = secondary sensor
<Port>	1 to 2 Power sensor ports; 1 = USB port, 2 = trigger I/O connector

**Parameters:**

<impedance>	HIGH   LOW
	<b>HIGH</b> ~10 kΩ
	<b>LOW</b> 50 kΩ
	*RST: HIGH

**Manual operation:** See "[Trigger 2 Input Impedance](#)" on page 71

**TRIGger<undef>:ALL:HOLDoff <holdoff>**

**TRIGger<Measurement>[:CHANnel<Channel>]:HOLDoff <holdoff>**

Sets the holdoff time, see [Chapter 6.1.3.4, "Holdoff time"](#), on page 67.

The command is not fully R&S NRP2 compatible. If port 1 is assigned to measurement 1, and so on, the command works. If port 1 is assigned to measurement 2, for example, enable the R&S NRP2 emulation by using `SYSTem:LANGuage "NRP2"`.

**Suffix:**

<Measurement>	1 to 8 Measurement
<Channel>	1 to 2 1 = primary sensor, 2 = secondary sensor

**Parameters:**

<holdoff>	Range: 0.0 s to 10.0 s
	*RST: 0.0 s
	Default unit: s

**Manual operation:** See "[Holdoff](#)" on page 70

**TRIGger<undef>:ALL:HYSTeresis <hysteresis>**

**TRIGger<Measurement>[:CHANnel<Channel>]:HYSTeresis <hysteresis>**

Sets the hysteresis. A trigger event occurs, if the trigger level:

- Falls below the set value on a rising slope.
- Rises above the set value on a falling slope.

Thus, you can use this setting to eliminate the effects of noise in the signal for the edge detector of the trigger system.

The command is not fully R&S NRP2 compatible. If port 1 is assigned to measurement 1, and so on, the command works. If port 1 is assigned to measurement 2, for example, enable the R&S NRP2 emulation by using `SYSTem:LANGuage "NRP2"`.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<hysteresis> Range: 0.0 dB to 10.0 dB  
\*RST: 0.0 dB  
Default unit: dB

**Manual operation:** See "[Hysteresis](#)" on page 70

**TRIGger<Measurement>[:CHANnel<Channel>]:JITTer:METHod <method>**

Defines the method how to cope with the misalignment between the trigger event and the sample point.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<method> COMPensate | MEASure | NONE

**COMPensate**  
Compensation means to resample the trace result.

**MEASure**  
Does not perform resampling, but stores the measured trigger jitter.

\*RST: COMPensate

**Manual operation:** See "[Jitter Suppression](#)" on page 70

**TRIGger<undef>:ALL:LEVel <level>**

**TRIGger<Measurement>[:CHANnel<Channel>]:LEVel <level>**

Effective only if `TRIGger<Measurement>[:CHANnel<Channel>]:SOURce INTernal`.

Sets the trigger threshold for internal triggering derived from the test signal.

If you enter a value without unit, the unit is defined by `UNIT<Measurement>:POWER[:VALue]`. For further information, see [Chapter 12.6.1.3, "Units"](#), on page 229.

The command is not fully R&S NRP2 compatible. If port 1 is assigned to measurement 1, and so on, the command works. If port 1 is assigned to measurement 2, for example, enable the R&S NRP2 emulation by using `SYSTem:LANGuage "NRP2"`.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<level> Range: -290.0 dBm to +223.01 dBm  
\*RST: -10.0 dBm  
Default unit: dBm

**Manual operation:** See "[Trigger Level](#)" on page 69

**TRIGger<undef>:ALL:MODE <mode>**

**TRIGger<Measurement>:MODE <mode>**

Controls the trigger execution depending on the setting of the trigger source, see [TRIGger<Measurement>\[:CHANnel<Channel>\]:SOURce](#).

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Parameters:**

<mode> NORMAl | FREerun | SINGle | AUTO

**NORMAl**

Continuous triggering with regular trigger events.

**FREerun**

Enables a continuous measurement. The sensor executes one measurement cycle after the other.

**SINGle**

Disables continuous triggering so that only one trigger event at a time is executed.

**AUTO**

Automatically starts a measurement if no trigger event has occurred after 300 ms.

\*RST: AUTO

**Manual operation:** See "[Trigger Mode](#)" on page 68

**TRIGger<Measurement>[:CHANnel<Channel>]:SENDER:PORT <port>**

Effective only if the connected sensor is trigger sender, see

[TRIGger<Measurement>\[:CHANnel<Channel>\]:SENDER\[:STATE\]](#).

Sets the port where the trigger sender sensor outputs a digital trigger signal.

**Suffix:**

<Measurement>	1 to 8 Measurement
<Channel>	1 to 2 1 = primary sensor, 2 = secondary sensor

**Parameters:**

<port>	INTernal   EXT2   EXTernal2
*RST:	INTernal

**Manual operation:** See "[Trigger Sender Port](#)" on page 71

**TRIGger<Measurement>[:CHANnel<Channel>]:SENDER[:STATe] <state>**

Enables or disables the sensor as trigger sender. If enabled, the sensor outputs a digital trigger signal in sync with its own trigger event. The trigger signal is output at the port selected by `TRIGger<Measurement>[:CHANnel<Channel>]:SENDER:PORT`.

The trigger sender has to use its internal trigger source. Set the trigger source for the trigger receivers to `INTA | INTB | INTC | INTD`, where [A to D] is the port to which the trigger sender is connected. The trigger signal generated by the trigger sender is routed to the R&S NRX. From the R&S NRX, it is distributed to the trigger receivers and, if `OUTPut:TRIGger:SOURce SENS1 | SENS2 | SENS3 | SENS4` is set, also to the trigger output.

The command is not fully R&S NRP2 compatible. If port 1 is assigned to measurement 1, and so on, the command works. If port 1 is assigned to measurement 2, for example, enable the R&S NRP2 emulation by using `SYSTem:LANGUage "NRP2"`.

**Suffix:**

<Measurement>	1 to 8 Measurement
<Channel>	1 to 2 1 = primary sensor, 2 = secondary sensor

**Parameters:**

<state>	ON   OFF
*RST:	OFF

**Manual operation:** See "[Trigger Sender State](#)" on page 70

**TRIGger<undef>:ALL:SLOPe <slope>****TRIGger<Measurement>[:CHANnel<Channel>]:SLOPe <slope>**

Determines which edge of the envelope power (internal triggering) or increasing voltage (external triggering) is used for triggering.

The command is not fully R&S NRP2 compatible. If port 1 is assigned to measurement 1, and so on, the command works. If port 1 is assigned to measurement 2, for example, enable the R&S NRP2 emulation by using `SYSTem:LANGUage "NRP2"`.



**Suffix:**

<Measurement> 1 to 8  
Measurement

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<slope> POSitive | NEGative  
\*RST: POSitive

**Manual operation:** See "[Slope](#)" on page 69

**TRIGger<undef>:ALL:SOURce <source>**

**TRIGger<Measurement>[:CHANnel<Channel>]:SOURce <source>**

Sets the source for the trigger event. See [Chapter 6.1.3.2, "Trigger sources"](#), on page 65.

The command is not fully R&S NRP2 compatible. If port 1 is assigned to measurement 1, and so on, the command works. If port 1 is assigned to measurement 2, for example, enable the R&S NRP2 emulation by using `SYSTem:LANGuage "NRP2"`.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<source> INTernal | EXTernal | INTA | INTB | INTC | INTD | EXT2 |  
EXTernal2 | CHKSource | BUS | HOLD | IMMEDIATE  
See [Chapter 6.1.3.2, "Trigger sources"](#), on page 65.

**IMMEDIATE**

Measures immediately, does not wait for trigger condition.

\*RST: INTernal

**Manual operation:** See "[Trigger Source](#)" on page 69

**TRIGger<Measurement>[:CHANnel<Channel>]:SYNChronize:PORT <port>**

Sets the internal or external connection for the sync output of the sensor. For more information, see `TRIGger<Measurement>[:CHANnel<Channel>]:SYNChronize[:STATe]` on page 250.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<port>                   INTernal | EXT2 | EXTernal2  
 \*RST:                   INTernal

**Manual operation:** See "[Trigger Synchronize Port](#)" on page 71

**TRIGger<undef>:ALL:SYNChronize[:STATe] <state>**

**TRIGger<Measurement>[:CHANnel<Channel>]:SYNChronize[:STATe] <state>**

Usually used if [TRIGger<Measurement>\[:CHANnel<Channel>\]:SENDER\[:STATe\]](#) ON is set.

If enabled, blocks the external trigger bus as long as the sensor remains in the measurement state. Thus, ensures that a new measurement is only started after all sensors have completed their measurements.

Make sure that the number of repetitions is the same for all sensors involved in the measurement. Otherwise, the trigger bus is blocked by any sensor that has completed its measurements before the others and has returned to the idle state.

The command is not fully R&S NRP2 compatible. If port 1 is assigned to measurement 1, and so on, the command works. If port 1 is assigned to measurement 2, for example, enable the R&S NRP2 emulation by using [SYSTEM:LANGuage "NRP2"](#).

**Suffix:**

<Measurement>       1 to 8  
                           Measurement

<Channel>             1 to 2  
                           1 = primary sensor, 2 = secondary sensor

**Parameters:**

<state>               ON | OFF  
 \*RST:                 OFF

**Manual operation:** See "[Trigger Synchronize State](#)" on page 71

**TRIGger<undef>:ALL[:IMMEDIATE]**

**TRIGger<Measurement>[:IMMEDIATE]**

Starts a measurement.

**Suffix:**

<Measurement>       1 to 8  
                           Measurement

**Usage:**             Event

### 12.6.3 Selecting the measurement

Before starting a measurement, select the measurement type.

**CALCulate<Measurement>[:CHANnel<Channel>]:FEED<Channel> "<string>"**

Determines the data that are processed. The parameters depend on the measurement type.

The sensor averages every measured value using a series of samples. If a `RANDom` feed is selected, the sensor takes a random value from the samples and forwards it to the R&S NRX as a measured value. `PEAK` is the maximum of all samples in the measurement interval.

**Table 12-4: Parameter to measurement assignment**

Measurement type	"<string>"	Measured value
Continuous average	POWER:AVERage POWER:PEAK POWER:RANDom	Average value Peak value Randomly selected value
Burst average	POWER:AVERage POWER:PEAK POWER:RANDom	Average value Peak value Randomly selected value
Trace	POWER:TRACe POWER:PEAK:TRACe POWER:RANDom:TRACe	Measurement sequence Peak value of the samples per test point Randomly selected value
Pulse analysis	POWER:TRACe POWER:PEAK:TRACe POWER:RANDom:TRACe	Measurement sequence Peak value of the samples per test point Randomly selected value
Time gate	POWER:AVERage POWER:PEAK POWER:RANDom	Average value Peak value Randomly selected value
Time gate Graphical display The suffix <1 to 4> selects the time gate.	POWER:AVERage ON SWEEp<1 to 4> POWER:PTAVerage ON SWEEp<1 to 4> POWER:PEAK ON SWEEp<1 to 4>	Average value in time gate 1, 2, 3 or 4 Peak-to-average value in time gate 1, 2, 3 or 4 Peak value in time gate 1, 2, 3 or 4
Timeslot	POWER:AVERage POWER:PEAK POWER:RANDom	Average value Peak value Randomly selected value
Statistics	CCDF:TRACe CDF:TRACe PDF:TRACe	Complementary cumulative distribution function Cumulative distribution function Probability density function

## Measurement settings and results

Measurement type	"<string>"	Measured value
NRT, absolute Forward direction	POWER:FORWARD:AVERAGE POWER:FORWARD:PEP POWER:ABSORPTION:AVERAGE POWER:ABSORPTION:PEP POWER:FORWARD:AVERAGE:BURST POWER:ABSORPTION:AVERAGE: BURST	Average power Peak power of an amplitude-modulated signal Absorbed average power Absorbed peak envelope power (PEP) Average power within a burst Absorbed burst average
NRT, absolute Reverse direction	POWER:OFF POWER:REVERSE	Reflected power disabled Reflected power
NRT, relative Forward direction	POWER:FORWARD:CCDFUNCTION POWER:CFACTOR	Complementary cumulative distribution function Crest factor
NRT, relative Reverse direction	POWER:SWRATIO POWER:RLOSS POWER:RCOEFFICIENT POWER:RFRATIO	Standing wave ratio Return loss Reflection coefficient Reflection ratio

**Suffix:**

&lt;Measurement&gt;

1 to 8  
Measurement

&lt;Channel&gt;

1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

&lt;Channel&gt;

1 to 2  
1 for R&S NRX  
2 is allowed for R&S NRP2 compatibility, but only if the first channel suffix is set to 1.**Parameters:**

"&lt;string&gt;"

The availability depends on the measurement type, see [Table 12-4](#).

\*RST: POWER:AVERAGE

**Manual operation:** See ["Statistics Function"](#) on page 107  
 See ["Average"](#) on page 113  
 See ["CCDF"](#) on page 113  
 See ["Peak Envelope Power \(PEP\)"](#) on page 113  
 See ["Absorption Average"](#) on page 113  
 See ["Crest Factor \(CF\)"](#) on page 114  
 See ["Absorption PEP"](#) on page 114  
 See ["Burst Average"](#) on page 114  
 See ["Absorption Burst"](#) on page 114  
 See ["Off"](#) on page 115  
 See ["Reverse Power"](#) on page 115  
 See ["Standing Wave Ratio \(SWR\)"](#) on page 115  
 See ["Return Loss"](#) on page 115  
 See ["Reflection Coefficient"](#) on page 115  
 See ["Reflection Ratio"](#) on page 116  
 See ["Evaluate"](#) on page 120

---

### CALCulate<Measurement>:TYPE <type>

Sets the measurement type.

**Suffix:**

<Measurement> 1 to 8  
 Measurement

**Parameters:**

<type> CONTav | NRT | TRACe | STATistics | TGATe | BURStav |  
 TSLot | PULSe  
 \*RST: CONTav

**Manual operation:** See ["Measurement Type"](#) on page 72

---

### [SENSe<Sensor>:]AUXiliary <mode>

Enables the measurement of additional measured values that are determined together with the main measured value.

**Suffix:**

<Sensor> 1 to 128  
 Configured sensor connected at: port A = 1, ... , port D = 4, R&S  
 NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<mode> NONE | MINMax | RNDMax

**NONE**

No additional values are measured.

**MINMax**

Minima and maxima of the trace are transmitted together with the measured value.

Usually, extreme values are lost due to averaging the measured values.

**RNDMax**

Randomly selected samples are transmitted. All evaluations use these values instead of the average values.

\*RST: NONE

## 12.6.4 Selecting the sensor

Further information:

- [Chapter 6.1.4, "Measurement settings dialog"](#), on page 71

<a href="#">[SENSe&lt;Sensor&gt;:]CATalog?</a> .....	254
<a href="#">CALCulate&lt;Measurement&gt;[:CHANnel&lt;Channel&gt;]:SENSe:INDex</a> .....	254

---

### [SENSe<Sensor>:]CATalog?

Returns a list of all connected sensors together with the suffix of the port where the sensor is connected.

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Example:**

```
CAT?
Query
"2:NRP33SN-900004"
Response
```

**Usage:** Query only

**Manual operation:** See "[Primary Sensor, Secondary Sensor](#)" on page 72

---

### CALCulate<Measurement>[:CHANnel<Channel>]:SENSe:INDex <index>

Effective for continuous average, burst average, trace, pulse analysis, time gate, time-slot measurements.

Assigns the primary or secondary sensor. You can choose any of the sensors that are connected to a sensor port of the R&S NRX. You can query the connected sensors using [\[SENSe<Sensor>:\]CATalog?](#).

**Suffix:**

<Measurement> 1 to 8  
Measurement

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<index> Selects the sensor by the sensor port to which it is connected.

**1 to 4**

Sensor connector A, B, C, D

**4 to 100**

USB connector

**101**

Optional connector: R&amp;S NRX-B9 sensor interface for R&amp;S NRT

**102 to 128**

LAN interface

Range: 0 to 128

\*RST: 0

**Manual operation:** See ["Primary Sensor, Secondary Sensor"](#) on page 72

## 12.6.5 Relative measurements

Available for continuous average, burst average, time gate, timeslot measurements.

Further information:

- ["Rel"](#) on page 76
- Relative NRT measurements: [Chapter 12.6.13, "NRT measurements"](#), on page 335

<a href="#">CALCulate&lt;Measurement&gt;:RELative&lt;DirectionalChannel&gt;[:MAGNitude]</a> .....	255
<a href="#">CALCulate&lt;Measurement&gt;:RELative&lt;DirectionalChannel&gt;[:MAGNitude]:AUTO</a> .....	255
<a href="#">CALCulate&lt;Measurement&gt;:RELative&lt;DirectionalChannel&gt;:STATE</a> .....	256
<a href="#">[SENSe&lt;Sensor&gt;:]POWer:REFerence</a> .....	257

---

**CALCulate<Measurement>:RELative<DirectionalChannel>[:MAGNitude] <value>**

Sets the reference value for the measured relative values.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<DirectionalChannel> 1 to 2  
1 = forward, 2 = reflection (reverse)

**Parameters:**

&lt;value&gt;

**Manual operation:** See ["Forward Reference Value, Reflection Reference Value"](#) on page 60  
See ["Reference Value"](#) on page 76

---

**CALCulate<Measurement>:RELative<DirectionalChannel>[:MAGNitude]:AUTO <state>**Alias for [CALCulate<Measurement>:RELative<DirectionalChannel>:STATE](#) on page 256.

ONCE corresponds to SET

**Suffix:**

<Measurement> 1 to 8  
Measurement

<DirectionalChannel> 1 to 2  
1 = forward, 2 = reflection (reverse)

**Parameters:**

<state> OFF | ONCE  
\*RST: OFF

**Manual operation:** See ["Forward Relative State, Reflection Relative State"](#) on page 60  
See ["Relative Measurements"](#) on page 76

**CALCulate<Measurement>:RELative<DirectionalChannel>:STATe** <state>

Allows you to relate a measured power or a power ratio to a reference value. Whether the power is measured by one sensor or whether it is a combined value measured by two sensors, is set by:

[CALCulate<Measurement>:MATH\[:EXPRession\]](#) on page 344

[CALCulate<Measurement>\[:CHANnel<Channel>\]:FEED<Channel>](#)  
on page 251

Alias:

[UNIT<Measurement>:POWER:RELative:STATe](#)

[CALCulate<Measurement>:RELative<DirectionalChannel>\[:MAGNitude\]:  
AUTO](#)

**Suffix:**

<Measurement> 1 to 8  
Measurement

<DirectionalChannel> 1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<state> OFF | ON | SET  
**OFF**  
Absolute power or power ratio  
**ON**  
Relative power or power ratio, using the specified reference value.  
**SET**  
Uses the current measurement value as the reference value and enables the relative measurement.  
\*RST: OFF



**Manual operation:** See ["Forward Relative State, Reflection Relative State"](#) on page 60  
See ["Relative Measurements"](#) on page 76

---

#### **[SENSe<Sensor>:]POWer:REFerence <ref>**

Sets the reference value for the relative power indication.

If you enter a value without unit, the unit is defined by [UNIT<Measurement>:POWer:RATio](#). For further information, see [Chapter 12.6.1.3, "Units"](#), on page 229.

#### **Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

#### **Parameters:**

<ref> Range: -290.0 dBm to +110.0 dBm  
\*RST: +30.0 dBm  
Default unit: dBm

**Manual operation:** See ["Forward Reference Value, Reflection Reference Value"](#) on page 60  
See ["Reference Value"](#) on page 76

## 12.6.6 Continuous average measurements

There are several ways to program the sensor for measurements. See [Chapter 12.4, "Making measurements"](#), on page 200.

Further information:

- [Chapter 6.2, "Continuous average"](#), on page 74

### 12.6.6.1 Combining commands for continuous average measurements

See also [Chapter 12.4, "Making measurements"](#), on page 200.

## Parameter list for continuous average measurements

Parameter	Description
<expected_value>	Optional. Value that is expected for the measurement.
<resolution>	Optional. Limit up to which the measurement result probably is free of noise.  Corresponds to <code>[SENSe&lt;Sensor&gt;:]AVERage:COUNT:AUTO:RESolution</code> .
<source_list>	Mandatory. Primary and secondary sensor. The number for each sensor is preceded by the character @. The entire expression is enclosed in parentheses.  Example: <code>(@3),(@2)</code>  Sensor C is the primary sensor, and sensor B is the secondary sensor.

**CONFigure<Measurement>[:SCALar][:POWER][:AVG]?**

[<expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[, <source\_list>]...]]

**FETCh<Measurement>[:SCALar][:POWER][:AVG]?**

[<expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[, <source\_list>]...]]

**READ<Measurement>[:SCALar][:POWER][:AVG]?**

[<expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[, <source\_list>]...]]

**MEASure<Measurement>[:SCALar][:POWER][:AVG]?**

[<expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[, <source\_list>]...]]

Measured average power that is measured by one sensor.

The FETCh? and READ? commands send without parameters have a special meaning.

FETCh? returns the current measured value if it is valid. If a measured value is not yet available, processing is suspended until a valid result is available.

READ? starts a measurement and returns a measured value without checking the current settings.

**Suffix:**

<Measurement>      1 to 8  
                         Measurement

**Query parameters:**

<expected\_value\_or\_source\_list>  
                         <numeric> | <expr>

<resolution\_or\_source\_list>  
                         <numeric> | <expr>

<source\_list>            <expr>

For the parameter descriptions, see "[Parameter list for continuous average measurements](#)" on page 258.

**Usage:** Query only

---

**CONFigure**<Measurement>[:SCALar][:POWer][:AVG]:RELative?  
 [<expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
 <source\_list>]...]]

**FETCh**<Measurement>[:SCALar][:POWer][:AVG]:RELative?  
 [<expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
 <source\_list>]...]]

**READ**<Measurement>[:SCALar][:POWer][:AVG]:RELative?  
 [<expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
 <source\_list>]...]]

**MEASure**<Measurement>[:SCALar][:POWer][:AVG]:RELative?  
 [<expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
 <source\_list>]...]]

Relative power that is measured by one sensor.

**Suffix:**

<Measurement> 1 to 8  
 Measurement

**Query parameters:**

<expected\_value\_or\_source\_list>  
 <numeric> | <expr>

<resolution\_or\_source\_list>  
 <numeric> | <expr>

<source\_list> <expr>

For the parameter descriptions, see "[Parameter list for continuous average measurements](#)" on page 258.

**Usage:** Query only

---

**CONFigure**<Measurement>[:SCALar][:POWer][:AVG]:DIFFerence?  
 [<expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
 <source\_list>]...]]

**FETCh**<Measurement>[:SCALar][:POWer][:AVG]:DIFFerence?  
 [<expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
 <source\_list>]...]]

**READ**<Measurement>[:SCALar][:POWer][:AVG]:DIFFerence?  
 [<expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
 <source\_list>]...]]

**MEASure**<Measurement>[:SCALar][:POWer][:AVG]:DIFFerence?  
 [<expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
 <source\_list>]...]]

Difference that is measured by two sensors.

**Suffix:**

<Measurement> 1 to 8  
 Measurement

**Query parameters:**

<expected\_value\_or\_source\_list>  
                                   <numeric> | <expr>

<resolution\_or\_source\_list>  
                                   <numeric> | <expr>

<source\_list>                  <expr>

For the parameter descriptions, see ["Parameter list for continuous average measurements"](#) on page 258.

**Usage:**                  Query only

**CONFigure<Measurement>[:SCALar][:POWer][:AVG]:DIFFerence:RELative?**  
   [<expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
   <source\_list>]...]]

**FETCh<Measurement>[:SCALar][:POWer][:AVG]:DIFFerence:RELative?**  
   [<expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
   <source\_list>]...]]

**READ<Measurement>[:SCALar][:POWer][:AVG]:DIFFerence:RELative?**  
   [<expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
   <source\_list>]...]]

**MEASure<Measurement>[:SCALar][:POWer][:AVG]:DIFFerence:RELative?**  
   [<expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
   <source\_list>]...]]

Relative difference that is measured by two sensors.

**Suffix:**

<Measurement>          1 to 8  
                           Measurement

**Query parameters:**

<expected\_value\_or\_source\_list>  
                                   <numeric> | <expr>

<resolution\_or\_source\_list>  
                                   <numeric> | <expr>

<source\_list>              <expr>

For the parameter descriptions, see ["Parameter list for continuous average measurements"](#) on page 258.

**Usage:**                  Query only

**CONFigure<Measurement>[:SCALar][:POWer][:AVG]:SUM?**  
   [<expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
   <source\_list>]...]]

**FETCh<Measurement>[:SCALar][:POWer][:AVG]:SUM?**  
   [<expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
   <source\_list>]...]]

**READ<Measurement>[:SCALar][:POWer][:AVG]:SUM?**

[<expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
<source\_list>]...]]

**MEASure<Measurement>[:SCALar][:POWer][:AVG]:SUM?**

[<expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
<source\_list>]...]]

Sum of the values that is measured by two sensors.

**Suffix:**

<Measurement>      1 to 8  
                         Measurement

**Query parameters:**

<expected\_value\_or\_source\_list>  
                         <numeric> | <expr>

<resolution\_or\_source\_list>  
                         <numeric> | <expr>

<source\_list>            <expr>

For the parameter descriptions, see "[Parameter list for continuous average measurements](#)" on page 258.

**Usage:**                    Query only

**CONFigure<Measurement>[:SCALar][:POWer][:AVG]:SUM:RELative?**

[<expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
<source\_list>]...]]

**FETCh<Measurement>[:SCALar][:POWer][:AVG]:SUM:RELative?**

[<expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
<source\_list>]...]]

**READ<Measurement>[:SCALar][:POWer][:AVG]:SUM:RELative?**

[<expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
<source\_list>]...]]

**MEASure<Measurement>[:SCALar][:POWer][:AVG]:SUM:RELative?**

[<expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
<source\_list>]...]]

Relative sum that is measured by two sensors.

**Suffix:**

<Measurement>      1 to 8  
                         Measurement

**Query parameters:**

<expected\_value\_or\_source\_list>  
                         <numeric> | <expr>

<resolution\_or\_source\_list>  
                         <numeric> | <expr>

<source\_list>            <expr>

For the parameter descriptions, see "[Parameter list for continuous average measurements](#)" on page 258.

**Usage:**                    Query only

**CONFigure**<Measurement>[:SCALar][:POWer][:AVG]:RATio?

[<expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
<source\_list>]...]]

**FETCh**<Measurement>[:SCALar][:POWer][:AVG]:RATio?

[<expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
<source\_list>]...]]

**READ**<Measurement>[:SCALar][:POWer][:AVG]:RATio?

[<expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
<source\_list>]...]]

**MEASure**<Measurement>[:SCALar][:POWer][:AVG]:RATio?

[<expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
<source\_list>]...]]

Ratio that is measured by two sensors.

**Suffix:**

<Measurement>            1 to 8  
                                 Measurement

**Query parameters:**

<expected\_value\_or\_source\_list>  
                                 <numeric> | <expr>

<resolution\_or\_source\_list>  
                                 <numeric> | <expr>

<source\_list>            <expr>

For the parameter descriptions, see "[Parameter list for continuous average measurements](#)" on page 258.

**Usage:**                    Query only

**CONFigure**<Measurement>[:SCALar][:POWer][:AVG]:RATio:RELative?

[<expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
<source\_list>]...]]

**FETCh**<Measurement>[:SCALar][:POWer][:AVG]:RATio:RELative?

[<expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
<source\_list>]...]]

**READ**<Measurement>[:SCALar][:POWer][:AVG]:RATio:RELative?

[<expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
<source\_list>]...]]

**MEASure**<Measurement>[:SCALar][:POWer][:AVG]:RATio:RELative?

[<expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
<source\_list>]...]]

Relative ratio that is measured by two sensors.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Query parameters:**

<expected\_value\_or\_source\_list>  
<numeric> | <expr>

<resolution\_or\_source\_list>  
<numeric> | <expr>

<source\_list> <expr>

For the parameter descriptions, see "[Parameter list for continuous average measurements](#)" on page 258.

**Usage:** Query only

**CONFigure<Measurement>[:SCALar][:POWER][:AVG]:SWR?**

[<expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
<source\_list>]...]]

**FETCH<Measurement>[:SCALar][:POWER][:AVG]:SWR?**

[<expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
<source\_list>]...]]

**READ<Measurement>[:SCALar][:POWER][:AVG]:SWR?**

[<expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
<source\_list>]...]]

**MEASure<Measurement>[:SCALar][:POWER][:AVG]:SWR?**

[<expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
<source\_list>]...]]

Standing wave ratio measurement of two sensors.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Query parameters:**

<expected\_value\_or\_source\_list>  
<numeric> | <expr>

<resolution\_or\_source\_list>  
<numeric> | <expr>

<source\_list> <expr>

For the parameter descriptions, see "[Parameter list for continuous average measurements](#)" on page 258.

**Usage:** Query only

---

**CONFigure**<Measurement>[:SCALar][:POWer][:AVG]:REFLection?  
 [<expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
 <source\_list>]...]]

**FETCh**<Measurement>[:SCALar][:POWer][:AVG]:REFLection?  
 [<expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
 <source\_list>]...]]

**READ**<Measurement>[:SCALar][:POWer][:AVG]:REFLection?  
 [<expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
 <source\_list>]...]]

**MEASure**<Measurement>[:SCALar][:POWer][:AVG]:REFLection?  
 [<expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
 <source\_list>]...]]

Reflection coefficient/transmission factor of a DUT that is measured by two sensors.

**Suffix:**

<Measurement>      1 to 8  
                          Measurement

**Query parameters:**

<expected\_value\_or\_source\_list>  
                          <numeric> | <expr>

<resolution\_or\_source\_list>  
                          <numeric> | <expr>

<source\_list>            <expr>

For the parameter descriptions, see "[Parameter list for continuous average measurements](#)" on page 258.

**Usage:**                    Query only

---

**CONFigure**<Measurement>[:SCALar][:POWer][:AVG]:RLOSs?  
 [<expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
 <source\_list>]...]]

**FETCh**<Measurement>[:SCALar][:POWer][:AVG]:RLOSs?  
 [<expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
 <source\_list>]...]]

**READ**<Measurement>[:SCALar][:POWer][:AVG]:RLOSs?  
 [<expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
 <source\_list>]...]]

**MEASure**<Measurement>[:SCALar][:POWer][:AVG]:RLOSs?  
 [<expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
 <source\_list>]...]]

Return loss/transmission loss of a DUT that is measured by two sensors.

**Suffix:**

<Measurement>      1 to 8  
                          Measurement





**Suffix:**

<Measurement>      1 to 8  
Measurement

**Query parameters:**

<buffered\_size>      <expr>  
  
<expected\_value\_or\_source\_list>  
                         <numeric> | <expr>  
  
<resolution\_or\_source\_list>  
                         <numeric> | <expr>  
  
<source\_list>        <expr>

For the parameter descriptions, see ["Parameter list for continuous average measurements with buffering"](#) on page 265.

**Usage:**              Query only

**CONFigure**<Measurement>:ARRay[:POWER][:AVG]:DIFFerence? <buffered\_size>[,  
                         <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
                         <source\_list>]...]]

**FETCh**<Measurement>:ARRay[:POWER][:AVG]:DIFFerence? <buffered\_size>[,  
                         <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
                         <source\_list>]...]]

**READ**<Measurement>:ARRay[:POWER][:AVG]:DIFFerence? <buffered\_size>[,  
                         <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
                         <source\_list>]...]]

**MEASure**<Measurement>:ARRay[:POWER][:AVG]:DIFFerence? <buffered\_size>[,  
                         <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
                         <source\_list>]...]]

Difference that is measured by two sensors with buffering.

**Suffix:**

<Measurement>      1 to 8  
Measurement

**Query parameters:**

<buffered\_size>      <expr>  
  
<expected\_value\_or\_source\_list>  
                         <numeric> | <expr>  
  
<resolution\_or\_source\_list>  
                         <numeric> | <expr>  
  
<source\_list>        <expr>

For the parameter descriptions, see ["Parameter list for continuous average measurements with buffering"](#) on page 265.

**Usage:**              Query only

**CONFigure**<Measurement>:ARRay[:POWer][:AVG]:DIFFerence:RELative?

<buffered\_size>[, <expected\_value\_or\_source\_list>[,  
<resolution\_or\_source\_list>[, <source\_list>...]]

**FETCh**<Measurement>:ARRay[:POWer][:AVG]:DIFFerence:RELative?

<buffered\_size>[, <expected\_value\_or\_source\_list>[,  
<resolution\_or\_source\_list>[, <source\_list>...]]

**READ**<Measurement>:ARRay[:POWer][:AVG]:DIFFerence:RELative?

<buffered\_size>[, <expected\_value\_or\_source\_list>[,  
<resolution\_or\_source\_list>[, <source\_list>...]]

**MEASure**<Measurement>:ARRay[:POWer][:AVG]:DIFFerence:RELative?

<buffered\_size>[, <expected\_value\_or\_source\_list>[,  
<resolution\_or\_source\_list>[, <source\_list>...]]

Relative difference that is measured by two sensors with buffering.

**Suffix:**

<Measurement>      1 to 8  
                         Measurement

**Query parameters:**

<buffered\_size>      <expr>  
  
<expected\_value\_or\_source\_list>  
                         <numeric> | <expr>  
  
<resolution\_or\_source\_list>  
                         <numeric> | <expr>  
  
<source\_list>        <expr>

For the parameter descriptions, see "[Parameter list for continuous average measurements with buffering](#)" on page 265.

**Usage:**              Query only

**CONFigure**<Measurement>:ARRay[:POWer][:AVG]:RATio? <buffered\_size>[,  
<expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
<source\_list>...]]

**FETCh**<Measurement>:ARRay[:POWer][:AVG]:RATio? <buffered\_size>[,  
<expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
<source\_list>...]]

**READ**<Measurement>:ARRay[:POWer][:AVG]:RATio? <buffered\_size>[,  
<expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
<source\_list>...]]

**MEASure**<Measurement>:ARRay[:POWer][:AVG]:RATio? <buffered\_size>[,  
<expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
<source\_list>...]]

Ratio that is measured by two sensors with buffering.

**Suffix:**

<Measurement>      1 to 8  
                         Measurement

**Query parameters:**

<buffered\_size>      <expr>

<expected\_value\_or\_source\_list>  
                          <numeric> | <expr>

<resolution\_or\_source\_list>  
                          <numeric> | <expr>

<source\_list>            <expr>

For the parameter descriptions, see "[Parameter list for continuous average measurements with buffering](#)" on page 265.

**Usage:**                    Query only

**CONFigure<Measurement>:ARRay[:POWer][:AVG]:RATio:RELative?**

<buffered\_size>[, <expected\_value\_or\_source\_list>[,  
<resolution\_or\_source\_list>[, <source\_list>]...]]

**FEtCh<Measurement>:ARRay[:POWer][:AVG]:RATio:RELative? <buffered\_size>[,**

<expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
<source\_list>]...]]

**READ<Measurement>:ARRay[:POWer][:AVG]:RATio:RELative? <buffered\_size>[,**

<expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
<source\_list>]...]]

**MEASure<Measurement>:ARRay[:POWer][:AVG]:RATio:RELative?**

<buffered\_size>[, <expected\_value\_or\_source\_list>[,  
<resolution\_or\_source\_list>[, <source\_list>]...]]

Relative ratio that is measured by two sensors with buffering.

**Suffix:**

<Measurement>          1 to 8  
                          Measurement

**Query parameters:**

<buffered\_size>      <expr>

<expected\_value\_or\_source\_list>  
                          <numeric> | <expr>

<resolution\_or\_source\_list>  
                          <numeric> | <expr>

<source\_list>            <expr>

For the parameter descriptions, see "[Parameter list for continuous average measurements with buffering](#)" on page 265.

**Usage:**                    Query only

---

**CONFigure**<Measurement>:ARRay[:POWer][:AVG]:REFLection? <buffered\_size>[,  
 <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
 <source\_list>]...]]

**FETCh**<Measurement>:ARRay[:POWer][:AVG]:REFLection? <buffered\_size>[,  
 <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
 <source\_list>]...]]

**READ**<Measurement>:ARRay[:POWer][:AVG]:REFLection? <buffered\_size>[,  
 <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
 <source\_list>]...]]

**MEASure**<Measurement>:ARRay[:POWer][:AVG]:REFLection? <buffered\_size>[,  
 <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
 <source\_list>]...]]

Reflection coefficient/transmission factor of a DUT that is measured by two sensors with buffering.

**Suffix:**

<Measurement>      1 to 8  
 Measurement

**Query parameters:**

<buffered\_size>      <expr>  
 <expected\_value\_or\_source\_list>  
                          <numeric> | <expr>  
 <resolution\_or\_source\_list>  
                          <numeric> | <expr>  
 <source\_list>        <expr>

For the parameter descriptions, see "[Parameter list for continuous average measurements with buffering](#)" on page 265.

**Usage:**              Query only

---

**CONFigure**<Measurement>:ARRay[:POWer][:AVG]:RELative? <buffered\_size>[,  
 <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
 <source\_list>]...]]

**FETCh**<Measurement>:ARRay[:POWer][:AVG]:RELative? <buffered\_size>[,  
 <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
 <source\_list>]...]]

**READ**<Measurement>:ARRay[:POWer][:AVG]:RELative? <buffered\_size>[,  
 <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
 <source\_list>]...]]

**MEASure**<Measurement>:ARRay[:POWer][:AVG]:RELative? <buffered\_size>[,  
 <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
 <source\_list>]...]]

Relative power that is measured by one sensor with buffering.

**Suffix:**

<Measurement>      1 to 8  
 Measurement

**Query parameters:**

<buffered\_size>      <expr>

<expected\_value\_or\_source\_list>  
                         <numeric> | <expr>

<resolution\_or\_source\_list>  
                         <numeric> | <expr>

<source\_list>            <expr>

For the parameter descriptions, see "[Parameter list for continuous average measurements with buffering](#)" on page 265.

**Usage:**                    Query only

**CONFigure<Measurement>:ARRay[:POWER][:AVG]:RLOSs?** <buffered\_size>[,  
                         <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
                         <source\_list>]...]]

**FEtCh<Measurement>:ARRay[:POWER][:AVG]:RLOSs?** <buffered\_size>[,  
                         <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
                         <source\_list>]...]]

**READ<Measurement>:ARRay[:POWER][:AVG]:RLOSs?** <buffered\_size>[,  
                         <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
                         <source\_list>]...]]

**MEASure<Measurement>:ARRay[:POWER][:AVG]:RLOSs?** <buffered\_size>[,  
                         <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
                         <source\_list>]...]]

Return loss/transmission loss of a DUT that is measured by two sensors with buffering.

**Suffix:**

<Measurement>        1 to 8  
                         Measurement

**Query parameters:**

<buffered\_size>      <expr>

<expected\_value\_or\_source\_list>  
                         <numeric> | <expr>

<resolution\_or\_source\_list>  
                         <numeric> | <expr>

<source\_list>            <expr>

For the parameter descriptions, see "[Parameter list for continuous average measurements with buffering](#)" on page 265.

**Usage:**                    Query only

---

**CONFigure**<Measurement>:ARRay[:POWer][:AVG]:SUM? <buffered\_size>[,  
 <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
 <source\_list>]...]]

**FETCh**<Measurement>:ARRay[:POWer][:AVG]:SUM? <buffered\_size>[,  
 <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
 <source\_list>]...]]

**READ**<Measurement>:ARRay[:POWer][:AVG]:SUM? <buffered\_size>[,  
 <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
 <source\_list>]...]]

**MEASure**<Measurement>:ARRay[:POWer][:AVG]:SUM? <buffered\_size>[,  
 <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
 <source\_list>]...]]

Sum of the values that is measured by two sensors with buffering.

**Suffix:**

<Measurement>      1 to 8  
 Measurement

**Query parameters:**

<buffered\_size>      <expr>  
 <expected\_value\_or\_source\_list>  
                          <numeric> | <expr>  
 <resolution\_or\_source\_list>  
                          <numeric> | <expr>  
 <source\_list>        <expr>

For the parameter descriptions, see "[Parameter list for continuous average measurements with buffering](#)" on page 265.

**Usage:**            Query only

---

**CONFigure**<Measurement>:ARRay[:POWer][:AVG]:SUM:RELative?  
 <buffered\_size>[, <expected\_value\_or\_source\_list>[,  
 <resolution\_or\_source\_list>[, <source\_list>]...]]

**FETCh**<Measurement>:ARRay[:POWer][:AVG]:SUM:RELative? <buffered\_size>[,  
 <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
 <source\_list>]...]]

**READ**<Measurement>:ARRay[:POWer][:AVG]:SUM:RELative? <buffered\_size>[,  
 <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
 <source\_list>]...]]

**MEASure**<Measurement>:ARRay[:POWer][:AVG]:SUM:RELative?  
 <buffered\_size>[, <expected\_value\_or\_source\_list>[,  
 <resolution\_or\_source\_list>[, <source\_list>]...]]

Relative sum that is measured by two sensors with buffering.

**Suffix:**

<Measurement>      1 to 8  
 Measurement

**Query parameters:**

<buffered\_size>      <expr>

<expected\_value\_or\_source\_list>  
                          <numeric> | <expr>

<resolution\_or\_source\_list>  
                          <numeric> | <expr>

<source\_list>            <expr>

For the parameter descriptions, see "[Parameter list for continuous average measurements with buffering](#)" on page 265.

**Usage:**                Query only

**CONFigure<Measurement>:ARRay[:POWER][:AVG]:SWR?** <buffered\_size>[,  
                          <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
                          <source\_list>]...]]

**FETCh<Measurement>:ARRay[:POWER][:AVG]:SWR?** <buffered\_size>[,  
                          <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
                          <source\_list>]...]]

**READ<Measurement>:ARRay[:POWER][:AVG]:SWR?** <buffered\_size>[,  
                          <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
                          <source\_list>]...]]

**MEASure<Measurement>:ARRay[:POWER][:AVG]:SWR?** <buffered\_size>[,  
                          <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
                          <source\_list>]...]]

Standing wave ratio measurement of two sensors with buffering.

**Suffix:**

<Measurement>        1 to 8  
                          Measurement

**Query parameters:**

<buffered\_size>      <expr>

<expected\_value\_or\_source\_list>  
                          <numeric> | <expr>

<resolution\_or\_source\_list>  
                          <numeric> | <expr>

<source\_list>            <expr>

For the parameter descriptions, see "[Parameter list for continuous average measurements with buffering](#)" on page 265.

**Usage:**                Query only

**12.6.6.3 Lower-level continuous average commands**

See also [Chapter 12.4.4, "Configuring one setting at a time"](#), on page 203.



[SENSe<Sensor>:][POWer:][AVG:]BUFFer:CLEAr.....	273
[SENSe<Sensor>:][POWer:][AVG:]BUFFer:COUNT?.....	273
[SENSe<Sensor>:][POWer:][AVG:]BUFFer:INFO?.....	273
[SENSe<Sensor>:][POWer:][AVG:]BUFFer:SIZE.....	273
[SENSe<Sensor>:][POWer:][AVG:]BUFFer:STATe.....	274

---

### [SENSe<Sensor>:][POWer:][AVG:]BUFFer:CLEAr

Effective for continuous average measurements.

Clears the contents of the result buffer.

**Suffix:**

<Sensor>                    1 to 128  
 Configured sensor connected at: port A = 1, ... , port D = 4, R&S  
 NRX-B9 = 101, USB and LAN port = 5 to 100

**Usage:**                    Event

---

### [SENSe<Sensor>:][POWer:][AVG:]BUFFer:COUNT?

Effective for continuous average measurements.

Queries the number of results that are currently stored in the result buffer.

**Suffix:**

<Sensor>                    1 to 128  
 Configured sensor connected at: port A = 1, ... , port D = 4, R&S  
 NRX-B9 = 101, USB and LAN port = 5 to 100

**Usage:**                    Query only

---

### [SENSe<Sensor>:][POWer:][AVG:]BUFFer:INFO? [<ITEM>]

Effective for continuous average measurements.

**Suffix:**

<Sensor>                    1 to 128  
 Configured sensor connected at: port A = 1, ... , port D = 4, R&S  
 NRX-B9 = 101, USB and LAN port = 5 to 100

**Query parameters:**

<ITEM>

**Usage:**                    Query only

---

### [SENSe<Sensor>:][POWer:][AVG:]BUFFer:SIZE <count>

Effective for continuous average measurements.

Sets the size of the result buffer.

You can enable the buffer using [SENSe<Sensor>:] [POWer:] [AVG:]BUFFer:STATe.

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<count> Range: 1 to 131072  
\*RST: 1

**[SENSe<Sensor>:][POWer:][AVG:]BUFFer:STATe <state>**

Enables or disables the buffered continuous average measurement. If enabled, all results generated by trigger events are collected until the buffer is filled. Thus, a higher data rate is achieved.

You can set the size of the buffer with `[SENSe<Sensor>:] [POWer:] [AVG:]BUFFer:SIZE`.

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<state> ON | OFF  
\*RST: OFF

## 12.6.7 Burst average measurements

There are several ways to program the sensor for measurements. See [Chapter 12.4, "Making measurements"](#), on page 200.

Further information:

- [Chapter 6.3, "Burst average"](#), on page 76

### 12.6.7.1 Combining commands for burst average measurements

**Parameter list for burst average measurements**

Parameter	Description
<dtolerance>	Mandatory. Length of a time interval during that the power level can drop below the trigger level without being interpreted as the end of the power pulse. Corresponds to <code>[SENSe&lt;Sensor&gt;:] [POWer:]BURSt:DTOLerance</code> .
<start_exclude>	Mandatory. Amount of time at the beginning of a timeslot or integration period that is not evaluated. Corresponds to <code>[SENSe&lt;Sensor&gt;:]TIMing:EXCLude:START</code> .

Parameter	Description
<end_exclude>	Mandatory. Amount of time at the end of a timeslot or integration period that is not evaluated. Corresponds to <code>[SENSe&lt;Sensor&gt;:]TIMing:EXCLude:STOP</code> .
<expected_value>	Optional. Value that is expected for the measurement.
<resolution>	Optional. Limit up to which the measurement result probably is free of noise. Corresponds to <code>[SENSe&lt;Sensor&gt;:]AVERage:COUNT:AUTO:RESolution</code> .
<source_list>	Mandatory. Primary and secondary sensor. The number for each sensor is preceded by the character @. The entire expression is enclosed in parentheses. Example: <code>(@3),(@2)</code> Sensor C is the primary sensor, and sensor B is the secondary sensor.

```

CONFigure<Measurement>[:SCALar][:POWER]:BURSt? <dtolerance>,
  <start_exclude>, <end_exclude>, <expected_value_or_source_list>[,
  <resolution_or_source_list>[, <source_list>]...]
FETCh<Measurement>[:SCALar][:POWER]:BURSt? <dtolerance>, <start_exclude>,
  <end_exclude>[, <expected_value_or_source_list>[,
  <resolution_or_source_list>[, <source_list>]...]
READ<Measurement>[:SCALar][:POWER]:BURSt? <dtolerance>, <start_exclude>,
  <end_exclude>[, <expected_value_or_source_list>[,
  <resolution_or_source_list>[, <source_list>]...]
MEASure<Measurement>[:SCALar][:POWER]:BURSt? <dtolerance>,
  <start_exclude>, <end_exclude>[, <expected_value_or_source_list>[,
  <resolution_or_source_list>[, <source_list>]...]

```

Power that is measured by one sensor.

**Suffix:**

<Measurement>      1 to 8  
Measurement

**Query parameters:**

<dtolerance>      Default unit: s  
 <start\_exclude>    Default unit: s  
 <end\_exclude>      Default unit: s  
 <expected\_value\_or\_source\_list>  
                      <numeric> | <expr>  
 <resolution\_or\_source\_list>  
                      <numeric> | <expr>  
 <source\_list>      <expr>

For the parameter descriptions, see [Chapter 12.6.7.1, "Combining commands for burst average measurements"](#), on page 274.

**Usage:**            Query only

---

**CONFigure**<Measurement>[:SCALar][:POWer]:BURSt:RELative? <dtolerance>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[, <source\_list>]...]]

**FETCh**<Measurement>[:SCALar][:POWer]:BURSt:RELative? <dtolerance>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[, <source\_list>]...]]

**READ**<Measurement>[:SCALar][:POWer]:BURSt:RELative? <dtolerance>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[, <source\_list>]...]]

**MEASure**<Measurement>[:SCALar][:POWer]:BURSt:RELative? <dtolerance>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[, <source\_list>]...]]

Relative power that is measured by one sensor.

**Suffix:**

<Measurement>            1 to 8  
                                 Measurement

**Query parameters:**

<dtolerance>            Default unit: s

<start\_exclude>        Default unit: s

<end\_exclude>            Default unit: s

<expected\_value\_or\_source\_list>  
                                 <numeric> | <expr>

<resolution\_or\_source\_list>  
                                 <numeric> | <expr>

<source\_list>            <expr>

For the parameter descriptions, see [Chapter 12.6.7.1, "Combining commands for burst average measurements"](#), on page 274.

**Usage:**                    Query only

---

**CONFigure**<Measurement>[:SCALar][:POWer]:BURSt:DIFFerence? <dtolerance>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[, <source\_list>]...]]

**FETCh**<Measurement>[:SCALar][:POWer]:BURSt:DIFFerence? <dtolerance>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[, <source\_list>]...]]

**READ**<Measurement>[:SCALar][:POWer]:BURSt:DIFFerence? <dtolerance>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[, <source\_list>]...]]

**MEASure**<Measurement>[:SCALar][:POWer]:BURSt:DIFFerence? <dtolerance>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[, <source\_list>]...]]

Difference measured by two sensors.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Query parameters:**

<dtolerance> Default unit: s  
 <start\_exclude> Default unit: s  
 <end\_exclude> Default unit: s  
 <expected\_value\_or\_source\_list>  
     <numeric> | <expr>  
 <resolution\_or\_source\_list>  
     <numeric> | <expr>  
 <source\_list> <expr>

For the parameter descriptions, see [Chapter 12.6.7.1, "Combining commands for burst average measurements"](#), on page 274.

**Usage:** Query only

**CONFigure<Measurement>[:SCALar][:POWer]:BURSt:DIFFerence:RELative?**

<dtolerance>, <start\_exclude>, <end\_exclude>[,  
 <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
 <source\_list>]...]]

**FETCh<Measurement>[:SCALar][:POWer]:BURSt:DIFFerence:RELative?**

<dtolerance>, <start\_exclude>, <end\_exclude>[,  
 <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
 <source\_list>]...]]

**READ<Measurement>[:SCALar][:POWer]:BURSt:DIFFerence:RELative?**

<dtolerance>, <start\_exclude>, <end\_exclude>[,  
 <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
 <source\_list>]...]]

**MEASure<Measurement>[:SCALar][:POWer]:BURSt:DIFFerence:RELative?**

<dtolerance>, <start\_exclude>, <end\_exclude>[,  
 <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
 <source\_list>]...]]

Relative difference measured by two sensors.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Query parameters:**

<dtolerance> Default unit: s  
 <start\_exclude> Default unit: s  
 <end\_exclude> Default unit: s  
 <expected\_value\_or\_source\_list>  
     <numeric> | <expr>



**CONFigure<Measurement>[:SCALar][:POWer]:BURSt:SUM:RELative?**

<dtolerance>, <start\_exclude>, <end\_exclude>[,  
 <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
 <source\_list>]...]]

**FETCh<Measurement>[:SCALar][:POWer]:BURSt:SUM:RELative? <dtolerance>**,

<start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>[,  
 <resolution\_or\_source\_list>[, <source\_list>]...]]

**READ<Measurement>[:SCALar][:POWer]:BURSt:SUM:RELative? <dtolerance>**,

<start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>[,  
 <resolution\_or\_source\_list>[, <source\_list>]...]]

**MEASure<Measurement>[:SCALar][:POWer]:BURSt:SUM:RELative?**

<dtolerance>, <start\_exclude>, <end\_exclude>[,  
 <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
 <source\_list>]...]]

Sum measured by two sensors.

**Suffix:**

<Measurement>      1 to 8  
 Measurement

**Query parameters:**

<dtolerance>      Default unit: s

<start\_exclude>    Default unit: s

<end\_exclude>      Default unit: s

<expected\_value\_or\_source\_list>  
                      <numeric> | <expr>

<resolution\_or\_source\_list>  
                      <numeric> | <expr>

<source\_list>      <expr>

For the parameter descriptions, see [Chapter 12.6.7.1, "Combining commands for burst average measurements"](#), on page 274.

**Usage:**            Query only

**CONFigure<Measurement>[:SCALar][:POWer]:BURSt:RATio? <dtolerance>**,

<start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>[,  
 <resolution\_or\_source\_list>[, <source\_list>]...]]

**FETCh<Measurement>[:SCALar][:POWer]:BURSt:RATio? <dtolerance>**,

<start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>[,  
 <resolution\_or\_source\_list>[, <source\_list>]...]]

**READ<Measurement>[:SCALar][:POWer]:BURSt:RATio? <dtolerance>**,

<start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>[,  
 <resolution\_or\_source\_list>[, <source\_list>]...]]

**MEASure<Measurement>[:SCALar][:POWer]:BURSt:RATio? <dtolerance>**,

<start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>[,  
 <resolution\_or\_source\_list>[, <source\_list>]...]]

Ratio measured by two sensors.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Query parameters:**

<dtolerance> Default unit: s  
 <start\_exclude> Default unit: s  
 <end\_exclude> Default unit: s  
 <expected\_value\_or\_source\_list>  
     <numeric> | <expr>  
 <resolution\_or\_source\_list>  
     <numeric> | <expr>  
 <source\_list> <expr>

For the parameter descriptions, see [Chapter 12.6.7.1, "Combining commands for burst average measurements"](#), on page 274.

**Usage:** Query only

**CONFigure<Measurement>[:SCALar][:POWer]:BURSt:RATio:RELative?**

<dtolerance>, <start\_exclude>, <end\_exclude>[,  
 <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
 <source\_list>]...]]

**FETCh<Measurement>[:SCALar][:POWer]:BURSt:RATio:RELative? <dtolerance>**

<start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>[,  
 <resolution\_or\_source\_list>[, <source\_list>]...]]

**READ<Measurement>[:SCALar][:POWer]:BURSt:RATio:RELative? <dtolerance>**

<start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>[,  
 <resolution\_or\_source\_list>[, <source\_list>]...]]

**MEASure<Measurement>[:SCALar][:POWer]:BURSt:RATio:RELative?**

<dtolerance>, <start\_exclude>, <end\_exclude>[,  
 <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
 <source\_list>]...]]

Relative ratio that is measured by two sensors.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Query parameters:**

<dtolerance> Default unit: s  
 <start\_exclude> Default unit: s  
 <end\_exclude> Default unit: s  
 <expected\_value\_or\_source\_list>  
     <numeric> | <expr>  
 <resolution\_or\_source\_list>  
     <numeric> | <expr>



<source\_list>            <expr>

For the parameter descriptions, see [Chapter 12.6.7.1, "Combining commands for burst average measurements"](#), on page 274.

**Usage:**                    Query only

**CONFigure**<Measurement>[:SCALar][:POWer]:BURSt:SWR? <dtolerance>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[, <source\_list>]...]]

**FETCh**<Measurement>[:SCALar][:POWer]:BURSt:SWR? <dtolerance>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[, <source\_list>]...]]

**READ**<Measurement>[:SCALar][:POWer]:BURSt:SWR? <dtolerance>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[, <source\_list>]...]]

**MEASure**<Measurement>[:SCALar][:POWer]:BURSt:SWR? <dtolerance>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[, <source\_list>]...]]

Standing wave ratio, measured by two sensors.

**Suffix:**

<Measurement>            1 to 8  
Measurement

**Query parameters:**

<dtolerance>              Default unit: s

<start\_exclude>          Default unit: s

<end\_exclude>             Default unit: s

<expected\_value\_or\_source\_list>  
                             <numeric> | <expr>

<resolution\_or\_source\_list>  
                             <numeric> | <expr>

<source\_list>             <expr>

For the parameter descriptions, see [Chapter 12.6.7.1, "Combining commands for burst average measurements"](#), on page 274.

**Usage:**                    Query only

**CONFigure**<Measurement>[:SCALar][:POWer]:BURSt:REFLection? <dtolerance>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[, <source\_list>]...]]

**FETCh**<Measurement>[:SCALar][:POWer]:BURSt:REFLection? <dtolerance>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[, <source\_list>]...]]

**READ<Measurement>[:SCALar][:POWer]:BURSt:REFLection?** <dtolerance>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[, <source\_list>]...]]

**MEASure<Measurement>[:SCALar][:POWer]:BURSt:REFLection?** <dtolerance>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[, <source\_list>]...]]

Reflection coefficient/transmission factor of a DUT, measured by two sensors.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Query parameters:**

<dtolerance> Default unit: s

<start\_exclude> Default unit: s

<end\_exclude> Default unit: s

<expected\_value\_or\_source\_list>  
<numeric> | <expr>

<resolution\_or\_source\_list>  
<numeric> | <expr>

<source\_list> <expr>

For the parameter descriptions, see [Chapter 12.6.7.1, "Combining commands for burst average measurements"](#), on page 274.

**Usage:** Query only

**CONFigure<Measurement>[:SCALar][:POWer]:BURSt:RLOSs?** <dtolerance>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[, <source\_list>]...]]

**FETCh<Measurement>[:SCALar][:POWer]:BURSt:RLOSs?** <dtolerance>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[, <source\_list>]...]]

**READ<Measurement>[:SCALar][:POWer]:BURSt:RLOSs?** <dtolerance>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[, <source\_list>]...]]

**MEASure<Measurement>[:SCALar][:POWer]:BURSt:RLOSs?** <dtolerance>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[, <source\_list>]...]]

Return loss/transmission loss of a DUT, measured by two sensors.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Query parameters:**

<dtolerance> Default unit: s

<start\_exclude> Default unit: s

<end\_exclude>      Default unit: s  
 <expected\_value\_or\_source\_list>  
                          <numeric> | <expr>  
 <resolution\_or\_source\_list>  
                          <numeric> | <expr>  
 <source\_list>            <expr>

For the parameter descriptions, see [Chapter 12.6.7.1, "Combining commands for burst average measurements"](#), on page 274.

**Usage:**                    Query only

## 12.6.8 Trace measurements

There are several ways to program the sensor for measurements. See [Chapter 12.4, "Making measurements"](#), on page 200.

Further information:

- [Chapter 6.4, "Trace"](#), on page 78

### 12.6.8.1 Combining commands for trace measurements

See also [Chapter 12.4, "Making measurements"](#), on page 200.

#### Parameter list for trace measurements

Parameter	Description
<scope_size>	Mandatory. Number of test points on the time axis. Corresponds to <a href="#">[SENSe&lt;Sensor&gt;:]TRACe:POINTs</a> on page 481.
<capture_time>	Mandatory. Period within which measured data are captured in the trace measurements. Corresponds to <a href="#">[SENSe&lt;Sensor&gt;:]TRACe:TIME</a> on page 228.
<source_list>	Mandatory. Primary and secondary sensor. The number for each sensor is preceded by the character @. The entire expression is enclosed in parentheses. Example: (@3),(@2) Sensor C is the primary sensor, and sensor B is the secondary sensor.

**CONFigure<Measurement>:XTIME[:POWER]? <scope\_size>, <capture\_time>[, <source\_list>]...**

**FETCh<Measurement>:XTIME[:POWER]? <scope\_size>, <capture\_time>[, <source\_list>]...**

**READ**<Measurement>:XTIME[:POWER]? <scope\_size>, <capture\_time>[,  
<source\_list>]...

**MEASure**<Measurement>:XTIME[:POWER]? <scope\_size>, <capture\_time>[,  
<source\_list>]...

Used to measure power over time.

**Suffix:**

<Measurement>      1 to 8  
                         Measurement

**Query parameters:**

<scope\_size>        <expr>  
<capture\_time>      Default unit: s  
<source\_list>        <expr>

For the parameter descriptions, see "[Parameter list for trace measurements](#)" on page 283.

**Usage:**              Query only

**CONFigure**<Measurement>:XTIME[:POWER]:NONE <scope\_size>, <capture\_time>[,  
<source\_list>]...

Disables trace 2. In contrast, trace 1 is always active.

**Suffix:**

<Measurement>      1 to 8  
                         Measurement

**Setting parameters:**

<scope\_size>        <expr>  
<capture\_time>      Default unit: s  
<source\_list>        <expr>

For the parameter descriptions, see "[Parameter list for trace measurements](#)" on page 283.

**Usage:**              Setting only

**CONFigure**<Measurement>:XTIME[:POWER]:RATio? <scope\_size>,  
<capture\_time>[, <source\_list>]...

**FETCh**<Measurement>:XTIME[:POWER]:RATio? <scope\_size>, <capture\_time>[,  
<source\_list>]...

**READ**<Measurement>:XTIME[:POWER]:RATio? <scope\_size>, <capture\_time>[,  
<source\_list>]...

**MEASure**<Measurement>:XTIME[:POWER]:RATio? <scope\_size>, <capture\_time>[,  
<source\_list>]...

Power ratio over time that is measured by two sensors.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Query parameters:**

<scope\_size> <expr>

<capture\_time> Default unit: s

<source\_list> <expr>

For the parameter descriptions, see "[Parameter list for trace measurements](#)" on page 283.

**Usage:** Query only

**12.6.8.2 Lower-level trace commands**

See also [Chapter 12.4.4, "Configuring one setting at a time"](#), on page 203.

[CALCulate<Measurement>:TRACe:X:POINTs](#).....285  
[\[SENSe<Sensor>:\]TRACe:REALtime](#).....285

**CALCulate<Measurement>:TRACe:X:POINTs <points>**

Sets the number of required values per trace sequence.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Parameters:**

<points> Range: 1 to 8192  
\*RST: 660

**[SENSe<Sensor>:]TRACe:REALtime <state>**

Effective for trace measurements.

If disabled, each measurement from the sensor is averaged. If enabled, only one sampling sequence per measurement is recorded, thus increasing the measurement speed. With a higher measurement speed, the measured values of an individual measurement are immediately delivered.

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<state> ON | OFF  
\*RST: OFF

### 12.6.8.3 Using markers

CALCulate<Measurement>:TRACe:MARKer<Marker>:XDELta?	286
CALCulate<Measurement>:TRACe:MARKer<Marker>:YDELta?	286
CALCulate<Measurement>:TRACe:MARKer<Marker>:YPOSition?	287
DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:FEED:INDex	287
DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:FUNCTion	287
DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:MODE	288
DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:MODE	288
DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:POWER:DBM	289
DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:POWER:DBUV	290
DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:RELative:POWER:DB	290
DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:POWER:RATio:DB	290
DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:RELative:POWER:DPCT	291
DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:POWER:RATio:DPCT	291
DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:RELative:POWER:O	291
DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:POWER:RATio:O	291
DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:RELative:POWER:WATT	292
DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:POWER:WATT	292
DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:RELative:TIME	292
DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:TIME	292
DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:REFerence	292
DISPlay[:WINDow<Window>]:TRACe:MARKer:SELECTION	293

---

#### CALCulate<Measurement>:TRACe:MARKer<Marker>:XDELta?

Queries the time difference between two markers.

##### Suffix:

<Measurement>	1 to 8 Measurement
<Marker>	1 to 4 Marker (M1 to M4)

**Usage:** Query only

---

#### CALCulate<Measurement>:TRACe:MARKer<Marker>:YDELta?

Queries the power difference between two markers.

##### Suffix:

<Measurement>	1 to 8 Measurement
<Marker>	1 to 4 Marker (M1 to M4)

**Usage:** Query only

**CALCulate<Measurement>:TRACe:MARKer<Marker>:YPOSition?**

Queries the position of a marker on the power axis.

**Suffix:**

<Measurement>      1 to 8  
Measurement

<Marker>            1 to 4  
Marker (M1 to M4)

**Usage:**            Query only

**DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:FEED:INDEX <index>**

Effective if `DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:MODE`  
`MEASure` is set.

Selects the trace.

**Suffix:**

<Window>            1 to 4  
Measurement pane

<Marker>            1 to 4  
Marker (M1 to M4)

**Parameters:**

<index>            **0**  
No trace selected.

**1**  
Trace 1

**2**  
Trace 2

Range:            0 to 2

\*RST:            0

**Manual operation:** See "[Data Source](#)" on page 83

**DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:FUNCTion <function>**

Effective if `DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:MODE`  
`MEASure` is set.

Defines the measurement.

**Suffix:**

<Window>            1 to 4  
Measurement pane

<Marker> 1 to 4  
Marker (M1 to M4)

**Parameters:**

<function> POWer | RPOWer | RTIME | RPAVerage

**POWer**

Measures the power of the trace.

**RPOWer**

Measures the power ratio in relation to the reference marker.

**RTIME**

Measures the time difference in relation to the reference marker.

**RPAVerage**

Measures the average power between time positions of the marker and its reference marker.

\*RST: POWer

**Manual operation:** See "[Measurement Mode](#)" on page 83

**DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:MODE <mode>**

Enables or disables the marker. Also defines the appearance of the marker.

**Suffix:**

<Window> 1 to 4  
Measurement pane

<Marker> 1 to 4  
Marker (M1 to M4)

**Parameters:**

<mode> OFF | RULer | MEASure

**OFF**

Disables the marker.

**RULer**

Shows a line at the marker position. Useful if you use the marker as a reference marker, see [DISPlay\[:WINDow<Window>\]:TRACe:MARKer<Marker>:REFerence](#).

**MEASure**

Shows a triangle at the marker position.

\*RST: OFF

**Manual operation:** See "[Marker Mode](#)" on page 82

**DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:MODE <mode>**

Defines where the marker is placed.

**Suffix:**

<Window> 1 to 4  
Measurement pane



<Marker> 1 to 4  
Marker (M1 to M4)

**Parameters:**

<mode> FTIME | FPOWER | RPOSITION | RPOWER | RPLleft | RPRright |  
PSEarch | MSEARCH | RPSLeft | RPSRight | RMSLeft |  
RMSRight

**FTIME**  
Fixed time, set by the marker position.

**FPOWER**  
Fixed power value, set by the marker position.

**RPOSITION**  
Time difference of the marker position to the x-position of the reference marker.

**RPOWER**  
Power difference of the marker position to the y-position of the reference marker.

**RPLleft**  
Starting from the left border, at a power difference of the marker position to the y-position of the reference marker.

**RPRright**  
Starting from the right border, at a power difference of the marker position to the y-position of the reference marker.

**PSEARCH**  
Measured maximum power

**MSEARCH**  
Measured minimum power

**RPSLeft**  
Maximum power measured left from the reference marker.

**RPSRight**  
Maximum power that is measured right from the reference marker.

**RMSLeft**  
Minimum power that is measured left from the reference marker.

**RMSRight**  
Minimum power that is measured right from the reference marker.

\*RST: FTIME

**Manual operation:** See "[Position Mode](#)" on page 82

---

**DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:POWER:DBM**  
<power>

Sets an absolute power value for the marker position defined under [DISPlay\[:WINDow<Window>\]:TRACe:MARKer<Marker>:POSition:MODE](#) on page 288.

**Suffix:**

<Window> 1 to 4  
Measurement pane

<Marker> 1 to 4  
Measurement pane

**Parameters:**

<power> Range: -200.0 dBm to 200.0 dBm  
\*RST: 0.0 dBm  
Default unit: dBm

**Manual operation:** See "[Position](#)" on page 82

**DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:POWER:DBUV  
<power>**

Sets an absolute power value for the marker position defined under [DISPlay\[:WINDow<Window>\]:TRACe:MARKer<Marker>:POSition:MODE](#) on page 288.

**Suffix:**

<Window> 1 to 4  
Measurement pane

<Marker> 1 to 4  
Marker (M1 to M4)

**Parameters:**

<power> Range: -100.0 dBuV to 300.0 dBuV  
\*RST: 0.0 dBuV  
Default unit: dBuV

**Manual operation:** See "[Position](#)" on page 82

**DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:RELative:  
POWER:DB <power>**

**DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:POWER:RATio:  
DB <power>**

Sets an absolute or relative power value for the marker position defined under [DISPlay\[:WINDow<Window>\]:TRACe:MARKer<Marker>:POSition:MODE](#) on page 288.

**Suffix:**

<Window> 1 to 4  
Measurement pane

<Marker> 1 to 4  
Marker (M1 to M4)

**Parameters:**

<power> Range: -200.0 dB to 200.0 dB  
\*RST: 0.0 dB  
Default unit: dB

**Manual operation:** See "Position" on page 82

---

**DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:RELative:  
POWER:DPCT <power>**

**DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:POWER:RATio:  
DPCT <power>**

Sets an absolute or relative value for the marker position defined under [DISPlay\[:WINDow<Window>\]:TRACe:MARKer<Marker>:POSition:MODE](#) on page 288.

**Suffix:**

<Window>            1 to 4  
                         Measurement pane

<Marker>            1 to 4  
                         Measurement pane

**Parameters:**

<power>            Range:     -1e18 dpct to 1e18 dpct  
                         \*RST:     0.0 dpct  
                         Default unit: dpct

**Manual operation:** See "Position" on page 82

---

**DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:RELative:  
POWER:O <power>**

**DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:POWER:RATio:  
O <power>**

Sets an absolute or relative value for the marker position defined under [DISPlay\[:WINDow<Window>\]:TRACe:MARKer<Marker>:POSition:MODE](#) on page 288.

**Suffix:**

<Window>            1 to 4  
                         Measurement pane

<Marker>            1 to 4  
                         Marker (M1 to M4)

**Parameters:**

<power>            Range:     -1e18 to 1e18  
                         \*RST:     0.0  
                         Default unit: -

**Manual operation:** See "Position" on page 82

---

**DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:RELative:POWer:WATT <power>**

**DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:POWer:WATT <power>**

Sets an absolute or relative power value for the marker position defined under [DISPlay\[:WINDow<Window>\]:TRACe:MARKer<Marker>:POSition:MODE](#) on page 288.

**Suffix:**

<Window>            1 to 4  
Measurement pane

<Marker>            1 to 4  
Marker (M1 to M4)

**Parameters:**

<power>            Range:        -100e-3 W to 1e12 W  
                  \*RST:        1e-3 W  
                  Default unit: W

**Manual operation:** See "[Position](#)" on page 82

---

**DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:RELative:TIME <time>**

**DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:TIME <time>**

Sets an absolute or relative time for the marker position defined under [DISPlay\[:WINDow<Window>\]:TRACe:MARKer<Marker>:POSition:MODE](#) on page 288.

**Suffix:**

<Window>            1 to 4  
Measurement pane

<Marker>            1 to 4  
Marker (M1 to M4)

**Parameters:**

<time>            Range:        -15.0 s to 15.0 s  
                  \*RST:        0.0 s  
                  Default unit: s

**Manual operation:** See "[Position](#)" on page 82

---

**DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:REFerence <reference>**

Defines a marker as a reference marker.

**Suffix:**

<Window>            1 to 4  
Measurement pane

<Marker>            1 to 4  
Marker (M1 to M4)

**Parameters:**

<reference>            Range:     1 to 4  
                              \*RST:     1

**Manual operation:**    See "[Reference Marker](#)" on page 83

**DISPlay[:WINDow<Window>]:TRACe:MARKer:SELECTION <markerNo>**

Shows the selected marker in the trace.

**Suffix:**

<Window>                1 to 4  
                              Measurement pane

**Parameters:**

<markerNo>              NONE | M1 | M2 | M3 | M4  
                              \*RST:     NONE

**Manual operation:**    See "[M1 / M2 / M3 / M4](#)" on page 80

## 12.6.9 Pulse analysis measurements

Further information:

- [Chapter 6.5, "Pulse analysis"](#), on page 84

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---

**[SENSe<Sensor>:]TRACe:MEASurement[:STATe] <value>**

Enables or disables automatic pulse measurement. If enabled, the sensor automatically determines the pulse parameters for the currently measured trace.

**Suffix:**

<Sensor>                    1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S  
NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<value>                    ON | OFF  
\*RST:                    OFF

**[SENSe<Sensor>:]TRACe:MEASurement:AUTO[:STATe] <value>**

Enables or disables the automatic transfer of the measured pulse parameters after each trace. If enabled, the trace and pulse data are synchronously displayed in continuous measurement mode.

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<value> \*RST: OFF

**[SENSe<Sensor>:]TRACe:MEASurement:OFFSet:TIME <value>**

Sets the start time of the pulse analysis, referenced to the delay set by [TRIGger<Measurement>\[:CHANnel<Channel>\]:DElay\[:VALue\]](#).

By default, the parameters of the first detected pulse are determined. Using this command, you can determine the parameters of another pulse. Make sure that the pulse analysis does not begin until shortly before this pulse.

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<value> Default unit: s

**[SENSe<Sensor>:]TRACe:MID:OFFSet:TIME <time>**

Sets an offset to the start of the gate in which the pulse analysis is performed. See also [\[SENSe<Sensor>:\]TRACe:MID:TIME](#) on page 295.

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<time> Range: 0.0 s to 30.0 s  
\*RST: 0.01 s  
Default unit: s

**[SENSe<Sensor>:]TRACe:MID:TIME <time>**

Sets the length of the gate in which the pulse analysis is performed. The gate start is referenced to the trigger event.

Used to define a gate on a trace measurement, in which you want to perform a pulse analysis. If the gate length equals the length of the trace measurement, the first detected pulse is analyzed. Using a gate, you can investigate successive pulses.

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<time> Range: 0.0 s to 30.0 s  
\*RST: 0.01 s  
Default unit: s

**CALCulate<Measurement>:TRACe:MEASurement:ALGorithm <value>**

Effective for pulse analysis measurements.

Sets the analysis algorithm for detecting the pulse top and the pulse base power of a pulsed signal. From these two power levels, the reference levels are derived.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Parameters:**

<value> HISTogram | INTegration | PEAK  
\*RST: HISTogram

**Manual operation:** See "[Algorithm](#)" on page 93

**CALCulate<Measurement>:TRACe:MEASurement:DEFine:DURation:REFerence <value>**

Effective for pulse analysis measurements.

Sets the pulse duration, pulse start time and pulse stop time.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Parameters:**

<value> Range: 0.0 pct to 100.0 pct  
\*RST: 50.0 pct  
Default unit: pct

**Manual operation:** See "[Reference Level](#)" on page 93

**CALCulate<Measurement>:TRACe:MEASurement:DEFine:TRANSition: HREFerence <value>**

Effective for pulse analysis measurements.



Defines the end of the rising edge and the start of the falling edge of the pulse. Used for the measurement of the rise or fall time.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Parameters:**

<value> Range: 0.0 pct to 100.0 pct  
\*RST: 90.0 pct  
Default unit: pct

**Manual operation:** See "[High Reference Level](#)" on page 93

**CALCulate<Measurement>:TRACe:MEASurement:DEFine:TRANSition:  
LREFerence <value>**

Effective for pulse analysis measurements.

Defines the start of the rising edge and the end of the falling edge of the pulse. Used for the measurement of the rise or fall time.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Parameters:**

<value> Range: 0.0 pct to 100.0 pct  
\*RST: 10.0 pct  
Default unit: pct

**Manual operation:** See "[Low Reference Level](#)" on page 93

**CALCulate<Measurement>:TRACe:MEASurement:POWER:AVG?**

Effective for pulse analysis measurements.

Queries the average power while the pulse is active.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Usage:** Query only

**Manual operation:** See "[Trace Avg](#)" on page 90

**CALCulate<Measurement>:TRACe:MEASurement:POWER:HREFerence?**

Effective for pulse analysis measurements.

Queries the power level at the high reference level set by

[CALCulate<Measurement>:TRACe:MEASurement:DEFine:TRANSition:  
HREFerence](#).

**Suffix:**  
 <Measurement> 1 to 8  
 Measurement

**Usage:** Query only

**Manual operation:** See "[High Ref.](#)" on page 91

#### **CALCulate<Measurement>:TRACe:MEASurement:POWer:LREference?**

Effective for pulse analysis measurements.

Queries the power level at the low reference level set by

[CALCulate<Measurement>:TRACe:MEASurement:DEFine:TRANSition:LREference.](#)

**Suffix:**  
 <Measurement> 1 to 8  
 Measurement

**Usage:** Query only

**Manual operation:** See "[Low Ref.](#)" on page 91

#### **CALCulate<Measurement>:TRACe:MEASurement:POWer:MAX?**

Effective for pulse analysis measurements.

Queries the maximum power measured within the analysis window.

**Suffix:**  
 <Measurement> 1 to 8  
 Measurement

**Usage:** Query only

**Manual operation:** See "[Trace Peak](#)" on page 90

#### **CALCulate<Measurement>:TRACe:MEASurement:POWer:MIN?**

Effective for pulse analysis measurements.

Queries the minimum power measured within the analysis window.

**Suffix:**  
 <Measurement> 1 to 8  
 Measurement

**Usage:** Query only

**Manual operation:** See "[Trace Min](#)" on page 91

#### **CALCulate<Measurement>:TRACe:MEASurement:POWer:PULSe:BASE?**

Effective for pulse analysis measurements.

Queries the pulse base power level detected by the selected `CALCulate<Measurement>:TRACe:MEASurement:ALGorithm`. This value is used as a reference (0 %) to determine other parameter values such as the rising or falling thresholds.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Usage:** Query only

**Manual operation:** See "Pulse Base" on page 90

**CALCulate<Measurement>:TRACe:MEASurement:POWER:PULSe:DROop?**

Effective for pulse analysis measurements.

Queries the droop of the pulse. The droop is the difference between leading edge amplitude, pulse top, and falling-edge amplitude. The droop is expressed in percentage of the pulse top amplitude.

The pulse droop measurement is used to test the stability of the output power of a device, e.g. an amplifier or a transmitter.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Usage:** Query only

**Manual operation:** See "Droop" on page 92

**CALCulate<Measurement>:TRACe:MEASurement:POWER:PULSe:TOP?**

Effective for pulse analysis measurements.

Queries the pulse-top power level detected by the selected `CALCulate<Measurement>:TRACe:MEASurement:ALGorithm`. This value is used as a reference (100 %) to determine other parameter values such as the rising or falling thresholds.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Usage:** Query only

**Manual operation:** See "Pulse Top" on page 90

**CALCulate<Measurement>:TRACe:MEASurement:POWER:REFerence?**

Effective for pulse analysis measurements.

Queries the power level at reference level. See `CALCulate<Measurement>:TRACe:MEASurement:DEFine:DURation:REFerence` on page 296.

**Suffix:**  
 <Measurement> 1 to 8  
 Measurement

**Usage:** Query only

#### **CALCulate<Measurement>:TRACe:MEASurement:PULSe:DCYClE?**

Effective for pulse analysis measurements.  
 Queries the duty cycle of the measured power.

**Suffix:**  
 <Measurement> 1 to 8  
 Measurement

**Usage:** Query only

**Manual operation:** See "[Duty Cycle](#)" on page 88

#### **CALCulate<Measurement>:TRACe:MEASurement:PULSe:DURation?**

Effective for pulse analysis measurements.  
 Queries the time between the first positive edge and the subsequent negative edge of the pulse, where the edges occur at crossings of the mid threshold.

**Suffix:**  
 <Measurement> 1 to 8  
 Measurement

**Usage:** Query only

**Manual operation:** See "[Pulse Width](#)" on page 87

#### **CALCulate<Measurement>:TRACe:MEASurement:PULSe:PERiod?**

Effective for pulse analysis measurements.  
 Queries the time between two consecutive edges of the same polarity in seconds. During this time, the pulse signal completes one cycle.

**Suffix:**  
 <Measurement> 1 to 8  
 Measurement

**Usage:** Query only

**Manual operation:** See "[Pulse Period](#)" on page 87

#### **CALCulate<Measurement>:TRACe:MEASurement:PULSe:SEParation?**

Effective for pulse analysis measurements.

Queries the time between the first negative edge and the subsequent positive edge of the pulse in seconds, where the edges occur at crossings of the mid threshold. During this time, the pulse remains at the pulse base level.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Usage:** Query only

**Manual operation:** See "[Pulse Off Time](#)" on page 88

**CALCulate<Measurement>:TRACe:MEASurement:TRANSition:NEGative:  
DURation?**

Effective for pulse analysis measurements.

Queries the time that the pulse requires to transition from the pulse top level to the pulse base level.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Usage:** Query only

**Manual operation:** See "[Fall Time](#)" on page 88

**CALCulate<Measurement>:TRACe:MEASurement:TRANSition:NEGative:  
OCCurrence?**

Effective for pulse analysis measurements.

Queries the time when the signal passes through the medial reference power level with falling edge, referenced to the delayed trigger event. Indicates the stop point of the first power pulse within the analysis window.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Usage:** Query only

**Manual operation:** See "[Stop Time](#)" on page 89

**CALCulate<Measurement>:TRACe:MEASurement:TRANSition:NEGative:  
OVERshoot?**

Effective for pulse analysis measurements.

Queries the height of the local minimum before a rising edge, divided by the pulse amplitude:

$$\text{Negative overshoot} = 100 \% \times \frac{\text{Pulse base power} - \text{minimum power}}{\text{Pulse amplitude}}$$

Depends on the setting under `DISPlay[:WINDow<Window>]:TRACe:MEASurement:RRELation`.

**Suffix:**

<Measurement>      1 to 8  
Measurement

**Usage:**              Query only

**Manual operation:** See "[Neg. Overshoot](#)" on page 91

### **CALCulate<Measurement>:TRACe:MEASurement:TRANSition:POSitive: DURation?**

Effective for pulse analysis measurements.

Queries the time that the pulse requires to transition from the pulse base level to the pulse top level.

**Suffix:**

<Measurement>      1 to 8  
Measurement

**Usage:**              Query only

**Manual operation:** See "[Rise Time](#)" on page 88

### **CALCulate<Measurement>:TRACe:MEASurement:TRANSition:POSitive: OCCurrence?**

Effective for pulse analysis measurements.

Queries the time when the signal passes through the medial reference power level with rising edge, referenced to the delayed trigger event. Indicates the start point of the first power pulse within the analysis window.

**Suffix:**

<Measurement>      1 to 8  
Measurement

**Usage:**              Query only

**Manual operation:** See "[Start Time](#)" on page 88

### **CALCulate<Measurement>:TRACe:MEASurement:TRANSition:POSitive: OVERshoot?**

Effective for pulse analysis measurements.

Queries the height of the local maximum before a falling edge, divided by the pulse amplitude:

$$\text{Positive overshoot} = 100 \% \times \frac{\text{Max. power} - \text{pulse top power}}{\text{Pulse amplitude}}$$

Depends on the setting under [DISPlay\[:WINDow<Window>\]:TRACe:MEASurement:RRELation](#).

**Suffix:**

<Measurement>      1 to 8  
Measurement

**Usage:**              Query only

**Manual operation:** See "[Pos. Overshoot](#)" on page 91

**CALCulate<Measurement>:TRACe:MEASurement:TRANSition:SPERiod?**

Effective for pulse analysis measurements.

Queries the number of samples per second.

**Suffix:**

<Measurement>      1 to 8  
Measurement

**Usage:**              Query only

**Manual operation:** See "[Sampling Rate](#)" on page 89

**DISPlay[:WINDow<Window>]:TRACe:MEASurement:POWer:AVG[:STATe] <value>**

Effective for pulse analysis measurements.

Enables or disables the display of the average signal power. See [CALCulate<Measurement>:TRACe:MEASurement:POWer:AVG?](#) on page 297.

**Suffix:**

<Window>              1 to 4  
Measurement pane

**Parameters:**

<value>                \*RST:      OFF

**Manual operation:** See "[Trace Avg](#)" on page 90

**DISPlay[:WINDow<Window>]:TRACe:MEASurement:POWer:MAXimum[:STATe] <value>**

Effective for pulse analysis measurements.

Enables or disables the display of the maximum power measured within the analysis window. See [CALCulate<Measurement>:TRACe:MEASurement:POWer:MAX?](#) on page 298.





**Suffix:**

<Window>            1 to 4  
Measurement pane

**Parameters:**

<value>            \*RST:        OFF

**Manual operation:** See "Droop" on page 92

**DISPlay[:WINDow<Window>]:TRACe:MEASurement:POWer:PULSe:  
HREFerence[:STATe] <value>**

Effective for pulse analysis measurements.

Enables or disables the display of the power level at high reference level. See [CALCulate<Measurement>:TRACe:MEASurement:POWer:HREFerence?](#) on page 297.

**Suffix:**

<Window>            1 to 4  
Measurement pane

**Parameters:**

<value>            \*RST:        OFF

**Manual operation:** See "High Ref." on page 91

**DISPlay[:WINDow<Window>]:TRACe:MEASurement:POWer:PULSe:  
LREFerence[:STATe] <value>**

Effective for pulse analysis measurements.

Enables or disables the display of the power level at low reference level. See [CALCulate<Measurement>:TRACe:MEASurement:POWer:LREFerence?](#) on page 298.

**Suffix:**

<Window>            1 to 4  
Measurement pane

**Parameters:**

<value>            \*RST:        OFF

**Manual operation:** See "Low Ref." on page 91

**DISPlay[:WINDow<Window>]:TRACe:MEASurement:POWer:PULSe:TOP[:STATe]  
<value>**

Effective for pulse analysis measurements.

Enables or disables the display of the pulse-top power. See [CALCulate<Measurement>:TRACe:MEASurement:POWer:PULSe:TOP?](#) on page 299.

**Suffix:**

<Window>            1 to 4  
Measurement pane

**Parameters:**

<value>            \*RST:        OFF

**Manual operation:** See "Pulse Top" on page 90

**DISPlay[:WINDow<Window>]:TRACe:MEASurement:PULSe:DCYCLe[:STATe]**  
 <value>

Effective for pulse analysis measurements.

Enables or disables the display of the duty cycle of the measured power. See [CALCulate<Measurement>:TRACe:MEASurement:PULSe:DCYCLe?](#) on page 300.

**Suffix:**

<Window>            1 to 4  
Measurement pane

**Parameters:**

<value>            \*RST:        OFF

**Manual operation:** See "Duty Cycle" on page 88

**DISPlay[:WINDow<Window>]:TRACe:MEASurement:POWer:PULSe:DROOp[:**  
**STATe] <value>**

Effective for pulse analysis measurements.

Enables or disables the display of the droop. See [CALCulate<Measurement>:TRACe:MEASurement:POWer:PULSe:DROOp?](#) on page 299.

**Suffix:**

<Window>            1 to 4  
Measurement pane

**Parameters:**

<value>            \*RST:        OFF

**Manual operation:** See "Droop" on page 92

**DISPlay[:WINDow<Window>]:TRACe:MEASurement:PULSe:DURation[:STATe]**  
 <value>

Effective for pulse analysis measurements.

Enables or disables the display of the pulse duration. See [CALCulate<Measurement>:TRACe:MEASurement:PULSe:DURation?](#) on page 300.

**Suffix:**

<Window>            1 to 4  
Measurement pane

**Parameters:**

<value>            \*RST:        OFF

**Manual operation:** See "Pulse Width" on page 87

**DISPlay[:WINDow<Window>]:TRACe:MEASurement:PULSe:PERiod[:STATe]**  
<value>

Effective for pulse analysis measurements.

Enables or disables the display of the time that the pulse signal needs to complete one cycle. See [CALCulate<Measurement>:TRACe:MEASurement:PULSe:PERiod?](#) on page 300.

**Suffix:**

<Window>            1 to 4  
Measurement pane

**Parameters:**

<value>            \*RST:        OFF

**Manual operation:** See "Pulse Period" on page 87

**DISPlay[:WINDow<Window>]:TRACe:MEASurement:PULSe:RESolution[:STATe]**  
<value>

Effective for pulse analysis measurements.

Displays the number of samples per second. See [CALCulate<Measurement>:TRACe:MEASurement:TRANSition:SPERiod?](#) on page 303.

**Suffix:**

<Window>            1 to 4  
Measurement pane

**Parameters:**

<value>            \*RST:        OFF

**Manual operation:** See "Sampling Rate" on page 89

**DISPlay[:WINDow<Window>]:TRACe:MEASurement:PULSe:SEParation[:STATe]**  
<value>

Effective for pulse analysis measurements.

Enables or disables the display of the gap between two pulses. See [CALCulate<Measurement>:TRACe:MEASurement:PULSe:SEParation?](#) on page 300.

**Suffix:**

<Window>            1 to 4  
Measurement pane

**Parameters:**

<value>            \*RST:        OFF

**Manual operation:** See ["Pulse Off Time"](#) on page 88

**DISPlay[:WINDow<Window>]:TRACe:MEASurement:RRELation <refRelation>**

Selects whether the reference levels are voltage-related or power-related.

**Suffix:**

<Window>            1 to 4  
Measurement pane

**Parameters:**

<refRelation>        POWer | VOLTage  
\*RST:            POWer

**Manual operation:** See ["Reference Levels relate to"](#) on page 92

**DISPlay[:WINDow<Window>]:TRACe:MEASurement:SELECTION <traceNo>**

Selects the displayed trace.

**Suffix:**

<Window>            1 to 4  
Measurement pane

**Parameters:**

<traceNo>            Range:        1 to 2  
\*RST:            1

**Manual operation:** See ["T1 / T2"](#) on page 85

**DISPlay[:WINDow<Window>]:TRACe:MEASurement:TRANSition:NEGative: DURATION[:STATE] <value>**

Effective for pulse analysis measurements.

Enables or disables the display of the fall time of the first detected pulse. See [CALCulate<Measurement>:TRACe:MEASurement:TRANSition:NEGative: DURATION?](#) on page 301.

**Suffix:**

<Window>            1 to 4  
Measurement pane

**Parameters:**

<value>            \*RST:        OFF

**Manual operation:** See ["Fall Time"](#) on page 88

---

**DISPlay[:WINDow<Window>]:TRACe:MEASurement:TRANSition:NEGative:  
OCCurrence[:STATe] <value>**

Effective for pulse analysis measurements.

Enables or disables the display of the time when the signal passes through the medial reference power level with falling edge. See [CALCulate<Measurement>:TRACe:MEASurement:TRANSition:NEGative:OCCurrence?](#) on page 301.

**Suffix:**

<Window>                    1 to 4  
                                  Measurement pane

**Parameters:**

<value>                    \*RST:        OFF

**Manual operation:**    See "[Stop Time](#)" on page 89

---

**DISPlay[:WINDow<Window>]:TRACe:MEASurement:TRANSition:NEGative:  
OVERshoot[:STATe] <value>**

Effective for pulse analysis measurements.

Enables or disables the display of the relative amount of negative overshoot. See [CALCulate<Measurement>:TRACe:MEASurement:TRANSition:NEGative:OVERshoot?](#) on page 301.

**Suffix:**

<Window>                    1 to 4  
                                  Measurement pane

**Parameters:**

<value>                    \*RST:        OFF

**Manual operation:**    See "[Neg. Overshoot](#)" on page 91

---

**DISPlay[:WINDow<Window>]:TRACe:MEASurement:TRANSition:POSitive:  
DURation[:STATe] <value>**

Effective for pulse analysis measurements.

Enables or disables the display of the rise time of the first detected pulse. See [CALCulate<Measurement>:TRACe:MEASurement:TRANSition:POSitive:DURation?](#) on page 302.

**Suffix:**

<Window>                    1 to 4  
                                  Measurement pane

**Parameters:**

<value>                    \*RST:        OFF

**Manual operation:**    See "[Rise Time](#)" on page 88

---

**DISPlay[:WINDow<Window>]:TRACe:MEASurement:TRANSition:POSitive:  
OCCurrence[:STATe] <value>**

Effective for pulse analysis measurements.

Enables or disables the display of the time when the signal passes through the medial reference power level with rising edge. See [CALCulate<Measurement>:TRACe:MEASurement:TRANSition:POSitive:OCCurrence?](#) on page 302.

**Suffix:**

<Window>                    1 to 4  
                                  Measurement pane

**Parameters:**

<value>                    \*RST:        OFF

**Manual operation:**    See "[Start Time](#)" on page 88

---

**DISPlay[:WINDow<Window>]:TRACe:MEASurement:TRANSition:POSitive:  
OVERshoot[:STATe] <value>**

Effective for pulse analysis measurements.

Enables or disables the display of the relative amount of positive overshoot. See [CALCulate<Measurement>:TRACe:MEASurement:TRANSition:POSitive:OVERshoot?](#) on page 302.

**Suffix:**

<Window>                    1 to 4  
                                  Measurement pane

**Parameters:**

<value>                    \*RST:        OFF

**Manual operation:**    See "[Pos. Overshoot](#)" on page 91

## 12.6.10 Time gate measurements

Further information:

- [Chapter 6.6, "Time gate"](#), on page 93

<a href="#">CALCulate&lt;Measurement&gt;[:POWER]:TGATe&lt;Gate&gt;[:AVG]:OFFSet[:TIME]</a> .....	310
<a href="#">CALCulate&lt;Measurement&gt;[:POWER]:TGATe&lt;Gate&gt;[:AVG]:TIME</a> .....	311
<a href="#">CALCulate&lt;Measurement&gt;[:POWER]:TGATe&lt;Gate&gt;[:AVG][:EXCLude]:MID:OFFSet[:TIME]</a> ...	311
<a href="#">CALCulate&lt;Measurement&gt;[:POWER]:TGATe&lt;Gate&gt;[:AVG][:EXCLude]:MID:TIME</a> .....	312
<a href="#">CALCulate&lt;Measurement&gt;[:POWER]:TGATe&lt;Gate&gt;[:AVG][:EXCLude]:MID[:STATe]</a> .....	312
<a href="#">CALCulate&lt;Measurement&gt;[:POWER]:TGATe[:AVG]:SELECTION</a> .....	312

---

**CALCulate<Measurement>[:POWER]:TGATe<Gate>[:AVG]:OFFSet[:TIME] <value>**

Sets the start time of the gate.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<Gate> 1 to 4  
Time gate

**Parameters:**

<value> Range: 0.0 s to 15.0 s  
\*RST: 0.0 s  
Default unit: s

**Manual operation:** See "[Start of Gate](#)" on page 98

**CALCulate<Measurement>[:POWER]:TGATe<Gate>[:AVG]:TIME <value>**

Sets the length of the gate.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<Gate> 1 to 4  
Time gate

**Parameters:**

<value> Range: 50.0e-9 s to 0.1 s  
\*RST: 1.0e-3 s  
Default unit: s

**Manual operation:** See "[Length of Gate](#)" on page 98

**CALCulate<Measurement>[:POWER]:TGATe<Gate>[:AVG][:EXCLude]:MID:  
OFFSet[:TIME] <value>**

Sets the start time of the fence. The start time refers to the start of the gate.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<Gate> 1 to 4  
Time gate

**Parameters:**

<value> Range: 0.0 s to 0.1 s  
\*RST: 0.0 s  
Default unit: s

**Manual operation:** See "[Start of Fence](#)" on page 98

---

**CALCulate<Measurement>[:POWER]:TGATe<Gate>[:AVG][:EXCLude]:MID:TIME**  
<value>

Sets length of the fence.

**Suffix:**

<Measurement>      1 to 8  
Measurement

<Gate>                1 to 4  
Time gate

**Parameters:**

<value>              Range:      0.0 s to 0.1 s  
                      \*RST:      0.0 s  
                      Default unit: s

**Manual operation:** See "[Length of Fence](#)" on page 98

---

**CALCulate<Measurement>[:POWER]:TGATe<Gate>[:AVG][:EXCLude]:MID[:STATe]**  
<value>

Enables or disables an exclusion interval for the selected gate. This exclusion interval is called fence. The interval where the fence overlaps with the gate is excluded from the measurement.

Like a gate, a fence is defined by its start time and its length.

**Suffix:**

<Measurement>      1 to 8  
Measurement

<Gate>                1 to 4  
Time gate

**Parameters:**

<value>              \*RST:      OFF

**Manual operation:** See "[Fence](#)" on page 98

---

**CALCulate<Measurement>[:POWER]:TGATe[:AVG]:SELECTION <value>**

Selects the active gate for the measurement.

**Suffix:**

<Measurement>      1 to 8  
Measurement

**Parameters:**

<value>              Range:      1 to 4  
                      \*RST:      1

**Manual operation:** See "[G1 / G2 / G3 / G4](#)" on page 96



## 12.6.11 Timeslot measurements

There are several ways to program the sensor for measurements. See [Chapter 12.4, "Making measurements"](#), on page 200.

Further information:

- [Chapter 6.7, "Timeslot"](#), on page 98

### 12.6.11.1 Combining commands for timeslot measurements

See also [Chapter 12.4, "Making measurements"](#), on page 200.

#### Parameter list for timeslot measurements

Parameter	Description
<tslot_width>	Mandatory. Width of a timeslot. Corresponds to <code>[SENSe&lt;Sensor&gt;:] [POWer:] TSLot [:AVG]:WIDTH</code> on page 465.
<no_slots>	Mandatory. Number of timeslots to be measured. Corresponds to <code>[SENSe&lt;Sensor&gt;:] [POWer:] TSLot [:AVG]:COUNT</code> on page 465.
<start_exclude>	Mandatory. Amount of time at the beginning of a timeslot or integration period that is not evaluated. Corresponds to <code>[SENSe&lt;Sensor&gt;:] TIMing:EXCLude:START</code> .
<end_exclude>	Mandatory. Amount of time at the end of a timeslot or integration period that is not evaluated. Corresponds to <code>[SENSe&lt;Sensor&gt;:] TIMing:EXCLude:STOP</code> .
<expected_value>	Optional. Value that is expected for the measurement.
<resolution>	Optional. Limit up to which the measurement result probably is free of noise. Corresponds to <code>[SENSe&lt;Sensor&gt;:] AVERAge:COUNT:AUTO:RESolution</code> .
<source_list>	Mandatory. Primary and secondary sensor. The number for each sensor is preceded by the character @. The entire expression is enclosed in parentheses. Example: <code>(@3),(@2)</code> Sensor C is the primary sensor, and sensor B is the secondary sensor.

```
CONFigure<Measurement>[:SCALAr][:POWer]:TSLot? <tslot_width>, <no_slots>,
<start_exclude>, <end_exclude>[, <expected_value_or_source_list>[,
<resolution_or_source_list>[, <source_list>]...]]
```

```
FETCh<Measurement>[:SCALAr][:POWer]:TSLot? <tslot_width>, <no_slots>,
<start_exclude>, <end_exclude>, <expected_value_or_source_list>[,
<resolution_or_source_list>[, <source_list>]...]]
```

**READ<Measurement>[:SCALar][:POWer]:TSLot?** <tslot\_width>, <no\_slots>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[, <source\_list>]...]]

**MEASure<Measurement>[:SCALar][:POWer]:TSLot?** <tslot\_width>, <no\_slots>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[, <source\_list>]...]]

Power that is measured by one sensor.

**Suffix:**

<Measurement>      1 to 8  
Measurement

**Query parameters:**

<tslot\_width>      Default unit: s  
<no\_slots>      Default unit: s  
<start\_exclude>      Default unit: s  
<end\_exclude>      Default unit: s  
<expected\_value\_or\_source\_list>  
                         <numeric> | <expr>  
<resolution\_or\_source\_list>  
                         <numeric> | <expr>  
<source\_list>      <expr>

For the parameter descriptions, see "[Parameter list for timeslot measurements](#)" on page 313.

**Usage:**      Query only

**CONFigure<Measurement>[:SCALar][:POWer]:TSLot:RELative?** <tslot\_width>, <no\_slots>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[, <source\_list>]...]]

**FETCh<Measurement>[:SCALar][:POWer]:TSLot:RELative?** <tslot\_width>, <no\_slots>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[, <source\_list>]...]]

**READ<Measurement>[:SCALar][:POWer]:TSLot:RELative?** <tslot\_width>, <no\_slots>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[, <source\_list>]...]]

**MEASure<Measurement>[:SCALar][:POWer]:TSLot:RELative?** <tslot\_width>, <no\_slots>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[, <source\_list>]...]]

Relative power that is measured by one sensor.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Query parameters:**

<tslot\_width> Default unit: s  
 <no\_slots> Default unit: s  
 <start\_exclude> Default unit: s  
 <end\_exclude> Default unit: s  
 <expected\_value\_or\_source\_list>  
     <numeric> | <expr>  
 <resolution\_or\_source\_list>  
     <numeric> | <expr>  
 <source\_list> <expr>

For the parameter descriptions, see ["Parameter list for timeslot measurements"](#) on page 313.

**Usage:** Query only

**CONFigure**<Measurement>[:SCALar][:POWer]:TSLot:DIFFerence? <tslot\_width>, <no\_slots>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[, <source\_list>]...]]

**FETCh**<Measurement>[:SCALar][:POWer]:TSLot:DIFFerence? <tslot\_width>, <no\_slots>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[, <source\_list>]...]]

**READ**<Measurement>[:SCALar][:POWer]:TSLot:DIFFerence? <tslot\_width>, <no\_slots>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[, <source\_list>]...]]

**MEASure**<Measurement>[:SCALar][:POWer]:TSLot:DIFFerence? <tslot\_width>, <no\_slots>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[, <source\_list>]...]]

Power that is measured by two sensors.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Query parameters:**

<tslot\_width> Default unit: s  
 <no\_slots> Default unit: s  
 <start\_exclude> Default unit: s  
 <end\_exclude> Default unit: s



---

**CONFigure**<Measurement>[:SCALar][:POWer]:TSLot:SUM? <tslot\_width>, <no\_slots>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[, <source\_list>]...]]

**FETCh**<Measurement>[:SCALar][:POWer]:TSLot:SUM? <tslot\_width>, <no\_slots>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[, <source\_list>]...]]

**READ**<Measurement>[:SCALar][:POWer]:TSLot:SUM? <tslot\_width>, <no\_slots>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[, <source\_list>]...]]

**MEASure**<Measurement>[:SCALar][:POWer]:TSLot:SUM? <tslot\_width>, <no\_slots>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[, <source\_list>]...]]

Sum that is measured by two sensors.

**Suffix:**

<Measurement>      1 to 8  
Measurement

**Query parameters:**

<tslot\_width>      Default unit: s  
<no\_slots>      Default unit: s  
<start\_exclude>      Default unit: s  
<end\_exclude>      Default unit: s  
<expected\_value\_or\_source\_list>  
                         <numeric> | <expr>  
<resolution\_or\_source\_list>  
                         <numeric> | <expr>  
<source\_list>      <expr>

For the parameter descriptions, see "[Parameter list for timeslot measurements](#)" on page 313.

**Usage:**      Query only

---

**CONFigure**<Measurement>[:SCALar][:POWer]:TSLot:SUM:RELative? <tslot\_width>, <no\_slots>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[, <source\_list>]...]]

**FETCh**<Measurement>[:SCALar][:POWer]:TSLot:SUM:RELative? <tslot\_width>, <no\_slots>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[, <source\_list>]...]]

**READ<Measurement>[:SCALar][:POWer]:TSLot:SUM:RELative?** <tslot\_width>, <no\_slots>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[, <source\_list>]...]]

**MEASure<Measurement>[:SCALar][:POWer]:TSLot:SUM:RELative?** <tslot\_width>, <no\_slots>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[, <source\_list>]...]]

Relative sum that is measured by two sensors.

**Suffix:**

<Measurement>      1 to 8  
Measurement

**Query parameters:**

<tslot\_width>      Default unit: s  
<no\_slots>      Default unit: s  
<start\_exclude>      Default unit: s  
<end\_exclude>      Default unit: s  
<expected\_value\_or\_source\_list>  
                         <numeric> | <expr>  
<resolution\_or\_source\_list>  
                         <numeric> | <expr>  
<source\_list>      <expr>

For the parameter descriptions, see "[Parameter list for timeslot measurements](#)" on page 313.

**Usage:**      Query only

**CONFigure<Measurement>[:SCALar][:POWer]:TSLot:RATio?** <tslot\_width>, <no\_slots>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[, <source\_list>]...]]

**FETCh<Measurement>[:SCALar][:POWer]:TSLot:RATio?** <tslot\_width>, <no\_slots>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[, <source\_list>]...]]

**READ<Measurement>[:SCALar][:POWer]:TSLot:RATio?** <tslot\_width>, <no\_slots>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[, <source\_list>]...]]

**MEASure<Measurement>[:SCALar][:POWer]:TSLot:RATio?** <tslot\_width>, <no\_slots>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[, <source\_list>]...]]

Ratio that is measured by two sensors.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Query parameters:**

<tslot\_width> Default unit: s  
 <no\_slots> Default unit: s  
 <start\_exclude> Default unit: s  
 <end\_exclude> Default unit: s  
 <expected\_value\_or\_source\_list>  
     <numeric> | <expr>  
 <resolution\_or\_source\_list>  
     <numeric> | <expr>  
 <source\_list> <expr>

For the parameter descriptions, see "[Parameter list for timeslot measurements](#)" on page 313.

**Usage:** Query only

**CONFigure<Measurement>[:SCALar][:POWer]:TSLot:RATio:RELative?**

<tslot\_width>, <no\_slots>, <start\_exclude>, <end\_exclude>[,  
 <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
 <source\_list>]...]]

**FETCh<Measurement>[:SCALar][:POWer]:TSLot:RATio:RELative?** <tslot\_width>,  
 <no\_slots>, <start\_exclude>, <end\_exclude>[,  
 <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
 <source\_list>]...]]

**READ<Measurement>[:SCALar][:POWer]:TSLot:RATio:RELative?** <tslot\_width>,  
 <no\_slots>, <start\_exclude>, <end\_exclude>[,  
 <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
 <source\_list>]...]]

**MEASure<Measurement>[:SCALar][:POWer]:TSLot:RATio:RELative?**  
 <tslot\_width>, <no\_slots>, <start\_exclude>, <end\_exclude>[,  
 <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[,  
 <source\_list>]...]]

Relative ratio that is measured by two sensors.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Query parameters:**

<tslot\_width> Default unit: s  
 <no\_slots> Default unit: s  
 <start\_exclude> Default unit: s  
 <end\_exclude> Default unit: s





---

**CONFigure**<Measurement>[:SCALar][:POWer]:TSLot:REFLection? <tslot\_width>, <no\_slots>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[, <source\_list>]...]]

**FETCh**<Measurement>[:SCALar][:POWer]:TSLot:REFLection? <tslot\_width>, <no\_slots>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[, <source\_list>]...]]

**READ**<Measurement>[:SCALar][:POWer]:TSLot:REFLection? <tslot\_width>, <no\_slots>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[, <source\_list>]...]]

**MEASure**<Measurement>[:SCALar][:POWer]:TSLot:REFLection? <tslot\_width>, <no\_slots>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[, <source\_list>]...]]

Reflection coefficient/transmission factor of a DUT that is measured by two sensors.

**Suffix:**

<Measurement>      1 to 8  
Measurement

**Query parameters:**

<tslot\_width>      Default unit: s  
<no\_slots>          Default unit: s  
<start\_exclude>    Default unit: s  
<end\_exclude>      Default unit: s  
<expected\_value\_or\_source\_list>  
                         <numeric> | <expr>  
<resolution\_or\_source\_list>  
                         <numeric> | <expr>  
<source\_list>       <expr>

For the parameter descriptions, see "[Parameter list for timeslot measurements](#)" on page 313.

**Usage:**            Query only

---

**CONFigure**<Measurement>[:SCALar][:POWer]:TSLot:RLOSs? <tslot\_width>, <no\_slots>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[, <source\_list>]...]]

**FETCh**<Measurement>[:SCALar][:POWer]:TSLot:RLOSs? <tslot\_width>, <no\_slots>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[, <source\_list>]...]]

**READ<Measurement>[:SCALar][:POWer]:TSLot:RLOSs?** <tslot\_width>, <no\_slots>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[, <source\_list>]...]]

**MEASure<Measurement>[:SCALar][:POWer]:TSLot:RLOSs?** <tslot\_width>, <no\_slots>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>[, <resolution\_or\_source\_list>[, <source\_list>]...]]

Return loss/transmission loss of a DUT that is measured by two sensors.

**Suffix:**

<Measurement>            1 to 8  
Measurement

**Query parameters:**

<tslot\_width>            Default unit: s  
<no\_slots>                Default unit: s  
<start\_exclude>         Default unit: s  
<end\_exclude>            Default unit: s  
<expected\_value\_or\_source\_list>  
                              <numeric> | <expr>  
<resolution\_or\_source\_list>  
                              <numeric> | <expr>  
<source\_list>             <expr>

For the parameter descriptions, see "[Parameter list for timeslot measurements](#)" on page 313.

**Usage:**                    Query only

### 12.6.11.2 Lower-level timeslot commands

See also [Chapter 12.4.4, "Configuring one setting at a time"](#), on page 203.

<a href="#">CALCulate&lt;Measurement&gt;:TSLot:TIMing:EXCLude:START</a> .....	322
<a href="#">CALCulate&lt;Measurement&gt;:TSLot:TIMing:EXCLude:STOP</a> .....	323
<a href="#">CALCulate&lt;Measurement&gt;[:POWer]:TSLot[:AVG]:COUNT</a> .....	323
<a href="#">CALCulate&lt;Measurement&gt;[:POWer]:TSLot[:AVG]:SELection</a> .....	323
<a href="#">CALCulate&lt;Measurement&gt;[:POWer]:TSLot[:AVG]:WIDTh</a> .....	324
<a href="#">CALCulate&lt;Measurement&gt;[:POWer]:TSLot[:AVG][:EXCLude]:MID:OFFSet[:TIME]</a> .....	324
<a href="#">CALCulate&lt;Measurement&gt;[:POWer]:TSLot[:AVG][:EXCLude]:MID:TIME</a> .....	324
<a href="#">CALCulate&lt;Measurement&gt;[:POWer]:TSLot[:AVG][:EXCLude]:MID[:STATe]</a> .....	324

---

**CALCulate<Measurement>:TSLot:TIMing:EXCLude:START** <value>

Defines an interval at the start of the timeslot that is excluded from the measurement.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Parameters:**

<value> Range: 0.0 s to 15.0 s  
\*RST: 0.0 s  
Default unit: s

**Manual operation:** See ["Exclude from Start"](#) on page 103

**CALCulate<Measurement>:TSLot:TIMing:EXCLude:STOP <value>**

Defines an interval at the end of the timeslot that is excluded from the measurement.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Parameters:**

<value> Range: 0.0 s to 15.0 s  
\*RST: 0.0 s  
Default unit: s

**Manual operation:** See ["Exclude from End"](#) on page 103

**CALCulate<Measurement>[:POWER]:TSLot[:AVG]:COUNT <value>**

Sets the number of simultaneously measured timeslots.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Parameters:**

<value> Range: 1 to 128  
\*RST: 8

**Manual operation:** See ["Slots"](#) on page 103

**CALCulate<Measurement>[:POWER]:TSLot[:AVG]:SELECTION <value>**

Selects a timeslot for the measurement.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Parameters:**

<value> Range: 1 to 128  
\*RST: 1

**Manual operation:** See ["Timeslot"](#) on page 101

---

**CALCulate<Measurement>[:POWER]:TSLot[:AVG]:WIDTh <value>**

Sets the length of the timeslot.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Parameters:**

<value> Range: 50.0e-9 s to 0.1 s  
\*RST: 1.0e-3 s  
Default unit: s

**Manual operation:** See "[Nominal Width](#)" on page 103

---

**CALCulate<Measurement>[:POWER]:TSLot[:AVG][:EXCLude]:MID:OFFSet[:TIME] <value>**

Sets the start time of the fence. The start time refers to the start of the timeslots.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Parameters:**

<value> Range: 0.0 s to 0.1 s  
\*RST: 0.0 s  
Default unit: s

**Manual operation:** See "[Start of Fence](#)" on page 104

---

**CALCulate<Measurement>[:POWER]:TSLot[:AVG][:EXCLude]:MID:TIME <value>**

Sets the length of the fence.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Parameters:**

<value> Range: 0.0 s to 0.1 s  
\*RST: 0.0 s  
Default unit: s

**Manual operation:** See "[Length of Fence](#)" on page 104

---

**CALCulate<Measurement>[:POWER]:TSLot[:AVG][:EXCLude]:MID[:STATe] <value>**

Enables or disables an exclusion interval in the timeslots. This exclusion interval is called fence. The fence is defined by its start time and its length.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Parameters:**

<value> \*RST: OFF

**Manual operation:** See "Fence" on page 104

## 12.6.12 Statistics measurements

There are several ways to program the sensor for measurements. See [Chapter 12.4, "Making measurements"](#), on page 200.

Further information:

- [Chapter 6.8, "Statistics"](#), on page 104

### 12.6.12.1 Combining commands for statistics measurements

See also [Chapter 12.4, "Making measurements"](#), on page 200.

#### Parameter list for the statistics measurement

Parameter	Description
<statistics_size>	Mandatory. Number of test points on the time axis. Corresponds to <a href="#">[SENSe&lt;Sensor&gt;:]STATistics:SCALE:X:POINTS</a> on page 470.
<capture_time>	Mandatory. Period within which measured data are captured in the trace measurements. Corresponds to <a href="#">[SENSe&lt;Sensor&gt;:]TRACe:TIME</a> on page 228.
<source_list>	Mandatory. Primary and secondary sensor. The number for each sensor is preceded by the character @. The entire expression is enclosed in parentheses. Example: (@3),(@2) Sensor C is the primary sensor, and sensor B is the secondary sensor.

**CONFigure**<Measurement>:STATistics:CCDF? <statistics\_size>, <capture\_time>[, <source\_list>]...

**FETCh**<Measurement>:STATistics:CCDF? <statistics\_size>, <capture\_time>[, <source\_list>]...

**READ**<Measurement>:STATistics:CCDF? <statistics\_size>, <capture\_time>[, <source\_list>]...

**MEASure**<Measurement>:STATistics:CCDF? <statistics\_size>, <capture\_time>[, <source\_list>]...

Measures the power in the defined time interval and performs a statistic evaluation (probability density function, PDF).

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Query parameters:**

<statistics\_size> <expr>

<capture\_time> Default unit: s

<source\_list> <expr>

For the parameter descriptions, see "[Parameter list for the statistics measurement](#)" on page 325.

**Usage:** Query only

**CONFigure**<Measurement>:STATistics:PDF? <statistics\_size>, <capture\_time>[, <source\_list>]...

**FETCh**<Measurement>:STATistics:PDF? <statistics\_size>, <capture\_time>[, <source\_list>]...

**READ**<Measurement>:STATistics:PDF? <statistics\_size>, <capture\_time>[, <source\_list>]...

**MEASure**<Measurement>:STATistics:PDF? <statistics\_size>, <capture\_time>[, <source\_list>]...

Measures the power in the defined time interval and performs a statistic evaluation (complementary cumulative distribution function, CCDF).

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Query parameters:**

<statistics\_size> <expr>

<capture\_time> Default unit: s

<source\_list> <expr>

For the parameter descriptions, see "[Parameter list for the statistics measurement](#)" on page 325.

**Usage:** Query only

**12.6.12.2 Lower-level statistics commands**

See also [Chapter 12.4.4, "Configuring one setting at a time"](#), on page 203.

For time gate settings, see also [Chapter 12.6.10, "Time gate measurements"](#), on page 310.

[SENSe<Sensor>:]STATistics:AVERage?.....	327
[SENSe<Sensor>:]STATistics:OFFSet[:TIME].....	327
[SENSe<Sensor>:]STATistics:PEAK?.....	327
CALCulate<Measurement>:STATistics:POWer:AVG:DATA?.....	327
CALCulate<Measurement>:STATistics:APERture.....	328

<a href="#">CALCulate&lt;Measurement&gt;:STATistics:AWGN[:STATE]</a> .....	328
<a href="#">CALCulate&lt;Measurement&gt;:STATistics:SAMPles[:MINimum]</a> .....	328
<a href="#">CALCulate&lt;Measurement&gt;:STATistics:TGATe:SELECTION</a> .....	329

---

### **[SENSe<Sensor>:]STATistics:AVERAge?**

Queries the average power value calculated during a statistics measurement.

#### **Suffix:**

<Sensor>                    1 to 128  
 Configured sensor connected at: port A = 1, ... , port D = 4, R&S  
 NRX-B9 = 101, USB and LAN port = 5 to 100

**Usage:**                    Query only

---

### **[SENSe<Sensor>:]STATistics:OFFSet[:TIME] <time>**

Sets the start of the sampling window, referenced to the delay set by  
[TRIGger<Measurement>\[:CHANnel<Channel>\]:DElay\[:VALue\]](#).

#### **Suffix:**

<Sensor>                    1 to 128  
 Configured sensor connected at: port A = 1, ... , port D = 4, R&S  
 NRX-B9 = 101, USB and LAN port = 5 to 100

#### **Parameters:**

<time>                    Range:        0.0 s to 10.0 s  
                              \*RST:        0.0 s  
                              Default unit: s

---

### **[SENSe<Sensor>:]STATistics:PEAK?**

Queries the peak power value calculated during a CCDF or PDF statistics measurement.

#### **Suffix:**

<Sensor>                    1 to 128  
 Configured sensor connected at: port A = 1, ... , port D = 4, R&S  
 NRX-B9 = 101, USB and LAN port = 5 to 100

**Usage:**                    Query only

---

### **CALCulate<Measurement>:STATistics:POWer:AVG:DATA?**

Effective for statistics measurements.

Queries the average power value in the sampling window.

The command is not fully R&S NRP2 compatible. If port 1 is assigned to measurement 1, and so on, the command works. If port 1 is assigned to measurement 2, for example, enable the R&S NRP2 emulation by using [SYSTem:LANGuage](#) "NRP2".

**Suffix:**  
 <Measurement> 1 to 8  
 Measurement

**Usage:** Query only

#### **CALCulate<Measurement>:STATistics:APERture <value>**

Effective for statistics measurements.

Sets the width of the sampling window for unsynchronized acquisition that is if [CALCulate<Measurement>:STATistics:TGate:SElection 0](#) is set.

**Suffix:**  
 <Measurement> 1 to 8  
 Measurement

**Parameters:**  
 <value> Range: 10e-6 s to 10.0 s  
 \*RST: 0.01 s  
 Default unit: s

**Manual operation:** See "[Aperture](#)" on page 120

#### **CALCulate<Measurement>:STATistics:AWGN[:STATe] <value>**

Effective for statistics measurements.

Enables or disables the internal, additional white Gaussian noise (AWGN) source. If enabled, you cannot measure with a second sensor.

**Suffix:**  
 <Measurement> 1 to 8  
 Measurement

**Parameters:**  
 <value> \*RST: OFF

**Manual operation:** See "[AWGN](#)" on page 108

#### **CALCulate<Measurement>:STATistics:SAMPles[:MINimum] <value>**

Effective for statistics measurements.

Sets the minimum number of samples.

**Suffix:**  
 <Measurement> 1 to 8  
 Measurement

**Parameters:**  
 <value> Range: 1 to 2147483647  
 \*RST: 1000000

**Manual operation:** See "[Minimum Samples](#)" on page 108



**CALCulate<Measurement>:STATistics:TGATe:SElection <value>**

Effective for statistics measurements.

Configures the sampling window.

**Suffix:**

<Measurement>      1 to 8  
Measurement

**Parameters:**

<value>              0  
Continuous  
  
1 - 4  
Gate number  
Range:              0 to 4  
\*RST:                1

**Manual operation:** See "Evaluate" on page 111

**12.6.12.3 Scaling**

[SENSe<Sensor>:]STATistics:SCALE:X:MPWidth?	329
CALCulate<Measurement>:STATistics:PDF[:SCALE]:Y:PDIVision	330
CALCulate<Measurement>:STATistics:PDF[:SCALE]:Y:TOP	330
CALCulate<Measurement>:STATistics[:CDF][:SCALE]:Y[:LINear]:PDIVision	330
CALCulate<Measurement>:STATistics[:CDF][:SCALE]:Y[:LINear]:TOP	331
CALCulate<Measurement>:STATistics[:SCALE]:X:MODE	331
CALCulate<Measurement>:STATistics[:SCALE]:X:POINTS	331
CALCulate<Measurement>:STATistics[:SCALE]:X:RANGE	332
CALCulate<Measurement>:STATistics[:SCALE]:X:RLEVel:RELative	332
CALCulate<Measurement>:STATistics[:SCALE]:X:RLEVel[:ABSolute]	332
CALCulate<Measurement>:STATistics[:SCALE]:Y:SPACing	333

**[SENSe<Sensor>:]STATistics:SCALE:X:MPWidth?**

Queries the highest level resolution that is attainable. The value is fixed at 0.006 dB per pixel. If this value is not reached, the sensor outputs a settings conflict message.

Solutions for the conflict can be:

- Select a smaller number of pixels using `CALCulate<Measurement>:STATistics[:SCALE]:X:POINTS`.
- Choose a larger width for the level range using `CALCulate<Measurement>:STATistics[:SCALE]:X:RANGE`.

**Suffix:**

<Sensor>              1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S  
NRX-B9 = 101, USB and LAN port = 5 to 100

**Usage:**              Query only

**CALCulate<Measurement>:STATistics:PDF[:SCALE]:Y:PDIVision <value>**

Effective if `CALCulate<Measurement>:STATistics[:SCALE]:Y:SPACing LIN` is set.

Sets the scaling of the y-axis for PDF statistics measurements.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Parameters:**

<value> Range: 0.01 to 1000.0  
\*RST: 0.2  
Default unit: -

**Manual operation:** See "[Y / div](#)" on page 109

**CALCulate<Measurement>:STATistics:PDF[:SCALE]:Y:TOP <value>**

Effective if `CALCulate<Measurement>:STATistics[:SCALE]:Y:SPACing LIN` is set.

Sets the maximum value of the y-axis for PDF statistics measurements.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Parameters:**

<value> Range: 0.0 to 10000.0  
\*RST: 1.0  
Default unit: -

**Manual operation:** See "[Y Maximum](#)" on page 109

**CALCulate<Measurement>:STATistics[:CDF][:SCALE]:Y[:LINear]:PDIVision <value>**

Effective if `CALCulate<Measurement>:STATistics[:SCALE]:Y:SPACing LIN` is set.

Sets the scaling of the y-axis for CDF statistics measurements.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Parameters:**

<value> Range: 0.001 pct to 20.0 pct  
\*RST: 20.0 pct  
Default unit: pct

**Manual operation:** See "[Y / div](#)" on page 109

**CALCulate<Measurement>:STATistics[:CDF][:SCALE]:Y[:LINear]:TOP <value>**

Effective if `CALCulate<Measurement>:STATistics[:SCALE]:Y:SPACing LIN` is set.

Sets the maximum value of the y-axis for CDF statistics measurements.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Parameters:**

<value> Range: 0.0 pct to 100.0 pct  
\*RST: 100.0 pct  
Default unit: pct

**Manual operation:** See "[Y Maximum](#)" on page 109

**CALCulate<Measurement>:STATistics[:SCALE]:X:MODE <value>**

Effective for statistics measurements.

Sets relative or absolute scaling for the x-axis.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Parameters:**

<value> ABSolute | RELative  
\*RST: ABSolute

**Manual operation:** See "[Scaling of Power Axis](#)" on page 109

**CALCulate<Measurement>:STATistics[:SCALE]:X:POINTS <value>**

Effective for statistics measurements.

Sets the measurement result resolution. It specifies the number of pixels that are assigned to the logarithmic level range for measured value output. The width of the level range divided by N–1, where N is the number of pixels, must not be less than the smallest level resolution.

- Level range: `CALCulate<Measurement>:STATistics[:SCALE]:X:RANGE` on page 332
- Smallest level resolution: `[SENSe<Sensor>:]STATistics:SCALE:X:MPWidth?` on page 329

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Parameters:**

<value>                    Range:     3 to 8191  
                               \*RST:     600

**Manual operation:**    See "[Power / div](#)" on page 109

**CALCulate<Measurement>:STATistics[:SCALe]:X:RANGe <value>**

Effective for statistics measurements.

Sets the width of the level range for the analysis result.

Lower limit of the level range:

- [CALCulate<Measurement>:STATistics\[:SCALe\]:X:RLEVel:RELative](#) on page 332
- [CALCulate<Measurement>:STATistics\[:SCALe\]:X:RLEVel\[:ABSolute\]](#) on page 332

**Suffix:**

<Measurement>        1 to 8  
                               Measurement

**Parameters:**

<value>                    Range:     3.6 dB to 100.0 dB  
                               \*RST:     50.0 dB  
                               Default unit: dB

**Manual operation:**    See "[Power / div](#)" on page 109

**CALCulate<Measurement>:STATistics[:SCALe]:X:RLEVel:RELative <value>**

Effective for statistics measurements with relative power display.

Sets the lower limit of the level range for the analysis result. This level is assigned to the first pixel. The level assigned to the last pixel is equal to the level of the first pixel plus the level range.

**Suffix:**

<Measurement>        1 to 8  
                               Measurement

**Parameters:**

<value>                    Range:     -400.0 dB to 400.0 dB  
                               \*RST:     -25.0 dB  
                               Default unit: dB

**Manual operation:**    See "[Minimum Power](#)" on page 109

**CALCulate<Measurement>:STATistics[:SCALe]:X:RLEVel[:ABSolute] <value>**

Effective for statistics measurements with absolute power display.

Sets the lower limit of the level range for the analysis result. This level is assigned to the first pixel. The level assigned to the last pixel is equal to the level of the first pixel plus the level range.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Parameters:**

<value> Range: -400.0 dBm to 400.0 dBm  
\*RST: -30.0 dBm  
Default unit: dBm

**Manual operation:** See "[Minimum Power](#)" on page 109

**CALCulate<Measurement>:STATistics[:SCALe]:Y:SPACing <value>**

Effective for statistics measurements.

Sets linear or logarithmic scaling for the y-axis.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Parameters:**

<value> LINear | LOGarithmic  
\*RST: LOGarithmic

**Manual operation:** See "[Scaling of Y Axis](#)" on page 109

**12.6.12.4 Using markers**

<a href="#">CALCulate&lt;Measurement&gt;:STATistics[:CDF]:MARKer:Y:POSition.....</a>	333
<a href="#">CALCulate&lt;Measurement&gt;:STATistics:MARKer:HORIZontal:DATA?.....</a>	334
<a href="#">CALCulate&lt;Measurement&gt;:STATistics:MARKer:VERTical:DATA[:POWER]?.....</a>	334
<a href="#">CALCulate&lt;Measurement&gt;:STATistics:MARKer:X:POSition[:ABSolute].....</a>	334
<a href="#">CALCulate&lt;Measurement&gt;:STATistics:MARKer:X:POSition:RELative.....</a>	334
<a href="#">CALCulate&lt;Measurement&gt;:STATistics:PDF:MARKer:Y:POSition.....</a>	335

**CALCulate<Measurement>:STATistics[:CDF]:MARKer:Y:POSition <value>**

Positions the y-marker to a measurement value of the CDF statistics measurement.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Parameters:**

<value> Range: 0.0 pct to 100.0 pct  
\*RST: 50.0 pct  
Default unit: pct

**Manual operation:** See "[\[%\] marker](#)" on page 106

---

**CALCulate<Measurement>:STATistics:MARKer:HORizontal:DATA?**

Effective for statistics measurements.

Queries the measurement result at the x-marker position.

The command is not fully R&S NRP2 compatible. If port 1 is assigned to measurement 1, and so on, the command works. If port 1 is assigned to measurement 2, for example, enable the R&S NRP2 emulation by using `SYSTem:LANGuage "NRP2"`.

**Suffix:**

<Measurement>      1 to 8  
                         Measurement

**Usage:**              Query only

---

**CALCulate<Measurement>:STATistics:MARKer:VERTical:DATA[:POWER]?**

Effective for statistics measurements.

Queries the power value at the y-marker position.

The command is not fully R&S NRP2 compatible. If port 1 is assigned to measurement 1, and so on, the command works. If port 1 is assigned to measurement 2, for example, enable the R&S NRP2 emulation by using `SYSTem:LANGuage "NRP2"`.

**Suffix:**

<Measurement>      1 to 8  
                         Measurement

**Usage:**              Query only

---

**CALCulate<Measurement>:STATistics:MARKer:X:POSITION[:ABSolute] <value>**

Effective for statistics measurements.

Sets the absolute position of the x-marker.

**Suffix:**

<Measurement>      1 to 8  
                         Measurement

**Parameters:**

<value>              Range:      -200.0 dBm to 200.0 dBm  
                         \*RST:      0.0 dBm  
                         Default unit: dBm

**Manual operation:**    See "[dBm] / [dB] marker" on page 106

---

**CALCulate<Measurement>:STATistics:MARKer:X:POSITION:RELative <value>**

Effective for statistics measurements.

Sets the x-marker relative to a power value.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Parameters:**

<value> Range: -200.0 dB to 200.0 dB  
\*RST: 0.0 dB  
Default unit: dB

**Manual operation:** See "[dBm] / [dB] marker" on page 106

**CALCulate<Measurement>:STATistics:PDF:MARKer:Y:POSition <value>**

Positions the y-marker to a measurement value of the PDF statistics measurement.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Parameters:**

<value> Range: 0.0 to 10000.0  
\*RST: 0.0  
Default unit: -

**Manual operation:** See "[%] marker" on page 106

### 12.6.13 NRT measurements

Further information:

- [Chapter 6.9.2, "NRT settings"](#), on page 112

Further commands for relative NRT measurements:

- [Chapter 12.6.5, "Relative measurements"](#), on page 255

CALCulate<Measurement>:RELative<DirectionalChannel>:CCDF.....	336
CALCulate<Measurement>:RELative<DirectionalChannel>:POWer[:MAGNitude].....	336
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CALCulate<Measurement>:RELative<DirectionalChannel>:RATio[:MAGNitude].....	338
[SENSe<Sensor>:]FUNction:CONCurent.....	338
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[SENSe<Sensor>:]POWer[:POWer]:RANGe:AUTO.....	340
[SENSe<Sensor>:]POWer:REFLection:RANGe:LIMit:DETECT.....	340
[SENSe<Sensor>:]POWer[:POWer]:RANGe:LIMit:DETECT.....	340
[SENSe<Sensor>:]POWer:REFLection:RANGe:LIMit[:STATe].....	341
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[SENSe<Sensor>:]RRESolution.....	342

---

### **CALCulate<Measurement>:RELative<DirectionalChannel>:CCDF <value>**

Sets the reference value for the cumulative distribution function (CCDF).

**Suffix:**

<Measurement> 1 to 8  
Measurement

<DirectionalChannel> 1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value> Range: 0.0 pct to 100.0 pct  
\*RST: 50.0 pct  
Default unit: pct

**Manual operation:** See "[Forward Reference Value, Reflection Reference Value](#)" on page 60

---

### **CALCulate<Measurement>:RELative<DirectionalChannel>:POWer[:MAGNitude] <value>**

Sets the reference value for relative ratio measurements.

If you enter a value without unit, the unit is defined by `UNIT<Measurement>:POWer[:VALue]`. For further information, see [Chapter 12.6.1.3, "Units"](#), on page 229.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<DirectionalChannel> 1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value> Range: -120.0 dBm to +150.0 dBm  
\*RST: 0.0 dBm  
Default unit: dBm

**Manual operation:** See "[Forward Reference Value, Reflection Reference Value](#)" on page 60



---

**CALCulate<Measurement>:RELative<DirectionalChannel>:RATio:RCOefficient**  
<value>

Sets the reference value for the reflection coefficient.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<DirectionalChannel> 1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value> Range: 0.0 to 1.0  
\*RST: 0.5  
Default unit: -

**Manual operation:** See "[Forward Reference Value, Reflection Reference Value](#)" on page 60

---

**CALCulate<Measurement>:RELative<DirectionalChannel>:RATio:RFRatio**  
<value>

Sets the reference value for the ratio of forward/reverse power.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<DirectionalChannel> 1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value> Range: 0.0 pct to 100.0 pct  
\*RST: 50.0 pct  
Default unit: pct

**Manual operation:** See "[Forward Reference Value, Reflection Reference Value](#)" on page 60

---

**CALCulate<Measurement>:RELative<DirectionalChannel>:RATio:RLOSs** <value>

Sets the reference value for the return loss.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<DirectionalChannel> 1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value> Range: -200.0 dB to 200.0 dB  
 \*RST: 0.0 dB  
 Default unit: dB

**Manual operation:** See "[Forward Reference Value, Reflection Reference Value](#)" on page 60

**CALCulate<Measurement>:RELative<DirectionalChannel>:RATio:SWR <value>**

Sets the reference value for the standing wave ratio (SWR).

**Suffix:**

<Measurement> 1 to 8  
 Measurement

<DirectionalChannel> 1 to 2  
 1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value> Range: 0.0 to 1.0  
 \*RST: 0.5  
 Default unit: -

**Manual operation:** See "[Forward Reference Value, Reflection Reference Value](#)" on page 60

**CALCulate<Measurement>:RELative<DirectionalChannel>:RATio[:MAGNitude] <value>**

Sets the reference value for relative ratio measurements.

**Suffix:**

<Measurement> 1 to 8  
 Measurement

<DirectionalChannel> 1 to 2  
 1 to 2

**Parameters:**

<value> Default unit: pct

**Manual operation:** See "[Forward Reference Value, Reflection Reference Value](#)" on page 60

**[SENSe<Sensor>:]FUNCTION:CONCurrent <concurrent>**

Requires the R&S NRX-B9 sensor interface for R&S NRT.

Enables or disables the usage of several measurement functions simultaneously.

**Suffix:**

<Sensor> 101  
R&S NRT directional power sensor

**Parameters:**

<concurrent> **ON**  
Two measurement functions can be enabled simultaneously.

**OFF**  
Only a single function can be enabled. If a new measurement function is enabled, the previously active function is disabled automatically.

\*RST: ON

---

**[SENSe<Sensor>:]FUNCTION:OFF:ALL<Channel>**

Requires the R&S NRX-B9 sensor interface for R&S NRT.

Disables all measurement functions for the specified channel.

**Suffix:**

<Sensor> 101  
R&S NRT directional power sensor

<Channel> 1 to 2  
1 = forward, 2 = reflection (reverse)

**Usage:** Event

---

**[SENSe<Sensor>:]FUNCTION:OFF[:FUNC] <function>**

Requires the R&S NRX-B9 sensor interface for R&S NRT.

Disables the specified measurement function.

The query returns all disabled measurement functions.

**Suffix:**

<Sensor> 101  
R&S NRT directional power sensor

**Setting parameters:**

<function> See [CALCulate<Measurement>\[:CHANnel<Channel>\]:FEED<Channel>](#) on page 251.

**Usage:** Setting only

---

**[SENSe<Sensor>:]FUNCTION:STATe? <function>**

Requires the R&S NRX-B9 sensor interface for R&S NRT.

Queries whether the measurement function is enabled or disabled.

**Suffix:**  
 <Sensor> 101  
 R&S NRT directional power sensor

**Query parameters:**  
 <function> See [CALCulate<Measurement>\[:CHANnel<Channel>\]:FEED<Channel>](#) on page 251.

**Usage:** Query only

**[SENSe<Sensor>:]POWer:REFLection:RANGe:AUTO <state>**

**[SENSe<Sensor>:]POWer[:POWer]:RANGe:AUTO <state>**

If enabled, adapts the scaling of the graphical display once.

**Suffix:**  
 <Sensor> 1 to 128  
 Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**  
 <state> ON | OFF  
 \*RST: ON

**Manual operation:** See "[Autoscale](#)" on page 116

**[SENSe<Sensor>:]POWer:REFLection:RANGe:LIMit:DETECT <value>**

**[SENSe<Sensor>:]POWer[:POWer]:RANGe:LIMit:DETECT <value>**

Effective if the Out 1 / Trig Out connector is configured as a monitoring output for the power indication, for example using [\[SENSe<Sensor>:\]POWer\[:POWer\]:RANGe:LIMit\[:STATe\] ON](#).

Defines when a logic high level (> 2.7 V) is output at the Out 1 / Trig Out connector.

**Suffix:**  
 <Sensor> 1 to 128  
 Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**  
 <value> INBound | OUTBound | HIGH  
**INBound**  
 Measured power is within the range specified.  
**OUTBound**  
 Measured power is out of the range defined.  
**HIGH**  
 Measured power exceeds the upper scale limit.  
 \*RST: HIGH

**Manual operation:** See "[Fail Voltage](#)" on page 154

---

**[SENSe<Sensor>:]POWer:REFLection:RANGe:LIMit[:STATe]** <state>

**[SENSe<Sensor>:]POWer[:POWer]:RANGe:LIMit[:STATe]** <state>

Enables or disables the Out 1 / Trig Out connector as a monitoring output for the power indication.

If enabled, you cannot use the connector for any other purpose.

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<state> \*RST: OFF

**Manual operation:** See "[Mode](#)" on page 152

---

**[SENSe<Sensor>:]POWer:REFLection:RANGe:LOWer** <lower>

**[SENSe<Sensor>:]POWer[:POWer]:RANGe:LOWer** <lower>

Effective if [\[SENSe<Sensor>:\]POWer:REFLection:RANGe:AUTO](#) is disabled.

Sets the lower scale limit for the power indication.

The entry has no unit. The unit corresponds to the output unit selected by [UNIT<Measurement>:POWer\[:VALue\]](#) or [UNIT<Measurement>:POWer:RATio](#).

If you change the unit, the entered value remains the same.

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<lower> Range: -1999.0 to 1999.0  
\*RST: 0.0

**Manual operation:** See "[Measurement for Limit Output](#)" on page 154

---

**[SENSe<Sensor>:]POWer:REFLection:RANGe[:UPPer]** <upper>

**[SENSe<Sensor>:]POWer[:POWer]:RANGe[:UPPer]** <upper>

Effective if [\[SENSe<Sensor>:\]POWer:REFLection:RANGe:AUTO](#) is disabled.

Sets the lower scale limit for the power indication. For further details, see

[\[SENSe<Sensor>:\]POWer\[:POWer\]:RANGe:LOWer](#) on page 341.

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<upper>                    Range:     -1999.0 to 1999.0  
                               \*RST:     1.0

**Manual operation:**    See "[Measurement for Limit Output](#)" on page 154

**[SENSe<Sensor>:]RRESolution <rres>**

Requires the R&S NRX-B9 sensor interface for R&S NRT.

Configures the resolution of the measurement.

**Suffix:**

<Sensor>                    101  
                               R&S NRT directional power sensor

**Parameters:**

<rres>                        LOW | HIGH  
                               **HIGH**  
                               Equals `CALCulate<Measurement>:RESolution` OOI.  
                               **LOW**  
                               All other settings.  
                               \*RST:     LOW

**Manual operation:**    See "[Resolution](#)" on page 56

## 12.6.14 Querying measurement results

<code>CALCulate&lt;Measurement&gt;:COUNT:DATA?</code> .....	342
<code>CALCulate&lt;Measurement&gt;:DATA?</code> .....	342
<code>CALCulate&lt;Measurement&gt;:MAXimum:DATA?</code> .....	343
<code>CALCulate&lt;Measurement&gt;:MINimum:DATA?</code> .....	343
<code>CALCulate&lt;Measurement&gt;:MEAN:DATA?</code> .....	343
<code>CALCulate&lt;Measurement&gt;:PTPeak:DATA?</code> .....	343
<code>CALCulate&lt;Measurement&gt;:SDEViation:DATA?</code> .....	343

**CALCulate<Measurement>:COUNT:DATA?**

Queries the number of measured values that are included for the calculation of the mean value and standard deviation.

**Suffix:**

<Measurement>            1 to 8  
                               Measurement

**Usage:**                    Query only

**CALCulate<Measurement>:DATA?**

Queries the measurement result.

**Suffix:**  
<Measurement> 1 to 8  
Measurement

**Usage:** Query only

---

**CALCulate<Measurement>:MAXimum:DATA?**  
**CALCulate<Measurement>:MINimum:DATA?**

Queries the maximum/minimum of all measured values.

**Suffix:**  
<Measurement> 1 to 8  
Measurement

**Usage:** Query only

---

**CALCulate<Measurement>:MEAN:DATA?**

Queries the mean value of all measured values. The mean value is reset if the auxiliary values are reset.

**Suffix:**  
<Measurement> 1 to 8  
Measurement

**Usage:** Query only

---

**CALCulate<Measurement>:PTPeak:DATA?**

Queries the peak-to-peak distance (maximum to minimum) of the measured values.

**Suffix:**  
<Measurement> 1 to 8  
Measurement

**Usage:** Query only

---

**CALCulate<Measurement>:SDEVIation:DATA?**

Queries the standard deviation of all measured values. The standard deviation is calculated and reset together with the mean value, [CALCulate<Measurement>:MEAN:DATA?](#).

**Suffix:**  
<Measurement> 1 to 8  
Measurement

**Usage:** Query only

## 12.7 Calculation functions

Further information:

- "Channel Calculation Function" on page 73
- Chapter 12.3, "Addressing measurements and sensors", on page 199

### 12.7.1 Selecting a calculation function

CALCulate<Measurement>:MATH[:EXPRession]..... 344

CALCulate<Measurement>:MATH[:EXPRession]:CATalog?.....345

#### CALCulate<Measurement>:MATH[:EXPRession] [<expression>]

Selects a channel calculation function that processes the results of one or two sensors. The result of this calculation is made available as a measured value.

SENS<sub>n</sub> is assigned as primary sensor, SENS<sub>m</sub> as secondary sensor.

**Table 12-5: <expression> parameters for absolute power measurements**

Channel calculation function	<expression>	Description
Single measurement	" (SENS <sub>n</sub> ) "	Measured value of sensor A, B, C or D
Sum	" (SENS <sub>n</sub> +SENS <sub>m</sub> ) "	Sum of the values measured by sensor n and sensor m
Difference	" (SENS <sub>n</sub> -SENS <sub>m</sub> ) "	Difference between the measured values of sensor n and sensor m
With n and m= 1, 2, 3, 4 or A, B, C, D		

**Table 12-6: <expression> parameters for relative power measurements**

Channel calculation function	<expression>	Description
Ratio	" (SENS <sub>n</sub> /SENS <sub>m</sub> ) "	Quotient of the values measured by sensor n and sensor m
Standing wave ratio	"SWR (SENS <sub>n</sub> , SENS <sub>m</sub> ) "	Standing wave ratio. No output unit. $\frac{1 + \sqrt{\text{SENS}_m / \text{SENS}_n}}{1 - \sqrt{\text{SENS}_m / \text{SENS}_n}}$ Sensor n measures the forward power of a wave. Sensor m measures the reflected power.
With n and m = 1, 2, 3, 4 or A, B, C, D		



Channel calculation function	<expression>	Description
Reflection coefficient	"RCO (SENSn, SENSm) "	Reflection coefficient of a DUT. No output unit. $\sqrt{\text{SENSm}/\text{SENSn}}$ Sensor n measures the forward power of a wave. Sensor m measures the reflected power.
Return loss	"RLOS (SENSn, SENSm) "	Return loss of a DUT. The output unit is dB. $10 \times \log \frac{\text{SENSm}/\text{SENSn}}{\text{SENSm}/\text{SENSn}}$ Sensor n measures the forward power of a wave. Sensor m measures the reflected power.
Reflection ratio	"REFL (SENSn, SENSm) "	Reflection ratio of a DUT. The output unit is percent. $100 \frac{\text{SENSm}}{\text{SENSn}}$ Sensor n measures the forward power of a wave. Sensor m measures the reflected power.
With n and m = 1, 2, 3, 4 or A, B, C, D		

**Table 12-7: Additional <expression> parameters for queries**

<expression>	Description
OFF	No channel calculation function is selected.
-	For SENSn or SENSm, if no primary or secondary sensor is selected.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Parameters:**

<expression> See [Table 12-5](#) and [Table 12-6](#). The unit is set by  
 UNIT<Measurement>:POWER[:VALue] or  
 UNIT<Measurement>:POWER:RATio.  
 The query returns two additional expressions, see [Table 12-7](#).  
 \*RST: Depends on the selected channel.  
 Default unit: Depends on <expression> and the set unit.

**Manual operation:** See "[Channel Calculation Function](#)" on page 73

---

**CALCulate<Measurement>:MATH[:EXPReSSion]:CATalog? [<expressions>]**

Queries all channel calculation functions supported by CALCulate<Measurement>:MATH[:EXPReSSion].

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Query parameters:**

<expressions>

**Usage:** Query only

**Manual operation:** See "[Channel Calculation Function](#)" on page 73

## 12.8 Configuring sensors

- [Setting the frequency](#)..... 346
- [Sensor mode settings](#)..... 347
- [Sensor correction settings](#)..... 351
- [Sensor filter settings](#)..... 357
- [Sensor range settings](#)..... 365
- [Standardized signals](#)..... 368
- [Frequency selective power sensors](#)..... 381
- [Channel configuration for NRT measurements](#)..... 383

### 12.8.1 Setting the frequency

- [\[SENSe<Sensor>:\]FREQUency:FIXed](#)..... 346
- [\[SENSe<Sensor>:\]FREQUency\[:CW\]](#)..... 346
- [\[SENSe<Sensor>:\]FREQUency:TRACk](#)..... 346

---

**[SENSe<Sensor>:]FREQUency:FIXed <frequency>**

**[SENSe<Sensor>:]FREQUency[:CW] <frequency>**

Sets the carrier frequency of the applied signal. This value is used for frequency response correction of the measurement result.

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<frequency> Range: Depends on sensor.  
\*RST: Depends on sensor.  
Default unit: Hz

**Manual operation:** See "[\[Freq\]](#)" on page 30

---

**[SENSe<Sensor>:]FREQUency:TRACk <state>**

Enables or disables the frequency tracker of the sensor, if available.

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<state> OFF | ON  
\*RST: OFF

## 12.8.2 Sensor mode settings

Further information:

- [Chapter 7.1, "Mode settings"](#), on page 119
- [Chapter 12.8.8.1, "Channel mode settings"](#), on page 383

CALCulate<Measurement>[:CHANnel<Channel>]:BURSt:TIMing:EXCLude:STARt.....	347
CALCulate<Measurement>[:CHANnel<Channel>]:BURSt:TIMing:EXCLude:STOP.....	348
CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:DCYCLe:STATe.....	348
CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:DCYCLe[:VALue].....	348
CALCulate<Measurement>[:CHANnel<Channel>]:TRACe:ESAMpling.....	349
CALCulate<Measurement>[:CHANnel<Channel>]:SAMPling.....	349
CALCulate<Measurement>[:CHANnel<Channel>][:POWer]:BURSt:DTOLerance.....	350
CALCulate<Measurement>[:CHANnel<Channel>][:POWer][:AVG]:APERTure[:VALue].....	350
CALCulate<Measurement>[:CHANnel<Channel>][:POWer][:AVG]:SMOothing[:STATe].....	351
CALCulate<Measurement>:TRACe:MEASurement:TRANSition:ESAMpling:AUTO[:STATe]....	351

---

### CALCulate<Measurement>[:CHANnel<Channel>]:BURSt:TIMing:EXCLude:STARt <value>

Effective for burst average measurements.

Sets the time interval at the beginning of bursts that is excluded from the measurement. Thus, signal overshoots are omitted.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<value> Range: 0.0 s to 15.0 s  
\*RST: 0.0 s  
Default unit: s

**Manual operation:** See ["Exclude from Start, Exclude from End"](#) on page 122

---

**CALCulate<Measurement>[:CHANnel<Channel>]:BURSt:TIMing:EXCLude:STOP**  
<value>

Effective for burst average measurements.

Sets the time interval at the end of bursts that is excluded from the measurement. Thus, signal overshoots are omitted.

**Suffix:**

<Measurement>      1 to 8  
                            Measurement

<Channel>            1 to 2  
                            1 = primary sensor, 2 = secondary sensor

**Parameters:**

<value>              Range:      0.0 s to 15.0 s  
                            \*RST:      0.0 s  
                            Default unit: s

**Manual operation:** See ["Exclude from Start, Exclude from End"](#) on page 122

---

**CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:DCYCLe:STATe**  
<state>

Effective for continuous average measurements.

Enables or disables the duty cycle correction.

**Suffix:**

<Measurement>      1 to 8  
                            Measurement

<Channel>            1 to 2  
                            1 = primary sensor, 2 = secondary sensor

**Parameters:**

<state>              \*RST:      OFF

**Manual operation:** See ["Duty Cycle State"](#) on page 119

---

**CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:DCYCLe[:VALue]**  
<duty\_cycle>

Effective for continuous average measurements.

Sets the duty cycle for measuring pulse-modulated signals. The duty cycle defines the percentage of one period during which the signal is active. If the duty cycle is enabled, the R&S NRX considers this percentage when calculating the signal pulse power from the average power.

For thermal power sensor or multipath power sensor, the duty cycle correction is the only way to determine the power of pulsed signals.

**Suffix:**

<Measurement>	1 to 8 Measurement
<Channel>	1 to 2 1 = primary sensor, 2 = secondary sensor

**Parameters:**

<duty_cycle>	Range: 0.001 pct to 100.0 pct *RST: 50.0 pct Default unit: pct
--------------	--

**Manual operation:** See "[Duty Cycle](#)" on page 119

**CALCulate<Measurement>[:CHANnel<Channel>]:TRACe:ESAMpling <value>**

Effective for trace measurements.

Enables or disables the automatic equivalent sampling that allows for high-resolution measurements.

**Suffix:**

<Measurement>	1 to 8 Measurement
<Channel>	1 to 2 1 = primary sensor, 2 = secondary sensor

**Parameters:**

<value>	*RST: ON
---------	----------

**Manual operation:** See "[Equivalent Time Sampling](#)" on page 120

**CALCulate<Measurement>[:CHANnel<Channel>]:SAMPling <value>**

Effective for continuous average measurements.

Sets the sampling rate.

If the sampling frequency is located within the video bandwidth, aliasing can occur, that is when spectral components near the sampling frequency cause beating effects. If you change the sampling rate, the beating effects usually disappear.

**Suffix:**

<Measurement>	1 to 8 Measurement
<Channel>	1 to 2 1 = primary sensor, 2 = secondary sensor

**Parameters:**

<value>	FREQ1   FREQ2 <b>FREQ1</b> Normal sampling rate
---------	---

**FREQ2**

Lower sampling rate

Recommended avoiding measurement errors caused due to aliasing effects. However, this setting extends the measurement time.

\*RST: FREQ1

**Manual operation:** See "[Sampling Rate](#)" on page 121

**CALCulate<Measurement>[:CHANnel<Channel>][:POWer]:BURSt:DTOLerance**  
 <value>

Effective for burst average measurements.

Detects the falling edge of a burst. If the power keeps low for at least the set time, the end of the burst is assumed. Modulation-specific power drops that are shorter than the set value are ignored.

See also [Chapter 6.3, "Burst average"](#), on page 76.

**Suffix:**

<Measurement> 1 to 8  
 Measurement

<Channel> 1 to 2  
 1 = primary sensor, 2 = secondary sensor

**Parameters:**

<value> Range: 0.0 s to 0.3 s  
 \*RST: 0.0 s  
 Default unit: s

**Manual operation:** See "[Dropout Tolerance](#)" on page 121

**CALCulate<Measurement>[:CHANnel<Channel>][:POWer][:AVG]:APERTure[:**  
**VALue] <value>**

Effective for continuous average measurements.

Sets the width of the sampling window.

When measuring modulated signals, the measurement can show fluctuation due to the modulation. If that is the case, adapt the size of the sampling window exactly to the modulation period to get an optimally stable display. If the modulation period varies or is not precisely known, you can also set `CALCulate<Measurement>[:CHANnel<Channel>][:POWer][:AVG]:SMOothing[:STATe] ON`.

**Suffix:**

<Measurement> 1 to 8  
 Measurement

<Channel> 1 to 2  
 1 = primary sensor, 2 = secondary sensor

**Parameters:**

<value>                    Range:        8.3e-9 s to 30.0 s  
                               \*RST:        0.01 s  
                               Default unit: s

**Manual operation:**    See "[Aperture](#)" on page 120

**CALCulate<Measurement>[:CHANnel<Channel>][:POWer][:AVG]:SMOothing[:  
 STATE] <value>**

Effective for continuous average measurements.

Enables or disables the smoothing filter, a steep-edge digital lowpass filter. The filter reduces result fluctuations caused by modulation.

**Suffix:**

<Measurement>        1 to 8  
                               Measurement  
  
 <Channel>                1 to 2  
                               1 = primary sensor, 2 = secondary sensor

**Parameters:**

<value>                    See "[Smoothing](#)" on page 121.  
                               \*RST:        OFF

**Manual operation:**    See "[Smoothing](#)" on page 121

**CALCulate<Measurement>:TRACe:MEASurement:TRANSition:ESAMpling:  
 AUTO[:STATE] <value>**

Effective for pulse analysis measurements.

Enables or disables the automatic equivalent sampling that allows for high-resolution measurements.

**Suffix:**

<Measurement>        1 to 8  
                               Measurement

**Parameters:**

<value>                    \*RST:        ON

**Manual operation:**    See "[Equivalent Time Sampling](#)" on page 120

### 12.8.3 Sensor correction settings

Further information:

- [Chapter 7.2, "Correction settings"](#), on page 122
- [Chapter 12.13, "Managing setups and correction tables"](#), on page 410
- [Chapter 12.8.8.2, "Channel correction settings"](#), on page 387

[SENSe<Sensor>:]CORRection:SPDevice:LIST?	352
[SENSe<Sensor>:]CORRection:SPDevice:SElect	352
[SENSe<Sensor>:]CORRection:SPDevice:STATe	352
[SENSe<Sensor>:]IGAMma:EUNCertainty?	353
[SENSe<Sensor>:]IGAMma:PHASe?	353
[SENSe<Sensor>:]IGAMma[:MAGNitude]?	353
[SENSe<Sensor>:]RGAMma[:MAGNitude]	354
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CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:OFFSet:STATe	354
CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:OFFSet:TABLE:INDEX	355
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CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:OFFSet[:MAGNitude]	356
CALCulate<Measurement>[:CHANnel<Channel>]:SGAMma:CORRection:STATe	356
CALCulate<Measurement>[:CHANnel<Channel>]:SGAMma:PHASe	356
CALCulate<Measurement>[:CHANnel<Channel>]:SGAMma[:MAGNitude]	357

---

### [SENSe<Sensor>:]CORRection:SPDevice:LIST?

Queries the list of the S-parameter data sets that have been loaded to the sensor. The result of the query indicates the consecutive number and mnemonic of each data set.

#### Suffix:

<Sensor>                    1 to 128  
 Configured sensor connected at: port A = 1, ... , port D = 4, R&S  
 NRX-B9 = 101, USB and LAN port = 5 to 100

**Usage:**                    Query only

**Manual operation:**    See "[S-Parameter List](#)" on page 124

---

### [SENSe<Sensor>:]CORRection:SPDevice:SElect <num>

Selects a data set for S-parameter correction that has been loaded to the sensor.

#### Suffix:

<Sensor>                    1 to 128  
 Configured sensor connected at: port A = 1, ... , port D = 4, R&S  
 NRX-B9 = 101, USB and LAN port = 5 to 100

#### Parameters:

<num>                        Range:     1 to 1999  
                                  \*RST:     1

**Manual operation:**    See "[S-Parameter List](#)" on page 124

---

### [SENSe<Sensor>:]CORRection:SPDevice:STATe <state>

Enables or disables the S-parameter correction. If enabled, the sensor uses the S-parameter data set selected by `[SENSe<Sensor>:]CORRection:SPDevice:SElect`.



For some sensors, the S-parameter correction is always activated. If you try to deactivate the S-parameter correction for such a sensor, a SCPI error is generated.

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<state> ON | OFF  
\*RST: OFF

**Manual operation:** See "[S-Parameter List](#)" on page 124

**[SENSe<Sensor>:]IGAMma:EUNCertainty?**

Queries the expanded ( $k = 2$ ) uncertainty of the magnitude of the complex input reflection coefficient  $\Gamma_{in}$ . Following gamma correction, the residual mismatch uncertainty becomes so small that it is practically negligible.

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Example:**

IGAM:EUNC?  
Query  
5.000000E-03  
Response

**Usage:** Query only

**[SENSe<Sensor>:]IGAMma:PHASe?**

Queries the phase angle of the complex input reflection coefficient  $\Gamma_{in}$ . The result is provided in degrees. Range: -180 degrees to +180 degrees.

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Example:**

IGAM:PHAS?  
Query  
-1.327654E+02  
Response

**Usage:** Query only

**[SENSe<Sensor>:]IGAMma[:MAGNitude]?**

Queries the magnitude of the complex input reflection coefficient  $\Gamma_{in}$ .

**Suffix:**

&lt;Sensor&gt;

1 to 128

Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Example:**

IGAM:MAGN?

Query

1.739179E-02

Response

**Usage:**

Query only

**[SENSe<Sensor>:]RGAMma[:MAGNitude] <magnitude>**

Sets the magnitude of the complex reflection coefficient of the source,  $\Gamma_{\text{source}}$ .

A value of 0.0 corresponds to an ideal matched source. A value of 1.0 corresponds to total reflection.

**Suffix:**

&lt;Sensor&gt;

1 to 128

Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

&lt;magnitude&gt;

**0.0**

Disables the compensation.

Range: -200.0 to 200.0

\*RST: 0.0

Default unit: -

**[SENSe<Sensor>:]RGAMma:PHASe <phase\_angle>**

Sets the phase angle of the complex reflection coefficient of the source,  $\Gamma_{\text{source}}$ .

**Suffix:**

&lt;Sensor&gt;

1 to 128

Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

&lt;phase\_angle&gt;

Range: 0.0 deg to 360.0 deg

\*RST: 0.0 deg

Default unit: deg

**CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:OFFSet:STATe <state>**

Enables or disables the offset correction.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<state> ON | OFF  
\*RST: OFF

**Manual operation:** See ["Offset State"](#) on page 123  
See ["Offset"](#) on page 135

**CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:OFFSet:TABLE:  
INDEX <value>**

Selects one of the available offset tables.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor

**Setting parameters:**

<value> Range: 1 to 10  
\*RST: 1

**Usage:** Setting only

**Manual operation:** See ["Frequency dependent offset table"](#) on page 124

**CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:OFFSet:TABLE[:  
STATE] <state>**

Enables or disables the selected table.

If enabled, the measurement results are corrected using the specified offset. If the exact frequency value is not available in the table, the values of the table are interpolated. If the selected frequency is outside the specified frequency range, the first or last offset value of the table is used.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor

**Setting parameters:**

<state> \*RST: OFF

**Usage:** Setting only

**Manual operation:** See "[Frequency dependent offset active](#)" on page 124

**CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:OFFSet[MAGNitude] <value>**

Effective if [CALCulate<Measurement>\[:CHANnel<Channel>\]:CORRection:OFFSet:STATe](#) ON is set.

Considers the transmission loss in a cable that connects the desired measurement point, set by [INPut<Sensor>:PORT:POSition](#), and the sensor.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value> Range: -200.0 dB to 200.0 dB  
\*RST: 0.0 dB  
Default unit: dB

**Manual operation:** See "[Offset](#)" on page 123  
See "[Offset](#)" on page 135

**CALCulate<Measurement>[:CHANnel<Channel>]:SGAMma:CORRection:STATe <value>**

Enables or disables gamma correction. See also "[Gamma Correction](#)" on page 125.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<value> \*RST: OFF

**Manual operation:** See "[Gamma Correction](#)" on page 125

**CALCulate<Measurement>[:CHANnel<Channel>]:SGAMma:PHASe <value>**

Effective if [CALCulate<Measurement>\[:CHANnel<Channel>\]:SGAMma:CORRection:STATe](#) ON is set.

Sets the phase angle of the complex reflection coefficient of the source.

**Suffix:**

<Measurement>	1 to 8 Measurement
<Channel>	1 to 2 1 = primary sensor, 2 = secondary sensor

**Parameters:**

<value>	Range: -360.0 deg to 360.0 deg
	*RST: 0.0 deg
	Default unit: deg

**Manual operation:** See "[Gamma Phase](#)" on page 125

**CALCulate<Measurement>[:CHANnel<Channel>]:SGAMma[:MAGNitude] <value>**

Effective if [CALCulate<Measurement>\[:CHANnel<Channel>\]:SGAMma:CORRection:STATe](#) ON is set.

Sets the magnitude of the complex reflection coefficient of the source.

**Suffix:**

<Measurement>	1 to 8 Measurement
<Channel>	1 to 2 1 = primary sensor, 2 = secondary sensor

**Parameters:**

<value>	Range: 0.0 to 1.0
	*RST: 0.0
	Default unit: -

**Manual operation:** See "[Gamma Magnitude](#)" on page 125

## 12.8.4 Sensor filter settings

Further information:

- [Chapter 7.3, "Filter settings"](#), on page 125
- [Chapter 12.8.8.3, "Channel filter settings"](#), on page 390

<a href="#">[SENSe&lt;Sensor&gt;:]AVERAge:COUNT:AUTO:RESolution</a> .....	358
<a href="#">[SENSe&lt;Sensor&gt;:]AVERAge:RESet</a> .....	358
<a href="#">CALCulate&lt;Measurement&gt;[:CHANnel&lt;Channel&gt;]:AVERAge:COUNT:AUTO:MTIME</a> .....	359
<a href="#">CALCulate&lt;Measurement&gt;[:CHANnel&lt;Channel&gt;]:AVERAge:COUNT:AUTO:NSRatio</a> .....	359
<a href="#">CALCulate&lt;Measurement&gt;[:CHANnel&lt;Channel&gt;]:AVERAge:COUNT:AUTO:SLOT</a> .....	359
<a href="#">CALCulate&lt;Measurement&gt;[:CHANnel&lt;Channel&gt;]:AVERAge:COUNT:AUTO:TYPE</a> .....	360
<a href="#">CALCulate&lt;Measurement&gt;[:CHANnel&lt;Channel&gt;]:AVERAge:TCONtrol:AUTO</a> .....	360
<a href="#">CALCulate&lt;Measurement&gt;[:CHANnel&lt;Channel&gt;]:AVERAge:TCONtrol[:ENUM]</a> .....	361
<a href="#">CALCulate&lt;Measurement&gt;[:CHANnel&lt;Channel&gt;]:AVERAge:TYPE</a> .....	362
<a href="#">CALCulate&lt;Measurement&gt;[:CHANnel&lt;Channel&gt;]:AVERAge[:STATe]</a> .....	362
<a href="#">CALCulate&lt;Measurement&gt;[:CHANnel&lt;Channel&gt;]:TRACe:AVERAge:COUNT[:VALue]</a> .....	362

CALCulate<Measurement>[:CHANnel<Channel>]:TRACe:AVERage:TCONtrol:AUTO.....	363
CALCulate<Measurement>[:CHANnel<Channel>]:TRACe:AVERage:TCONtrol[:ENUM].....	363
CALCulate<Measurement>[:CHANnel<Channel>]:TRACe:AVERage[:STATe].....	364
CALCulate<Measurement>[:CHANnel<Channel>][:POWer]:NCORrection[:STATe].....	364
CALCulate<Measurement>[:CHANnel<Channel>][:POWer]:VBWidth:ENUM.....	365

---

### [SENSe<Sensor>:]AVERage:COUNT:AUTO:RESolution <resolution>

Defines the number of significant places for linear units and the number of decimal places for logarithmic units that are expected to be free of noise in the measurement result.

The setting is considered only if:

- CALCulate<Measurement>[:CHANnel<Channel>]:AVERage:COUNT:AUTO:TYPE RES
- CALCulate<Measurement>[:CHANnel<Channel>]:AVERage:COUNT:AUTO[:STATe] ON

#### Suffix:

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

#### Parameters:

<resolution> Indicates the number of significant digits.

<b>1</b>	
1	
<b>2</b>	
0.1	
<b>3</b>	
0.01	
<b>4</b>	
0.001	
Range:	1 to 4
*RST:	3

---

### [SENSe<Sensor>:]AVERage:RESet

Effective for continuous average, burst average, time gate measurements.

Clears the filter buffer.

#### Suffix:

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Usage:** Event

**Manual operation:** See "Clear Filter Buffer" on page 127

---

**CALCulate<Measurement>[:CHANnel<Channel>]:AVERage:COUNT:AUTO:MTIME**  
 <value>

Effective for continuous average, burst average measurements, if

[CALCulate<Measurement>\[:CHANnel<Channel>\]:AVERage:COUNT:AUTO:TYPE](#) RES is set.

Sets an upper limit for the settling time of the auto-averaging filter that is never exceeded, thus limiting the length of the filter.

**Suffix:**

<Measurement>      1 to 8  
                           Measurement

<Channel>            1 to 2  
                           1 = primary sensor, 2 = secondary sensor

**Parameters:**

<value>              Range:      0.01 s to 1000.0 s  
                           \*RST:      1.0 s  
                           Default unit: s

**Manual operation:** See "[Maximum Settling Time](#)" on page 128

---

**CALCulate<Measurement>[:CHANnel<Channel>]:AVERage:COUNT:AUTO:NSRatio** <value>

Effective for continuous average, burst average measurements, if

[CALCulate<Measurement>\[:CHANnel<Channel>\]:AVERage:COUNT:AUTO:TYPE](#) NSR is set.

Sets the averaging number so that the inherent noise of the sensor does not exceed the specified value.

**Suffix:**

<Measurement>      1 to 8  
                           Measurement

<Channel>            1 to 2  
                           1 = primary sensor, 2 = secondary sensor

**Parameters:**

<value>              Range:      100e-6 dB to 1.0 dB  
                           \*RST:      1.0 dB  
                           Default unit: dB

**Manual operation:** See "[Noise Content](#)" on page 127

---

**CALCulate<Measurement>[:CHANnel<Channel>]:AVERage:COUNT:AUTO:SLOT**  
 <value>

Effective for continuous average, burst average measurements.

Sets a timeslot from which the measured value is used to determine the filter length automatically. The timeslot number must not exceed the number of the currently set timeslots.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<value> Range: 1 to 128  
\*RST: 1

**Manual operation:** See ["Timeslot"](#) on page 128

**CALCulate<Measurement>[:CHANnel<Channel>]:AVERage:COUNT:AUTO:TYPE**  
<value>

Effective for continuous average, burst average measurements.

Sets the autofilter.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<value> RESolution | NSRatio

**RESolution**

Sets the averaging number so that the inherent noise of the sensor does not exceed the value specified by

[CALCulate<Measurement>\[:CHANnel<Channel>\]:AVERage:COUNT:AUTO:NSRatio](#).

**NSRatio**

Limits the averaging number as specified by

[CALCulate<Measurement>\[:CHANnel<Channel>\]:AVERage:COUNT:AUTO:MTIME](#).

\*RST: RESolution

**Manual operation:** See ["Fixed Noise Mode"](#) on page 127

**CALCulate<Measurement>[:CHANnel<Channel>]:AVERage:TCONtrol:AUTO**  
<state>

Effective for continuous average, burst average, pulse analysis, timeslot, statistics measurements.



Enables or disables the automatic termination control. See also [CALCulate<Measurement>\[:CHANnel<Channel>\]:AVERage:TCONtrol\[:ENUM\]](#) on page 361.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<state> \*RST: ON

**Manual operation:** See "[Moving Average State](#)" on page 128

**CALCulate<Measurement>[:CHANnel<Channel>]:AVERage:TCONtrol[:ENUM]**  
<mode>

Effective for continuous average, burst average, pulse analysis, timeslot, statistics measurements.

Defines how the measurement results are output, also called termination control.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<mode> MOVing | REPEAT

If you use [SYSTem:PRESet](#) instead of \*RST, the RST value differs. See [Table 12-18](#).

**MOVing**

Outputs intermediate values to facilitate early detection of changes in the measured quantity. In the settled state that means when the number of measurements specified by the average count has been performed, a moving average is output.

**REPEAT**

Specifies that a measurement result is not output until the entire measurement has been completed. This means that the number of measurement cycle repetitions is equal to the set average count. If the average count is large, the measurement time can be long.

The average count is set using [CALCulate<Measurement>\[:CHANnel<Channel>\]:AVERage:COUNT\[:VALue\]](#) on page 391.

\*RST: MOVing

**Manual operation:** See "[Moving Average](#)" on page 128

---

**CALCulate<Measurement>[:CHANnel<Channel>]:AVERAge:TYPE <type>**

Requires a frequency selective power sensor.

Sets the averaging method. See also the user manual of the sensor.

**Suffix:**

<Measurement>      1 to 8  
                            Measurement

<Channel>            1 to 2  
                            1 = primary sensor, 2 = secondary sensor

**Parameters:**

<type>                POWer | VIDeo | LINear  
\*RST:                POWer

**Manual operation:** See "[Averaging Domain](#)" on page 129

---

**CALCulate<Measurement>[:CHANnel<Channel>]:AVERAge[:STATe] <value>**

Enables or disables the averaging filter. If enabled, the number of measured values is averaged. Averaging reduces the effect of noise so that more reliable results are obtained.

**Suffix:**

<Measurement>      1 to 8  
                            Measurement

<Channel>            1 to 2  
                            1 = primary sensor, 2 = secondary sensor

**Parameters:**

<value>                \*RST:            ON

**Manual operation:** See "[Filter State](#)" on page 126

---

**CALCulate<Measurement>[:CHANnel<Channel>]:TRACe:AVERAge:COUNT[:VALue] <value>**

Effective for trace measurements.

Sets the number of readings that are averaged for one measured value. The higher the count, the lower the noise, and the longer it takes to obtain a measured value.

**Suffix:**

<Measurement>      1 to 8  
                            Measurement

<Channel>            1 to 2  
                            1 = primary sensor, 2 = secondary sensor

**Parameters:**

<value> If the entered filter length is not a 2<sup>n</sup> value, the value is rounded to the next 2<sup>n</sup> value without an error message.

Range: 1 to 65536

\*RST: 4

**Manual operation:** See "[Filter Length](#)" on page 127

**CALCulate<Measurement>[:CHANnel<Channel>]:TRACe:AVERAge:TCONtrol:  
AUTO <state>**

Effective for trace measurements.

Enables or disables the automatic termination control. See also

[CALCulate<Measurement>\[:CHANnel<Channel>\]:TRACe:AVERAge:  
TCONtrol\[:ENUM\]](#) on page 363.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<state> \*RST: ON

**Manual operation:** See "[Moving Average State](#)" on page 128

**CALCulate<Measurement>[:CHANnel<Channel>]:TRACe:AVERAge:TCONtrol[:  
ENUM] <mode>**

Effective for trace measurements.

Defines how the measurement results are output, also called termination control.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<mode> MOVing | REPEAT

If you use [SYSTem:PRESet](#) instead of \*RST, the RST value differs. See [Table 12-18](#).

**MOVing**

Outputs intermediate values to facilitate early detection of changes in the measured quantity. In the settled state that means when the number of measurements specified by the average count has been performed, a moving average is output.

**REPeat**

Specifies that a measurement result is not output until the entire measurement has been completed. This means that the number of measurement cycle repetitions is equal to the set average count. If the average count is large, the measurement time can be long.

The average count is set using `CALCulate<Measurement>[:CHANnel<Channel>]:TRACe:AVERAge:COUNT[:VALue]`.

\*RST: MOVing

**Manual operation:** See "[Moving Average](#)" on page 128

**CALCulate<Measurement>[:CHANnel<Channel>]:TRACe:AVERAge[:STATe]**  
<value>

Effective for trace measurements.

Enables or disables the averaging filter. If enabled, the number of measured values is averaged. Averaging reduces the effect of noise so that more reliable results are obtained.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<value> \*RST: ON

**Manual operation:** See "[Filter State](#)" on page 126

**CALCulate<Measurement>[:CHANnel<Channel>][:POWER]:NCORrection[:STATe]**  
<state>

Effective for frequency selective power sensors.

Enables or disables the noise cancellation.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<state> \*RST: OFF

---

**CALCulate<Measurement>[:CHANnel<Channel>][:POWer]:VBWidth:ENUM**  
<value>

Requires a wideband power sensor.

Sets the video filter bandwidth. Reducing the video bandwidth also increases the trigger sensitivity.

**Suffix:**

<Measurement>      1 to 8  
                            Measurement

<Channel>            1 to 2  
                            1 = forward, 2 = reflection (reverse)

**Parameters:**

<value>              EFULI | E5M | E1M5 | E0M3

**EFULI**

Full

**E5M**

5 MHz

**E1M5**

1.5 MHz

**E0M3**

300 kHz

\*RST:                EFULI

**Manual operation:** See "Video Bandwidth" on page 129

## 12.8.5 Sensor range settings

Further information:

- [Chapter 7.4, "Range settings"](#), on page 129

CALCulate<Measurement>[:CHANnel<Channel>]:INPut:ATTenuation:AUTO.....	365
CALCulate<Measurement>[:CHANnel<Channel>]:INPut:ATTenuation[:VALue].....	366
CALCulate<Measurement>[:CHANnel<Channel>][:POWer][:AVG]:RANGe:AUTO.....	366
CALCulate<Measurement>[:CHANnel<Channel>][:POWer][:AVG]:RANGe:CLEVel:STATe....	367
CALCulate<Measurement>[:CHANnel<Channel>][:POWer][:AVG]:RANGe:CLEVel[:VALue]..	367
CALCulate<Measurement>[:CHANnel<Channel>][:POWer][:AVG]:RANGe[:VALue].....	367

---

**CALCulate<Measurement>[:CHANnel<Channel>]:INPut:ATTenuation:AUTO**  
<auto>

Requires a frequency selective power sensor.

Enables or disables the automatic setting of the input attenuation.

**Suffix:**

<Measurement>      1 to 8  
                            Measurement

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<auto> OFF | ON | ONCE  
**ONCE**  
Adjusts the input attenuation one time, then disables the automatic setting.  
\*RST: OFF

**Manual operation:** See "[Attenuator Mode](#)" on page 131

**CALCulate<Measurement>[:CHANnel<Channel>]:INPut:ATTenuation[:VALue]**  
<value>

Requires a frequency selective power sensor.

Effective if [CALCulate<Measurement>\[:CHANnel<Channel>\]:INPut:ATTenuation:AUTO](#) OFF is set.

Sets the input attenuation.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<value> Only two values are possible, 0.0 dB and 30.0 dB. The entered value is rounded to the next value.  
Range: 0.0 dB to 30.0 dB  
\*RST: 30.0 dB  
Default unit: dB

**Manual operation:** See "[Attenuation](#)" on page 131

**CALCulate<Measurement>[:CHANnel<Channel>][:POWer][:AVG]:RANGe:AUTO**  
<value>

Enables or disables the automatic measurement path selection.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<value> \*RST: ON

**Manual operation:** See "[Range State](#)" on page 130

---

**CALCulate<Measurement>[:CHANnel<Channel>][:POWer][:AVG]:RANGe:CLEVel:STATE <value>**

Effective if `CALCulate<Measurement>[:CHANnel<Channel>][:POWer][:AVG]:RANGe:AUTO` ON is set.

Enables or disables the reduction of the transition region between the measurement paths, set by `CALCulate<Measurement>[:CHANnel<Channel>][:POWer][:AVG]:RANGe:CLEVel[:VALue]`.

**Suffix:**

<Measurement>      1 to 8  
Measurement

<Channel>            1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<value>              \*RST:        OFF

**Manual operation:** See "[User Defined Transition](#)" on page 130

---

**CALCulate<Measurement>[:CHANnel<Channel>][:POWer][:AVG]:RANGe:CLEVel[:VALue] <value>**

Reduces the transition region between the measurement paths, 0 -> 1 and 1 -> 2, by the set value, the so-called cross-over level. Thus, you can improve the measurement accuracy for signals with a high peak-to-average ratio, since the headroom for modulation peaks becomes larger. However, the signal-to-noise ratio is reduced at the lower limits of the transition regions.

**Suffix:**

<Measurement>      1 to 8  
Measurement

<Channel>            1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<value>              Range:        -20.0 dB to 0.0 dB  
\*RST:            0.0 dB  
Default unit: dB

**Manual operation:** See "[Offset](#)" on page 131

---

**CALCulate<Measurement>[:CHANnel<Channel>][:POWer][:AVG]:RANGe[:VALue] <value>**

Effective if `CALCulate<Measurement>[:CHANnel<Channel>][:POWer][:AVG]:RANGe:AUTO` OFF is set.

Sets the active measurement path in which the sensor is measuring.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<value> LOW | MID | HIGH  
\*RST: MID

**Manual operation:** See "Range" on page 130

## 12.8.6 Standardized signals

For a set of standards, you can preconfigure settings.

### 12.8.6.1 Commands

<a href="#">SYSTem:STANdard:CATalog?</a> .....	368
<a href="#">SYSTem:STANdard:PRESet</a> .....	368
<a href="#">SYSTem:STANdard:PWSettings</a> .....	369
<a href="#">SYSTem:STANdard:TRIGger:SOURce</a> .....	369

---

#### **SYSTem:STANdard:CATalog?**

Queries the supported standards. Use the returned strings for [SYSTem:STANdard:PRESet](#).

**Usage:** Query only

---

#### **SYSTem:STANdard:PRESet** <string>

Configures the sensor and trigger settings for the selected standard. Query the supported standards using [SYSTem:STANdard:CATalog?](#).

If [SYSTem:STANdard:PWSettings](#) OFF is set, also configures the R&S NRX display settings.

Use [SYSTem:STANdard:TRIGger:SOURce](#) to set the trigger source.

**Setting parameters:**

<string> "<standard name>"  
Available standards. For the corresponding sensor configuration, follow the link.

**GSM/EDGE**

[Table 12-8](#)

**DECT**

[Table 12-9](#)



**WCDMA/3GPP FDD**[Table 12-10](#)**WCDMA/3GPP TDD DL**[Table 12-11](#)**WCDMA/3GPP TDD UL**[Table 12-12](#)**TD-SCDMA**[Table 12-13](#)**Bluetooth DH1**[Table 12-14](#)**Bluetooth DH3**[Table 12-15](#)**Bluetooth DH5**[Table 12-16](#)**CDMA2000**[Table 12-17](#)

**Usage:** Setting only

**Manual operation:** See "[Parameter Set](#)" on page 74  
See "[Recall Parameter Set](#)" on page 74

**SYSTem:STANdard:PWSettings** <state>

Specifies whether the display settings are kept unchanged when using [SYSTem:STANdard:PRESet](#).

**Parameters:**

&lt;state&gt;

**ON**

Only configures the sensor.

**OFF**

Configures the sensor and the display settings of the R&S NRX.  
See [Chapter 12.8.6.3, "Display configuration"](#), on page 379.

\*RST: OFF

**Manual operation:** See "[Preserve Window Settings](#)" on page 74

**SYSTem:STANdard:TRIGger:SOURce** <source>

Sets the trigger source for [SYSTem:STANdard:PRESet](#).

**Parameters:**

&lt;source&gt;

INTernal | EXTernal

**INTernal**

Internal triggering

**EXTernal**

External triggering

\*RST: INTernal

### 12.8.6.2 Preconfigured settings

For the following standards, you can preconfigure the sensor using:

- [Parameter Set](#)
- `SYSTEM:STANDARD:PRESet`

**Table 12-8: GSM/EDGE**

Sensor parameter	Remote control command	Value
Sensor mode	<code>CALCulate&lt;Measurement&gt;:TYPE</code>	TRACe
Aperture time	<code>CALCulate&lt;Measurement&gt;[:CHANnel&lt;Channel&gt;][:POWer][:AVG]:APERTure[:VALue]</code>	4.615 ms
Duty cycle	<code>CALCulate&lt;Measurement&gt;[:CHANnel&lt;Channel&gt;]:CORRection:DCYCLE[:VALue]</code>	11.762 %
Duty cycle correction	<code>CALCulate&lt;Measurement&gt;[:CHANnel&lt;Channel&gt;]:CORRection:DCYCLE:STATe</code>	ON
Smoothing	<code>CALCulate&lt;Measurement&gt;[:CHANnel&lt;Channel&gt;][:POWer][:AVG]:SMOothing[:STATe]</code>	OFF
Dropout tolerance	<code>CALCulate&lt;Measurement&gt;[:CHANnel&lt;Channel&gt;][:POWer]:BURSt:DTOLerance</code>	577 µs
Exclude time start	<code>CALCulate&lt;Measurement&gt;:TSLot:TIMing:EXCLude:START</code>	20 µs
Exclude time end	<code>CALCulate&lt;Measurement&gt;:TSLot:TIMing:EXCLude:STOP</code>	30 µs
Timeslot count	<code>CALCulate&lt;Measurement&gt;[:POWer]:TSLot[:AVG]:COUNT</code>	8
Timeslot fence	<code>CALCulate&lt;Measurement&gt;[:POWer]:TSLot[:AVG][:EXCLude]:MID[:STATe]</code>	OFF
Timeslot width	<code>CALCulate&lt;Measurement&gt;[:POWer]:TSLot[:AVG]:WIDTh</code>	577 µs
Timegate offset	<code>CALCulate&lt;Measurement&gt;[:POWer]:TGATe&lt;Gate&gt;[:AVG]:OFFSet[:TIME]</code>	1: 20 µs 2: 2.328 ms
Timegate length	<code>CALCulate&lt;Measurement&gt;[:POWer]:TGATe&lt;Gate&gt;[:AVG]:TIME</code>	1: 527 µs 2: 527 µs
Timegate fence	<code>CALCulate&lt;Measurement&gt;[:POWer]:TGATe&lt;Gate&gt;[:AVG][:EXCLude]:MID[:STATe]</code>	OFF
Trace offset time	<code>CALCulate&lt;Measurement&gt;:TRACe:X[:SCALe]:LEFT</code>	-50 µs
Trace capture time	<code>CALCulate&lt;Measurement&gt;:TRACe:X[:SCALe]:LENGTh</code>	5 ms
Trace number of points	<code>CALCulate&lt;Measurement&gt;:TRACe:X:POINTs</code>	261
Trace realtime	<code>[SENSe&lt;Sensor&gt;:]TRACe:REALtime</code>	OFF
Trigger delay	<code>TRIGGer&lt;Measurement&gt;[:CHANnel&lt;Channel&gt;]:DELay[:VALue]</code>	0 s

Sensor parameter	Remote control command	Value
Trigger level	TRIGger<Measurement>[:CHANnel<Channel>]:LEVel	-20 dBm
Trigger source	TRIGger<Measurement>[:CHANnel<Channel>]: SOURce	INT
Trigger slope	TRIGger<Measurement>[:CHANnel<Channel>]:SLOPe	POS
Trigger holdoff	TRIGger<Measurement>[:CHANnel<Channel>]: HOLDoff	27 ms
Trigger dropout time	TRIGger<Measurement>[:CHANnel<Channel>]:DTIME	0 s
Trigger hysteresis	TRIGger<Measurement>[:CHANnel<Channel>]: HYSTeresis	3 dB

Table 12-9: DECT

Sensor parameter	Remote control command	Value
Sensor mode	CALCulate<Measurement>:TYPE	TRACe
Aperture time	CALCulate<Measurement>[:CHANnel<Channel>][: POWer][:AVG]:APERture[:VALue]	10 ms
Duty cycle	CALCulate<Measurement>[:CHANnel<Channel>]: CORRection:DCYCLE[:VALue]	3.7 %
Duty cycle correction	CALCulate<Measurement>[:CHANnel<Channel>]: CORRection:DCYCLE:STATE	ON
Smoothing	CALCulate<Measurement>[:CHANnel<Channel>][: POWer][:AVG]:SMOothing[:STATE]	OFF
Dropout tolerance	CALCulate<Measurement>[:CHANnel<Channel>][: POWer]:BURSt:DTOLerance	416.7 µs
Exclude time start	CALCulate<Measurement>:TSLot:TIMing:EXCLude: START	15 µs
Exclude time end	CALCulate<Measurement>:TSLot:TIMing:EXCLude: STOP	25 µs
Timeslot count	CALCulate<Measurement>[:POWer]:TSLot[:AVG]: COUNT	24
Timeslot fence	CALCulate<Measurement>[:POWer]:TSLot[:AVG][: EXCLude]:MID[:STATE]	OFF
Timeslot width	CALCulate<Measurement>[:POWer]:TSLot[:AVG]: WIDTh	416.667 µs
Timegate offset	CALCulate<Measurement>[:POWer]:TGATe<Gate>[: AVG]:OFFSet[:TIME]	1: 15 µs 2: 5.015 ms
Timegate length	CALCulate<Measurement>[:POWer]:TGATe<Gate>[: AVG]:TIME	1: 348.055 µs 2: 348.0 µs
Timegate fence	CALCulate<Measurement>[:POWer]:TGATe<Gate>[: AVG][:EXCLude]:MID[:STATE]	OFF
Trace offset time	CALCulate<Measurement>:TRACe:X[:SCALE]:LEFT	-200 µs

Sensor parameter	Remote control command	Value
Trace capture time	CALCulate<Measurement>:TRACe:X[:SCALE]:LENGth	10.250 ms
Trace number of points	CALCulate<Measurement>:TRACe:X:POINts	261
Trace realtime	[SENSe<Sensor>:]TRACe:REALtime	OFF
Trigger delay	TRIGger<Measurement>[:CHANnel<Channel>]:DELay[:VALue]	0 s
Trigger level	TRIGger<Measurement>[:CHANnel<Channel>]:LEVel	-30 dBm
Trigger source	TRIGger<Measurement>[:CHANnel<Channel>]:SOURce	INT
Trigger slope	TRIGger<Measurement>[:CHANnel<Channel>]:SLOPe	POS
Trigger holdoff	TRIGger<Measurement>[:CHANnel<Channel>]:HOLDoff	39.9 ms
Trigger dropout time	TRIGger<Measurement>[:CHANnel<Channel>]:DTIME	0 s
Trigger hysteresis	TRIGger<Measurement>[:CHANnel<Channel>]:HYSTeresis	3 dB

Table 12-10: WCDMA/3GPP FDD

Sensor parameter	Remote control command	Value
Sensor mode	CALCulate<Measurement>:TYPE	CONTAv
Aperture time	CALCulate<Measurement>[:CHANnel<Channel>][:POWER][:AVG]:APERture[:VALue]	10 ms
Duty cycle correction	CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:DCYCLE:STATE	OFF
Smoothing	CALCulate<Measurement>[:CHANnel<Channel>][:POWER][:AVG]:SMOothing[:STATE]	OFF
Filter auto	CALCulate<Measurement>[:CHANnel<Channel>]:AVERage:COUNT:AUTO[:STATE]	OFF
Filter length	CALCulate<Measurement>[:CHANnel<Channel>]:AVERage:COUNT[:VALue]	16
Trigger source	TRIGger<Measurement>[:CHANnel<Channel>]:SOURce	EXT

Table 12-11: WCDMA/3GPP TDD DL

Sensor parameter	Remote control command	Value
Sensor mode	CALCulate<Measurement>:TYPE	TRACe
Aperture time	CALCulate<Measurement>[:CHANnel<Channel>][:POWER][:AVG]:APERture[:VALue]	10 ms
Duty cycle	CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:DCYCLE[:VALue]	6.667 %

Sensor parameter	Remote control command	Value
Duty cycle correction	CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:DCYCLe:STATe	ON
Smoothing	CALCulate<Measurement>[:CHANnel<Channel>][:POWer][:AVG]:SMOothing[:STATe]	OFF
Dropout tolerance	CALCulate<Measurement>[:CHANnel<Channel>][:POWer]:BURSt:DTOLerance	666.667 µs
Exclude time start	CALCulate<Measurement>:TSLot:TIMing:EXCLude:STARt	25 µs
Exclude time end	CALCulate<Measurement>:TSLot:TIMing:EXCLude:STOP	40 µs
Timeslot count	CALCulate<Measurement>[:POWer]:TSLot[:AVG]:COUNT	15
Timeslot fence	CALCulate<Measurement>[:POWer]:TSLot[:AVG][:EXCLude]:MID[:STATe]	OFF
Timeslot width	CALCulate<Measurement>[:POWer]:TSLot[:AVG]:WIDTh	666.667 µs
Timegate offset	CALCulate<Measurement>[:POWer]:TGATe<Gate>[:AVG]:OFFSet[:TIME]	1: 25 µs 2: 5.358 ms
Timegate length	CALCulate<Measurement>[:POWer]:TGATe<Gate>[:AVG]:TIME	1: 601.667 µs 2: 602 µs
Timegate fence	CALCulate<Measurement>[:POWer]:TGATe<Gate>[:AVG][:EXCLude]:MID[:STATe]	OFF
Trace offset time	CALCulate<Measurement>:TRACe:X[:SCALe]:LEFT	-200 µs
Trace capture time	CALCulate<Measurement>:TRACe:X[:SCALe]:LENGTh	10.250 ms
Trace number of points	CALCulate<Measurement>:TRACe:X:POINtS	261
Trace realtime	[SENSe<Sensor>:]TRACe:REALtime	OFF
Trigger delay	TRIGGer<Measurement>[:CHANnel<Channel>]:DELay[:VALue]	0 s
Trigger level	TRIGGer<Measurement>[:CHANnel<Channel>]:LEVel	-30 dBm
Trigger source	TRIGGer<Measurement>[:CHANnel<Channel>]:SOURce	INT
Trigger slope	TRIGGer<Measurement>[:CHANnel<Channel>]:SLOPe	POS
Trigger holdoff	TRIGGer<Measurement>[:CHANnel<Channel>]:HOLDOff	19.9 ms
Trigger dropout time	TRIGGer<Measurement>[:CHANnel<Channel>]:DTIME	0 s
Trigger hysteresis	TRIGGer<Measurement>[:CHANnel<Channel>]:HYSTerisiS	3 dB

Table 12-12: WCDMA/3GPP TDD UL

Sensor parameter	Remote control command	Value
Sensor mode	CALCulate<Measurement>:TYPE	TRACe
Aperture time	CALCulate<Measurement>[:CHANnel<Channel>][:POWer][:AVG]:APERture[:VALue]	10 ms
Duty cycle	CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:DCYClE[:VALue]	6.420 %
Duty cycle correction	CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:DCYClE:STATe	ON
Smoothing	CALCulate<Measurement>[:CHANnel<Channel>][:POWer][:AVG]:SMOothing[:STATe]	OFF
Dropout tolerance	CALCulate<Measurement>[:CHANnel<Channel>][:POWer]:BURSt:DTOLerance	666.667 µs
Exclude time start	CALCulate<Measurement>:TSLot:TIMing:EXCLude:START	15 µs
Exclude time end	CALCulate<Measurement>:TSLot:TIMing:EXCLude:STOP	40 µs
Timeslot count	CALCulate<Measurement>[:POWer]:TSLot[:AVG]:COUNT	15
Timeslot fence	CALCulate<Measurement>[:POWer]:TSLot[:AVG][:EXCLude]:MID[:STATe]	OFF
Timeslot width	CALCulate<Measurement>[:POWer]:TSLot[:AVG]:WIDTh	666.667 µs
Timegate offset	CALCulate<Measurement>[:POWer]:TGATe<Gate>[:AVG]:OFFSet[:TIME]	1: 15 µs 2: 5.348 ms
Timegate length	CALCulate<Measurement>[:POWer]:TGATe<Gate>[:AVG]:TIME	1: 611.667 µs 2: 612 µs
Timegate fence	CALCulate<Measurement>[:POWer]:TGATe<Gate>[:AVG][:EXCLude]:MID[:STATe]	OFF
Trace offset time	CALCulate<Measurement>:TRACe:X[:SCALe]:LEFT	-200 µs
Trace capture time	CALCulate<Measurement>:TRACe:X[:SCALe]:LENGTh	10.250 ms
Trace number of points	CALCulate<Measurement>:TRACe:X:POINTs	261
Trace realtime	[SENSe<Sensor>:]TRACe:REALtime	OFF
Trigger delay	TRIGger<Measurement>[:CHANnel<Channel>]:DELay[:VALue]	0 s
Trigger level	TRIGger<Measurement>[:CHANnel<Channel>]:LEVel	-30 dBm
Trigger source	TRIGger<Measurement>[:CHANnel<Channel>]:SOURce	INT
Trigger slope	TRIGger<Measurement>[:CHANnel<Channel>]:SLOPe	POS

Sensor parameter	Remote control command	Value
Trigger holdoff	TRIGger<Measurement>[:CHANnel<Channel>]: HOLDoff	19.9 ms
Trigger dropout time	TRIGger<Measurement>[:CHANnel<Channel>]:DTIME	0 s
Trigger hysteresis	TRIGger<Measurement>[:CHANnel<Channel>]: HYSTeresis	3 dB

Table 12-13: TD-SCDMA

Sensor parameter	Remote control command	Value
Sensor mode	CALCulate<Measurement>:TYPE	TRACe
Aperture time	CALCulate<Measurement>[:CHANnel<Channel>][: POWer][:AVG]:APERture[:VALue]	5 ms
Duty cycle	CALCulate<Measurement>[:CHANnel<Channel>]: CORRection:DCYCLE[:VALue]	13.250 %
Duty cycle correction	CALCulate<Measurement>[:CHANnel<Channel>]: CORRection:DCYCLE:STATE	ON
Smoothing	CALCulate<Measurement>[:CHANnel<Channel>][: POWer][:AVG]:SMOothing[:STATE]	OFF
Dropout tolerance	CALCulate<Measurement>[:CHANnel<Channel>][: POWer]:BURSt:DTOLerance	366 µs
Exclude time start	CALCulate<Measurement>:TSLot:TIMing:EXCLude: START	10 µs
Exclude time end	CALCulate<Measurement>:TSLot:TIMing:EXCLude: STOP	15 µs
Timegate offset	CALCulate<Measurement>[:POWer]:TGATE<Gate>[: AVG]:OFFSet[:TIME]	1: 20 µs 2: 710 µs 3: 835 µs 4: 5.970 ms
Timegate length	CALCulate<Measurement>[:POWer]:TGATE<Gate>[: AVG]:TIME	1: 620 µs 2: 30 µs 3: 85 µs 4: 620 µs
Timegate fence	CALCulate<Measurement>[:POWer]:TGATE<Gate>[: AVG][:EXCLude]:MID[:STATE]	OFF
Trace offset time	CALCulate<Measurement>:TRACe:X[:SCALE]:LEFT	-200 µs
Trace capture time	CALCulate<Measurement>:TRACe:X[:SCALE]:LENGTh	10.250 ms
Trace number of points	CALCulate<Measurement>:TRACe:X:POINTs	261
Trace realtime	[SENSe<Sensor>:]TRACe:REALtime	OFF
Trigger delay	TRIGger<Measurement>[:CHANnel<Channel>]: DELay[:VALue]	0 s

Sensor parameter	Remote control command	Value
Trigger level	TRIGger<Measurement>[:CHANnel<Channel>]:LEVel	-30 dBm
Trigger source	TRIGger<Measurement>[:CHANnel<Channel>]: SOURce	INT
Trigger slope	TRIGger<Measurement>[:CHANnel<Channel>]:SLOPe	POS
Trigger holdoff	TRIGger<Measurement>[:CHANnel<Channel>]: HOLDoff	19.9 ms
Trigger dropout time	TRIGger<Measurement>[:CHANnel<Channel>]:DTIME	0 s
Trigger hysteresis	TRIGger<Measurement>[:CHANnel<Channel>]: HYSTeresis	3 dB

Table 12-14: Bluetooth DH1

Sensor parameter	Remote control command	Value
Sensor mode	CALCulate<Measurement>:TYPE	TRACe
Aperture time	CALCulate<Measurement>[:CHANnel<Channel>][: POWer][:AVG]:APERture[:VALue]	1.25 ms
Duty cycle	CALCulate<Measurement>[:CHANnel<Channel>]: CORRection:DCYCLE[:VALue]	29.28 %
Duty cycle correction	CALCulate<Measurement>[:CHANnel<Channel>]: CORRection:DCYCLE:STATE	ON
Smoothing	CALCulate<Measurement>[:CHANnel<Channel>][: POWer][:AVG]:SMOothing[:STATE]	OFF
Dropout tolerance	CALCulate<Measurement>[:CHANnel<Channel>][: POWer]:BURSt:DTOLerance	366 µs
Exclude time start	CALCulate<Measurement>:TSLot:TIMing:EXCLude: START	10 µs
Exclude time end	CALCulate<Measurement>:TSLot:TIMing:EXCLude: STOP	15 µs
Timegate offset	CALCulate<Measurement>[:POWer]:TGATe<Gate>[: AVG]:OFFSet[:TIME]	1: 10 µs 2: 660 µs
Timegate length	CALCulate<Measurement>[:POWer]:TGATe<Gate>[: AVG]:TIME	1: 341 µs 2: 341 µs
Timegate fence	CALCulate<Measurement>[:POWer]:TGATe<Gate>[: AVG][:EXCLude]:MID[:STATE]	OFF
Trace offset time	CALCulate<Measurement>:TRACe:X[:SCALe]:LEFT	-30 µs
Trace capture time	CALCulate<Measurement>:TRACe:X[:SCALe]:LENGth	1.28 ms
Trace number of points	CALCulate<Measurement>:TRACe:X:POINTs	261
Trace realtime	[SENSe<Sensor>:]TRACe:REALtime	OFF



Sensor parameter	Remote control command	Value
Trigger delay	TRIGger<Measurement>[:CHANnel<Channel>]: DELay[:VALue]	0 s
Trigger level	TRIGger<Measurement>[:CHANnel<Channel>]:LEVel	-30 dBm
Trigger source	TRIGger<Measurement>[:CHANnel<Channel>]: SOURce	INT
Trigger slope	TRIGger<Measurement>[:CHANnel<Channel>]:SLOPe	POS
Trigger holdoff	TRIGger<Measurement>[:CHANnel<Channel>]: HOLDoff	2.480 ms
Trigger dropout time	TRIGger<Measurement>[:CHANnel<Channel>]:DTIME	0 s
Trigger hysteresis	TRIGger<Measurement>[:CHANnel<Channel>]: HYSTeresis	3 dB

Table 12-15: Bluetooth DH3

Sensor parameter	Remote control command	Value
Sensor mode	CALCulate<Measurement>:TYPE	TRACe
Aperture time	CALCulate<Measurement>[:CHANnel<Channel>][: POWer][:AVG]:APERTure[:VALue]	2.50 ms
Duty cycle	CALCulate<Measurement>[:CHANnel<Channel>]: CORRection:DCYCLE[:VALue]	64.88 %
Duty cycle correction	CALCulate<Measurement>[:CHANnel<Channel>]: CORRection:DCYCLE:STATE	ON
Smoothing	CALCulate<Measurement>[:CHANnel<Channel>][: POWer][:AVG]:SMOothing[:STATE]	OFF
Dropout tolerance	CALCulate<Measurement>[:CHANnel<Channel>][: POWer]:BURSt:DTOLerance	1.622 ms
Exclude time start	CALCulate<Measurement>:TSLot:TIMing:EXCLude: START	10 µs
Exclude time end	CALCulate<Measurement>:TSLot:TIMing:EXCLude: STOP	15 µs
Timegate offset	CALCulate<Measurement>[:POWer]:TGATe<Gate>[: AVG]:OFFSet[:TIME]	1: 10 µs 2: 1.885 ms
Timegate length	CALCulate<Measurement>[:POWer]:TGATe<Gate>[: AVG]:TIME	1: 1.597 ms 2: 351 µs
Timegate fence	CALCulate<Measurement>[:POWer]:TGATe<Gate>[: AVG][:EXCLude]:MID[:STATE]	OFF
Trace offset time	CALCulate<Measurement>:TRACe:X[:SCALe]:LEFT	-30 µs
Trace capture time	CALCulate<Measurement>:TRACe:X[:SCALe]:LENGth	2.530 ms
Trace number of points	CALCulate<Measurement>:TRACe:X:POINTs	261

Sensor parameter	Remote control command	Value
Trace realtime	[SENSE<Sensor>:]TRACe:REALtime	OFF
Trigger delay	TRIGger<Measurement>[:CHANnel<Channel>]: DELay[:VALue]	0 s
Trigger level	TRIGger<Measurement>[:CHANnel<Channel>]:LEVel	-30 dBm
Trigger source	TRIGger<Measurement>[:CHANnel<Channel>]: SOURce	INT
Trigger slope	TRIGger<Measurement>[:CHANnel<Channel>]:SLOPe	POS
Trigger holdoff	TRIGger<Measurement>[:CHANnel<Channel>]: HOLDoff	4.980 ms
Trigger dropout time	TRIGger<Measurement>[:CHANnel<Channel>]:DTIME	0 s
Trigger hysteresis	TRIGger<Measurement>[:CHANnel<Channel>]: HYSTeresis	3 dB

Table 12-16: Bluetooth DH5

Sensor parameter	Remote control command	Value
Sensor mode	CALCulate<Measurement>:TYPE	TRACe
Aperture time	CALCulate<Measurement>[:CHANnel<Channel>][: POWer][:AVG]:APERture[:VALue]	3.75 ms
Duty cycle	CALCulate<Measurement>[:CHANnel<Channel>]: CORRection:DCYCLE[:VALue]	76.533 %
Duty cycle correction	CALCulate<Measurement>[:CHANnel<Channel>]: CORRection:DCYCLE:STATE	ON
Smoothing	CALCulate<Measurement>[:CHANnel<Channel>][: POWer][:AVG]:SMOothing[:STATE]	OFF
Dropout tolerance	CALCulate<Measurement>[:CHANnel<Channel>][: POWer]:BURSt:DTOLerance	2.870 ms
Exclude time start	CALCulate<Measurement>:TSLot:TIMing:EXCLude: START	10 µs
Exclude time end	CALCulate<Measurement>:TSLot:TIMing:EXCLude: STOP	15 µs
Timegate offset	CALCulate<Measurement>[:POWer]:TGATe<Gate>[: AVG]:OFFSet[:TIME]	1: 10 µs 2: 3.135 ms
Timegate length	CALCulate<Measurement>[:POWer]:TGATe<Gate>[: AVG]:TIME	1: 2.845 ms 2: 351 µs
Timegate fence	CALCulate<Measurement>[:POWer]:TGATe<Gate>[: AVG][:EXCLude]:MID[:STATE]	OFF
Trace offset time	CALCulate<Measurement>:TRACe:X[:SCALe]:LEFT	-30 µs
Trace capture time	CALCulate<Measurement>:TRACe:X[:SCALe]:LENGth	3.780 ms

Sensor parameter	Remote control command	Value
Trace number of points	CALCulate<Measurement>:TRACe:X:POINTs	261
Trace realtime	[SENSe<Sensor>:]TRACe:REALtime	OFF
Trigger delay	TRIGger<Measurement>[:CHANnel<Channel>]:DELay[:VALue]	0 s
Trigger level	TRIGger<Measurement>[:CHANnel<Channel>]:LEVel	-30 dBm
Trigger source	TRIGger<Measurement>[:CHANnel<Channel>]:SOURce	INT
Trigger slope	TRIGger<Measurement>[:CHANnel<Channel>]:SLOPe	POS
Trigger holdoff	TRIGger<Measurement>[:CHANnel<Channel>]:HOLDoff	7.480 ms
Trigger dropout time	TRIGger<Measurement>[:CHANnel<Channel>]:DTIME	0 s
Trigger hysteresis	TRIGger<Measurement>[:CHANnel<Channel>]:HYSTeresis	3 dB

Table 12-17: CDMA2000

Sensor parameter	Remote control command	Value
Sensor mode	CALCulate<Measurement>:TYPE	CONTAv
Aperture time	CALCulate<Measurement>[:CHANnel<Channel>][:POWer][:AVG]:APERture[:VALue]	80 ms
Duty cycle correction	CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:DCYCLE:STATE	OFF
Smoothing	CALCulate<Measurement>[:CHANnel<Channel>][:POWer][:AVG]:SMOothing[:STATE]	OFF
Filter auto	CALCulate<Measurement>[:CHANnel<Channel>]:AVERAge:COUNT:AUTO[:STATE]	OFF
Filter length	CALCulate<Measurement>[:CHANnel<Channel>]:AVERAge:COUNT[:VALue]	16
Trigger source	TRIGger<Measurement>[:CHANnel<Channel>]:SOURce	EXT

### 12.8.6.3 Display configuration

You can choose whether you want to preserve the display settings when loading the parameter set using:

- [Preserve Window Settings](#)
- `SYSTEM:STANDARD:PWSettings`

If you do not preserve the display settings, they are changed as follows for all standards.

R&S NRX parameter	Remote control command	Value
Result resolution	<code>CALCulate&lt;Measurement&gt;:RESolution</code>	OOI
Lower power limit	<code>CALCulate&lt;Measurement&gt;: METer&lt;DirectionalChannel&gt;:LOWer[:DATA]: POWer]</code>	-90 dBm
Upper power limit	<code>CALCulate&lt;Measurement&gt;: METer&lt;DirectionalChannel&gt;:UPPer[:DATA]: POWer]</code>	30 dBm
Lower power ratio limit	<code>CALCulate&lt;Measurement&gt;: METer&lt;DirectionalChannel&gt;:LOWer[:DATA]: RATio[:VALue]</code>	-120 dB
Upper power ratio limit	<code>CALCulate&lt;Measurement&gt;: METer&lt;DirectionalChannel&gt;:UPPer[:DATA]: RATio[:VALue]</code>	60 dB
Relative measurement status	<code>CALCulate&lt;Measurement&gt;: RELative&lt;DirectionalChannel&gt;:STATe</code>	OFF
NRT measurement reference value	<code>CALCulate&lt;Measurement&gt;: RELative&lt;DirectionalChannel&gt;:POWer[: MAGNitude]</code>	1.0 dBm
NRT measurement reference value (ratio)	<code>CALCulate&lt;Measurement&gt;: RELative&lt;DirectionalChannel&gt;:RATio[: MAGNitude]</code>	1.0 dBm
Measurement function	<code>CALCulate&lt;Measurement&gt;:MATH[:EXPRession]</code>	Depends on the suffix: 1: "(SENS1)" 2: "(SENS2)" ...
Measurement type	<code>CALCulate&lt;Measurement&gt;[:CHANnel&lt;Channel&gt;]: FEED&lt;Channel&gt;</code>	"POWER: AVERage"
Output unit	<code>UNIT&lt;Measurement&gt;:POWer[:VALue]</code>	DBM
Output unit (ratio)	<code>UNIT&lt;Measurement&gt;:POWer:RATio</code>	DB
Upper limit check	<code>CALCulate&lt;Measurement&gt;: LIMit&lt;DirectionalChannel&gt;:UPPer:STATe</code>	OFF
Lower limit check	<code>CALCulate&lt;Measurement&gt;: LIMit&lt;DirectionalChannel&gt;:LOWer:STATe</code>	OFF
Upper power limit	<code>CALCulate&lt;Measurement&gt;: LIMit&lt;DirectionalChannel&gt;:UPPer[:DATA]:POWer</code>	0 dBm
Lower power limit	<code>CALCulate&lt;Measurement&gt;: LIMit&lt;DirectionalChannel&gt;:LOWer[:DATA]:POWer</code>	0 dBm

R&S NRX parameter	Remote control command	Value
Upper power ratio limit	<code>CALCulate&lt;Measurement&gt;: LIMit&lt;DirectionalChannel&gt;:UPPer[:DATA]: RATio[:VALue]</code>	1.0 dB
Lower power ratio limit	<code>CALCulate&lt;Measurement&gt;: LIMit&lt;DirectionalChannel&gt;:LOWer[:DATA]: RATio[:VALue]</code>	1.0 dB

## 12.8.7 Frequency selective power sensors

<code>CALCulate&lt;Measurement&gt;[:CHANnel&lt;Channel&gt;]:ROSCillator:REFio:FREQUency</code> .....	381
<code>CALCulate&lt;Measurement&gt;[:CHANnel&lt;Channel&gt;]:ROSCillator:REFio:OUTPut[:STATE]</code> .....	381
<code>CALCulate&lt;Measurement&gt;[:CHANnel&lt;Channel&gt;]:ROSCillator:SOURce</code> .....	382
<code>[SENSe&lt;Sensor&gt;:]BANDwidth[:RESolution]:TYPE:AUTO[:STATE]</code> .....	382
<code>[SENSe&lt;Sensor&gt;:]BANDwidth[:RESolution]:TYPE[:VALue]</code> .....	382
<code>[SENSe&lt;Sensor&gt;:]BANDwidth[:RESolution][:VALue]</code> .....	383

---

### `CALCulate<Measurement>[:CHANnel<Channel>]:ROSCillator:REFio:FREQUency` <freq>

Effective for:

- Frequency selective power sensors
- `CALCulate<Measurement>[:CHANnel<Channel>]:ROSCillator:SOURce` on page 382 `REFio` is set.

Sets the frequency of the reference clock signal that is supplied at the REF connector of the sensor.

**Suffix:**

<Measurement>      1 to 8  
                            Measurement

<Channel>            1 to 2  
                            1 = primary sensor, 2 = secondary sensor

**Parameters:**

<freq>                Range:      1.0e+7 to 1.2e+8  
                            \*RST:      1.0e+7

---

### `CALCulate<Measurement>[:CHANnel<Channel>]:ROSCillator:REFio:OUTPut[:STATE]` <state>

Effective for frequency selective power sensors.

If the REF connector of the sensor is used as an output, the command enables or disables the output signal.

**Suffix:**

<Measurement>      1 to 8  
                            Measurement

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<state> \*RST: OFF

**CALCulate<Measurement>[:CHANnel<Channel>]:ROSCillator:SOURce** <source>

Effective for NRP and frequency selective power sensors.

Sets the source of the reference oscillator.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<source> HOST | INTernal | REFio  
\*RST: INTernal

**[SENSe<Sensor>:]BANDwidth[:RESolution]:TYPE:AUTO[:STATe]** <state>

Effective for frequency selective power sensors.

If enabled, sets the filter type suitable for the currently chosen measurement mode and bandwidth.

You can query the selected filter type using `[SENSe<Sensor>:]BANDwidth[:RESolution]:TYPE[:VALue]`.

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<state> \*RST: ON

**[SENSe<Sensor>:]BANDwidth[:RESolution]:TYPE[:VALue]** <value>

Effective for frequency selective power sensors.

Sets the filter type for resolution bandwidth filter. The filter bandwidth is not affected.

If you want to set the filter type automatically, use `[SENSe<Sensor>:]BANDwidth[:RESolution]:TYPE:AUTO[:STATe]`.

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<value> FLAT | NORMal | LTE | W3GPP  
 \*RST: FLAT

---

**[SENSe<Sensor>:]BANDwidth[:RESolution][:VALue] <value>**

Effective for frequency selective power sensors.

Sets the resolution bandwidth.

**Suffix:**

<Sensor> 1 to 128  
 Configured sensor connected at: port A = 1, ... , port D = 4, R&S  
 NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<value> Range: 10.0 Hz to 400.0e6 Hz  
 \*RST: 25.0e6 Hz  
 Default unit: Hz

## 12.8.8 Channel configuration for NRT measurements

- [Channel mode settings](#)..... 383
- [Channel correction settings](#).....387
- [Channel filter settings](#).....390

### 12.8.8.1 Channel mode settings

Further information:

- [Chapter 7.5.1, "Channel mode settings"](#), on page 132

<a href="#">CALCulate&lt;Measurement&gt;[:CHANnel&lt;Channel&gt;]:NRT:BURSt:MODE</a> .....	383
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---

**CALCulate<Measurement>[:CHANnel<Channel>]:NRT:BURSt:MODE <mode>**

Defines how the average burst power is determined.

**Suffix:**

<Measurement> 1 to 8  
 Measurement

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<mode> AUTO | USER

**AUTO**

Not supported by all sensors.

The sensor automatically recognizes the duty cycle of the burst series and calculates the average burst power from this duty cycle and the average power. Set an appropriate video bandwidth using `CALCulate<Measurement>[:CHANnel<Channel>]:NRT:VBWidth[:VALue]`.

`CHANnel<Channel>]:NRT:VBWidth[:VALue]`.

**USER**

Define the duty cycle by:

`CALCulate<Measurement>[:CHANnel<Channel>]:NRT:BURSt:PERiod`

`CALCulate<Measurement>[:CHANnel<Channel>]:NRT:BURSt:WIDTh`

The R&S NRX calculates the average burst power from these values.

\*RST: AUTO

**Manual operation:** See "[Burst Mode](#)" on page 133

**CALCulate<Measurement>[:CHANnel<Channel>]:NRT:BURSt:PERiod <value>**

Effective if `CALCulate<Measurement>[:CHANnel<Channel>]:NRT:BURSt:MODE` USER is set.

Sets the burst period.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value> Range: 0.0 s to 1.0 s  
\*RST: 0.1 s  
Default unit: s

**Manual operation:** See "[Burst Period](#)" on page 133

**CALCulate<Measurement>[:CHANnel<Channel>]:NRT:BURSt:WIDTh <value>**

Effective if `CALCulate<Measurement>[:CHANnel<Channel>]:NRT:BURSt:MODE` USER is set.



Sets the burst width.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value> Range: 0.0 s to 1.0 s  
\*RST: 0.01 s  
Default unit: s

**Manual operation:** See ["Burst Width"](#) on page 133

**CALCulate<Measurement>[:CHANnel<Channel>]:NRT:CCDF:THReshold <value>**

Sets the threshold for the complementary cumulative distribution function (CCDF).

If you enter a value without unit, the unit is defined by [UNIT<Measurement>: POWER\[:VALue\]](#). For further information, see [Chapter 12.6.1.3, "Units"](#), on page 229.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value> Range: -290.0 dBm to +110.0 dBm  
\*RST: +0.0 dBm  
Default unit: dBm

**Manual operation:** See ["CCDF Threshold"](#) on page 134

**CALCulate<Measurement>[:CHANnel<Channel>]:NRT:DIRection <direction>**

Defines how the forward power is determined.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<direction> AUTO | FORWard | REVerse

**AUTO**

Determines the power flow direction automatically. The greater value of two measured values is automatically assigned as forward power.

**FORWARD | REVERSE**

Sets a fixed direction of the forward power, either from port 1 to port 2 (FORWARD), or from port 2 to port 1 (REVERSE).

\*RST: AUTO

**Manual operation:** See "[Direction](#)" on page 134

**CALCulate<Measurement>[:CHANnel<Channel>]:NRT:PEP:HOLD:TIME <value>**

Sets the hold time of the peak hold circuit of the sensor.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value> Range: 1.0e-3 s to 1.0e-1 s  
\*RST: 6.0e-2 s  
Default unit: s

**Manual operation:** See "[PEP Hold Time](#)" on page 134

**INPut<Sensor>:PORT:SOURce:AUTO <auto>**

Enables or disables the automatic assignment of the forward direction.

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<auto> **ON**  
The direction, in which the greater power flows, is taken as the forward direction.

**OFF**

The forward direction is defined by [INPut<Sensor>:PORT:SOURce\[:VALue\]](#).

\*RST: 0

**Manual operation:** See "[Direction](#)" on page 134

---

**INPut<Sensor>:PORT:SOURce[:VALue]** <val>

Effective if `INPut<Sensor>:PORT:SOURce:AUTO OFF` is set.

Sets a fixed direction of the forward power.

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<val> **1**  
Port 1 to port 2  
**2**  
Port 2 to port 1  
Range: 1 to 2  
\*RST: 1

**Manual operation:** See "[Direction](#)" on page 134

### 12.8.8.2 Channel correction settings

Further information:

- [Chapter 7.5.2, "Channel correction settings"](#), on page 134

`CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:OFFSet:STATe`

`CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:OFFSet[:MAGNitude]`

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<code>INPut&lt;Sensor&gt;:PORT:POSition</code> .....	390

---

**[SENSe<Sensor>:]DM:STATe** <state>

Requires the R&S NRX-B9 sensor interface for R&S NRT.

Enables or disables the modulation correction. To set the communication standard, use `[SENSe<Sensor>:]DM:STANdard`.

**Suffix:**

<Sensor> 101  
R&S NRT directional power sensor

**Parameters:**

<state> OFF | ON  
 \*RST: 0

**Manual operation:** See "[Modulation](#)" on page 135

**[SENSe<Sensor>:]DM:STANdard <standard>**

Requires the R&S NRX-B9 sensor interface for R&S NRT.

Sets a communication standard for the modulation correction to reduce systematic deviations occurring in power measurements.

**Suffix:**

<Sensor> 101  
 R&S NRT directional power sensor

**Parameters:**

<standard> IS95 | WCDMa | DVBT | DAB | EDGE | TETRa  
**IS95**  
 IS-95 CDMA standard for base stations  
**WCDMa**  
 WCDMA standard for base stations  
**DVBT**  
 DVB-T standard for terrestrial DVB TV transmitters  
**DAB**  
 DAB standard for radio transmitters.  
**EDGE**  
 Mobile communication standard  
**TETRa**  
 Terrestrial trunked radio standard  
 \*RST: IS95

**Manual operation:** See "[Modulation](#)" on page 135

**CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:OFFSet:RPLane <plane>**

Selects the sensor port to which the measurement results refer.

**Suffix:**

<Measurement> 1 to 8  
 Measurement  
 <Channel> 1 to 2  
 1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<plane> SOURce | LOAD  
 \*RST: SOURce

**Manual operation:** See "[Offset Reference Plane](#)" on page 135

---

**CALCulate<Measurement>[:CHANnel<Channel>]:NRT:DMODulation[:VALue]**  
 <modulation>

Sets a communication standard for the modulation correction to reduce systematic deviations occurring in power measurements.

**Suffix:**

<Measurement> 1 to 8  
 Measurement

<Channel> 1 to 2  
 1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<modulation> OFF | IS95 | WCDMa | DVBT | DAB | EDGE | TETRa

**IS95**  
 IS-95 CDMA standard for base stations

**WCDMa**  
 WCDMA standard for base stations

**DVBT**  
 DVB-T standard for terrestrial DVB TV transmitters

**DAB**  
 DAB standard for radio transmitters.

**EDGE**  
 Mobile communication standard

**TETRa**  
 Terrestrial trunked radio standard

\*RST: OFF

**Manual operation:** See "[Modulation](#)" on page 135

---

**CALCulate<Measurement>[:CHANnel<Channel>]:NRT:DMODulation:WCDMa:**  
**CRATe <value>**

Effective if [CALCulate<Measurement>\[:CHANnel<Channel>\]:NRT:DMODulation\[:VALue\]](#) WCDMa is set.

Sets the chip rate for the WCDMA communication standard.

**Suffix:**

<Measurement> 1 to 8  
 Measurement

<Channel> 1 to 2  
 1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value>                    Range:        0.0 Hz to 8.2e6 Hz  
                               \*RST:        1.0e6 Hz  
                               Default unit: Hz

**Manual operation:**    See "[WCDMA Chip Rate](#)" on page 136

**INPut<Sensor>:PORT:OFFSet <offs>**

Considers the transmission loss in a cable that connects the desired measurement point, set by [INPut<Sensor>:PORT:POSition](#), and the sensor.

**Suffix:**

<Sensor>                    1 to 128  
                               Configured sensor connected at: port A = 1, ... , port D = 4, R&S  
                               NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<offs>                      Range:        0.0 dB to 100.0 dB  
                               \*RST:        0.0 dB  
                               Default unit: dB

**Manual operation:**    See "[Offset](#)" on page 135

**INPut<Sensor>:PORT:POSition <pos>**

Selects the sensor port to which the measurement results refer.

**Suffix:**

<Sensor>                    1 to 128  
                               Configured sensor connected at: port A = 1, ... , port D = 4, R&S  
                               NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<pos>                        SOURce | LOAD  
                               \*RST:        SOURce

**Manual operation:**    See "[Offset Reference Plane](#)" on page 135

**12.8.8.3 Channel filter settings**

Further information:

- [Chapter 7.5.3, "Channel filter settings"](#), on page 136

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---

**CALCulate<Measurement>[:CHANnel<Channel>]:AVERAge:COUNT:AUTO[:STATE] <state>**

Sets the averaging mode.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

&lt;state&gt;

**OFF**

Uses the value set by `CALCulate<Measurement>[:CHANnel<Channel>]:AVERAge:COUNT[:VALue]`

**ON**

Determines the average count automatically from the level of the input signal.

**ONCE**

Automatically adapts the average count once.

\*RST: ON

**Manual operation:** See "[Recalc Filter Length](#)" on page 127  
See "[Averaging Mode](#)" on page 137

---

**CALCulate<Measurement>[:CHANnel<Channel>]:AVERAge:COUNT[:VALue] <value>**

Effective if `CALCulate<Measurement>[:CHANnel<Channel>]:AVERAge:COUNT:AUTO[:STATE] OFF` is set.

Sets the number of readings that are averaged for one measured value. The higher the count, the lower the noise, and the longer it takes to obtain a measured value.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

&lt;value&gt;

Range: 1 to 1048576 or smaller, depending on the power sensor.

\*RST: 4

**Manual operation:** See "[Filter Length](#)" on page 127  
See "[Averaging Count](#)" on page 137

---

**CALCulate<Measurement>[:CHANnel<Channel>]:AVERAge:COUNT:ENUM**  
<value>

See [CALCulate<Measurement>\[:CHANnel<Channel>\]:AVERAge:COUNT\[:VALue\]](#) on page 391.

**Suffix:**

<Measurement>      1 to 8  
                          Measurement

<Channel>            1 to 2  
                          1 = primary sensor, 2 = secondary sensor

**Parameters:**

<value>              E1 | E2 | E4 | E8 | E16 | E32 | E64 | E128 | E256  
                          \*RST:            E4

---

**CALCulate<Measurement>[:CHANnel<Channel>]:NRT:APERture:MODE** <mode>

Specifies which integration time is used for a single measurement.

**Suffix:**

<Measurement>      1 to 8  
                          Measurement

<Channel>            1 to 2  
                          1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<mode>              DEFault | USER

**DEFault**  
Default setting

**USER**  
Value defined by [CALCulate<Measurement>\[:CHANnel<Channel>\]:NRT:APERture\[:VALue\]](#).

\*RST:                USER

**Manual operation:** See "[Integration Time Mode](#)" on page 137

---

**CALCulate<Measurement>[:CHANnel<Channel>]:NRT:APERture[:VALue]** <value>

Effective if [CALCulate<Measurement>\[:CHANnel<Channel>\]:NRT:APERture:MODE](#) USER is set.

Defines the integration time for a single measurement.

**Suffix:**

<Measurement>      1 to 8  
                          Measurement

<Channel>            1 to 2  
                          1 = primary sensor, 2 = secondary sensor



**Parameters:**

<value>                    Range:        0.005 s to 0.111 s  
                               \*RST:        0.037 s  
                               Default unit: s

**Manual operation:**    See "[Integration Time](#)" on page 137

**CALCulate<Measurement>[:CHANnel<Channel>]:NRT:VBWidth[:VALue] <value>**

For measuring the peak envelope power, specify the video bandwidth that the sensor uses for measuring the detected RF signal.

**Suffix:**

<Measurement>            1 to 8  
                                   Measurement

<Channel>                    1 to 2  
                                   1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value>                    **0**  
                                   4 kHz

**1**  
                                   200 kHz

**2**  
                                   Maximum bandwidth of the sensor

                                  Range:        0 to 2  
                                   \*RST:        2

**Manual operation:**    See "[Video Bandwidth](#)" on page 137

**[SENSe<Sensor>:]BWIDth:VIDeo:FNUMber <fnum>**

**[SENSe<Sensor>:]BANDwidth:VIDeo:FNUMber <fnum>**

Requires the R&S NRX-B9 sensor interface for R&S NRT.

Sets the video bandwidth for the rectified RF. The setting mainly influences the measurement of the following:

- Peak envelope power (PEP)
- Crest factor (CF)
- Average burst power
- Complementary cumulative distribution function (CCDF)

**Suffix:**

<Sensor>                    101  
                                   R&S NRT directional power sensor

**Parameters:**

<numeric\_value>        **0**  
                                   4 kHz

1  
200 kHz

2  
The full bandwidth depends on the sensor:  
R&S NRT-Z14: 600 kHz  
R&S NRT-Z43, R&S NRT-Z44: 4 MHz

Range: 0 to 2  
\*RST: 0

**Manual operation:** See "[Video Bandwidth](#)" on page 137

## 12.9 Configuring the test generator

If the R&S NRX-B1 sensor check source is installed, you can use it as a power reference for testing the connected sensors.

Further information:

- [Chapter 3.2.1.2, "Module bay"](#), on page 28
- ["Sensor Check Source tab"](#) on page 150

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<a href="#">SOURce[:RF]:FREQuency[:VALue]</a> .....	395

---

**OUTPut:SOURce:STATe** <state>

**SOURce:OUTPut:STATe** <state>

Requires the R&S NRX-B1 sensor check source.

Enables or disables the signal output.

**Parameters:**

<state>                    \*RST:        0

**Manual operation:** See "[Signal Output](#)" on page 150

---

**SOURce:POWer[:VALue]** <value>

Requires the R&S NRX-B1 sensor check source.

Sets the power level for the output signal.

If you enter a value without unit, the unit is defined by [SOURce:UNIT:POWer](#). For further information, see [Chapter 12.6.1.3, "Units"](#), on page 229.

Configuring the analog signal output and the trigger input/output

**Parameters:**

<value>                    Range:     -20.0 dBm to +20.0 dBm  
                               Increment:  10.0 dBm  
                               \*RST:     +0.0 dBm  
                               Default unit: dBm

**Manual operation:**    See "[Power Level](#)" on page 151

**SOURce:PULM:STATe** <state>

Requires the R&S NRX-B1 sensor check source.

Effective if the output signal is enabled, using [SOURce:OUTPut:STATe](#) or [OUTPut:SOURce:STATe](#).

Sets the signal type of the output signal.

**Parameters:**

<state>                    OFF | ON  
                               **OFF**  
                               Continuous wave  
                               **ON**  
                               Pulse modulation  
                               \*RST:     0

**Manual operation:**    See "[Signal Output](#)" on page 150

**SOURce[:RF]:FREQuency[:VALue]** <freq>

Requires the R&S NRX-B1 sensor check source.

Sets the frequency of the output signal.

**Parameters:**

<freq>                    Range:     50.0e6 Hz | 1.0e9 Hz  
                               \*RST:     50.0e6 Hz  
                               Default unit: Hz

**Manual operation:**    See "[Frequency](#)" on page 151

## 12.10 Configuring the analog signal output and the trigger input/output

Configures the two multifunctional BNC connectors at the rear of the R&S NRX.

Further information:

- [Chapter 3.2.2.2, "Trig In / Out 2 and Out 1 / Trig Out connectors"](#), on page 32
- ["I/O 1, I/O 2 tabs"](#) on page 152

## Configuring the analog signal output and the trigger input/output

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OUTPut:REcorder<output>:LIMit:UPPer[:VALue].....	401
OUTPut:REcorder<output>:LIMit:UPPer:POWer.....	402
OUTPut:REcorder<output>:LIMit:UPPer:RATio:RCOefficient.....	402
OUTPut:REcorder<output>:LIMit:UPPer:RATio:RFRatio.....	403
OUTPut:REcorder<output>:LIMit:UPPer:RATio:RLOSSs.....	403
OUTPut:REcorder<output>:LIMit:UPPer:RATio:SWR.....	403
OUTPut:REcorder<output>:LIMit:UPPer:RATio[:VALue].....	404
OUTPut:TRIGger:SOURce.....	404

**INPut<undef>:TRIGger:IMPedance** <impedance>

Effective if `OUTPut:MODE<output>` TIN is set.

Sets the termination resistance of the external trigger signal that is supplied at the Trig In / Out 2 connector. Choose a setting that fits the impedance of the trigger source to minimize reflections on the trigger signals.

**Suffix:**

<undef>                    1 to n  
                               No suffix required.

**Parameters:**

<impedance>                HIGH | LOW  
                               \*RST:        HIGH

**Manual operation:** See "[Impedance for Trigger Input](#)" on page 154

**OUTPut:LIMit:FAIL** <mode>

Effective if `OUTPut:MODE<output>` is set to:

LIM, FLIMit or RLIMit

Sets the fail voltage that is output if a measured value causes a limit violation.

**Parameters:**

<mode>                      LOW | HIGH

Configuring the analog signal output and the trigger input/output

**HIGH**

Output voltage of 5 V.

**LOW**

Output voltage of 0 V.

\*RST: LOW

**Manual operation:** See "[Fail Voltage](#)" on page 154

**OUTPut:LIMit:FEED:INDEX** <index>

Effective if **OUTPut:MODE**<output> LIM or FLIM or RLIM is set.

Sets the measurement that is monitored.

**Parameters:**

<index>

**Manual operation:** See "[Measurement for Limit Output](#)" on page 154

**OUTPut:MODE**<output> <mode>

Sets the functionality of the Out 1 / Trig Out and Trig In / Out 2 connectors.

**Suffix:**

<output>

1 to 2

BNC connectors at the rear; 1 = Out 1 / Trig Out,

2 = Trig In / Out 2

**Parameters:**

<mode>

OFF | REcorder | FREcorder | RREcorder | LIMit | FLIMit |  
RLIMit | TOUT | TIN | OFF | REcorder | FREcorder |  
RREcorder | LIMit | FLIMit | RLIMit | TOUT | TIN

**OFF**

Disabled

**REcorder**

Analog output

**FREcorder**

Forward analog output

**RREcorder**

Reflection analog output

**LIMit**

Limit violation

**FLIMit**

Forward limit violation

**RLIMit**

Reflection limit violation

**TOUT**

Trigger output

Configuring the analog signal output and the trigger input/output

**TIN**

Trigger input

\*RST: OFF

**Manual operation:** See ["Mode"](#) on page 152

**OUTPut:RECOder<output>:FEED:INDEX <index>**

Effective if `OUTPut:MODE<output>` REC or FREC or RREC is set.

Sets the measurement of which the results are output.

**Suffix:**

<output> 1 to 2  
BNC connectors at the rear; 1 = Out 1 / Trig Out,  
2 = Trig In / Out 2

**Parameters:**

<index>

**Manual operation:** See ["Measurement for Recorder Output"](#) on page 153

**OUTPut:RECOder<output>:LIMit:LOWer:CCDF <value>**

Effective if `OUTPut:MODE<output>` is set to:

REC, FREC or RREC

Sets the CCDF measurement value that corresponds to 0 V output voltage.

**Suffix:**

<output> 1 to 2  
BNC connectors at the rear; 1 = Out 1 / Trig Out,  
2 = Trig In / Out 2

**Parameters:**

<value> Range: 0.0 pct to 100.0 pct  
\*RST: 0.0 pct  
Default unit: pct

**Manual operation:** See ["0 V Equivalent"](#) on page 153

**OUTPut:RECOder<output>:LIMit:LOWer[:VALue] <value>**

Effective if `OUTPut:MODE<output>` is set to REC, FREC or RREC.

Sets the measurement value that corresponds to 0 V output voltage.

If you enter a value without unit, the unit is defined by `UNIT<Measurement>:POWER[:VALue]`. For further information, see [Chapter 12.6.1.3, "Units"](#), on page 229.

## Configuring the analog signal output and the trigger input/output

**Suffix:**  
 <output> 1 to 2  
 BNC connectors at the rear; 1 = Out 1 / Trig Out,  
 2 = Trig In / Out 2

**Parameters:**  
 <value> The range depends on the measurement.

**Manual operation:** See "[0 V Equivalent](#)" on page 153

**OUTPut:RECOder<output>:LIMit:LOWer:POWer <value>**

Effective if `OUTPut:MODE<output>` is set to:

REC, FREC or RREC

Sets the power measurement value that corresponds to 0 V output voltage.

If you enter a value without unit, the unit is defined by `UNIT<Measurement>:POWer[:VALue]`. For further information, see [Chapter 12.6.1.3, "Units"](#), on page 229.

**Suffix:**  
 <output> 1 to 2  
 BNC connectors at the rear; 1 = Out 1 / Trig Out,  
 2 = Trig In / Out 2

**Parameters:**  
 <value> Range: -180.0 dBm to +210.0 dBm  
 \*RST: -30.0 dBm  
 Default unit: dBm

**Manual operation:** See "[0 V Equivalent](#)" on page 153

**OUTPut:RECOder<output>:LIMit:LOWer:RATio:RCOefficient <value>**

Effective if `OUTPut:MODE<output>` is set to:

REC, FREC or RREC

Sets the reflection coefficient measurement value that corresponds to 0 V output voltage.

**Suffix:**  
 <output> 1 to 2  
 BNC connectors at the rear; 1 = Out 1 / Trig Out,  
 2 = Trig In / Out 2

**Parameters:**  
 <value> Range: -1e18 to 1e18  
 \*RST: 0.0  
 Default unit: -

**Manual operation:** See "[0 V Equivalent](#)" on page 153

## Configuring the analog signal output and the trigger input/output

**OUTPut:RECOOrder<output>:LIMit:LOWer:RATio:RFRatio <value>**

Effective if `OUTPut:MODE<output>` is set to:

REC, FREC or RREC

Sets the ratio of forward/reverse power that corresponds to 0 V output voltage.

**Suffix:**

<output>                    1 to 2  
 BNC connectors at the rear; 1 = Out 1 / Trig Out,  
 2 = Trig In / Out 2

**Parameters:**

<value>                    Range:        0.0 pct to 100.0 pct  
                               \*RST:        0.0 pct  
                               Default unit: pct

**Manual operation:**    See "[0 V Equivalent](#)" on page 153

**OUTPut:RECOOrder<output>:LIMit:LOWer:RATio:RLOSs <value>**

Effective if `OUTPut:MODE<output>` is set to:

REC, FREC or RREC

Sets the return loss measurement value that corresponds to 0 V output voltage.

**Suffix:**

<output>                    1 to 2  
 BNC connectors at the rear; 1 = Out 1 / Trig Out,  
 2 = Trig In / Out 2

**Parameters:**

<value>                    Range:        -180.0 dB to 180.0 dB  
                               \*RST:        0.0 dB  
                               Default unit: dB

**Manual operation:**    See "[0 V Equivalent](#)" on page 153

**OUTPut:RECOOrder<output>:LIMit:LOWer:RATio:SWR <value>**

Effective if `OUTPut:MODE<output>` is set to:

REC, FREC or RREC

Sets the standing wave ration (SWR) measurement value that corresponds to 0 V output voltage.

**Suffix:**

<output>                    1 to 2  
 BNC connectors at the rear; 1 = Out 1 / Trig Out,  
 2 = Trig In / Out 2



## Configuring the analog signal output and the trigger input/output

**Parameters:**

<value>            Range:     -1e18 to 1e18  
                      \*RST:       1.0  
                      Default unit: -

**Manual operation:** See "[0 V Equivalent](#)" on page 153

**OUTPut:RECOder<output>:LIMit:LOWer:RATio[:VALue]** <value>

Effective if `OUTPut:MODE<output>` is set to:

REC, FREC or RREC

Sets the power ratio measurement value that corresponds to 0 V output voltage.

If you enter a value without unit, the unit is defined by `UNIT<Measurement>:POWER:RATio`. For further information, see [Chapter 12.6.1.3, "Units"](#), on page 229.

**Suffix:**

<output>            1 to 2  
                      BNC connectors at the rear; 1 = Out 1 / Trig Out,  
                      2 = Trig In / Out 2

**Parameters:**

<value>            Range:     -180.0 dB to +180.0 dB  
                      \*RST:       +0.0 dB  
                      Default unit: dB

**Manual operation:** See "[0 V Equivalent](#)" on page 153

**OUTPut:RECOder<output>:LIMit:UPPer:CCDF** <value>

Effective if `OUTPut:MODE<output>` is set to:

REC, FREC or RREC

Sets the CCDF measurement value that corresponds to 2.5 V output voltage.

**Suffix:**

<output>            1 to 2  
                      BNC connectors at the rear; 1 = Out 1 / Trig Out,  
                      2 = Trig In / Out 2

**Parameters:**

<value>            Range:     0.0 pct to 100.0 pct  
                      \*RST:       1.0 pct  
                      Default unit: pct

**Manual operation:** See "[2.5 V Equivalent](#)" on page 153

**OUTPut:RECOder<output>:LIMit:UPPer[:VALue]** <value>

Effective if `OUTPut:MODE<output>` is set to REC, FREC or RREC.

## Configuring the analog signal output and the trigger input/output

Sets the measurement value that corresponds to 2.5 V output voltage.

If you enter a value without unit, the unit is defined by `UNIT<Measurement>:POWER[:VALue]`. For further information, see [Chapter 12.6.1.3, "Units"](#), on page 229.

**Suffix:**

`<output>` 1 to 2  
BNC connectors at the rear; 1 = Out 1 / Trig Out,  
2 = Trig In / Out 2

**Parameters:**

`<value>` The range depends on the measurement.

**Manual operation:** See ["2.5 V Equivalent"](#) on page 153

**OUTPut:RECOorder<output>:LIMit:UPPer:POWer <value>**

Effective if `OUTPut:MODE<output>` is set to:

REC, FREC or RREC

Sets the power measurement value that corresponds to 2.5 V output voltage.

If you enter a value without unit, the unit is defined by `UNIT<Measurement>:POWER[:VALue]`. For further information, see [Chapter 12.6.1.3, "Units"](#), on page 229.

**Suffix:**

`<output>` 1 to 2  
BNC connectors at the rear; 1 = Out 1 / Trig Out,  
2 = Trig In / Out 2

**Parameters:**

`<value>` Range: -180.0 dBm to +210.0 dBm  
\*RST: +30.0 dBm  
Default unit: dBm

**Manual operation:** See ["2.5 V Equivalent"](#) on page 153

**OUTPut:RECOorder<output>:LIMit:UPPer:RATio:RCOefficient <value>**

Effective if `OUTPut:MODE<output>` is set to:

REC, FREC or RREC

Sets the reflection coefficient measurement value that corresponds to 2.5 V output voltage.

**Suffix:**

`<output>` 1 to 2  
BNC connectors at the rear; 1 = Out 1 / Trig Out,  
2 = Trig In / Out 2

Configuring the analog signal output and the trigger input/output

**Parameters:**

<value>                    Range:     -1e18 to 1e18  
                               \*RST:     1.0  
                               Default unit: -

**Manual operation:** See "2.5 V Equivalent" on page 153

**OUTPut:RECOOrder<output>:LIMit:UPPer:RATio:RFRatio <value>**

Effective if **OUTPut:MODE<output>** is set to:

REC, FREC or RREC

Sets the ratio of forward/reverse power that corresponds to 2.5 V output voltage.

**Suffix:**

<output>                    1 to 2  
                               BNC connectors at the rear; 1 = Out 1 / Trig Out,  
                               2 = Trig In / Out 2

**Parameters:**

<value>                    Range:     0.0 pct to 100.0 pct  
                               \*RST:     100.0 pct  
                               Default unit: pct

**Manual operation:** See "2.5 V Equivalent" on page 153

**OUTPut:RECOOrder<output>:LIMit:UPPer:RATio:RLOSs <value>**

Effective if **OUTPut:MODE<output>** is set to:

REC, FREC or RREC

Sets the return loss measurement value that corresponds to 2.5 V output voltage.

**Suffix:**

<output>                    1 to 2  
                               BNC connectors at the rear; 1 = Out 1 / Trig Out,  
                               2 = Trig In / Out 2

**Parameters:**

<value>                    Range:     -180.0 dB to 180.0 dB  
                               \*RST:     10.0 dB  
                               Default unit: dB

**Manual operation:** See "2.5 V Equivalent" on page 153

**OUTPut:RECOOrder<output>:LIMit:UPPer:RATio:SWR <value>**

Effective if **OUTPut:MODE<output>** is set to:

REC, FREC or RREC

## Configuring the analog signal output and the trigger input/output

Sets the standing wave ratio (SWR) measurement value that corresponds to 2.5 V output voltage.

**Suffix:**

<output> 1 to 2  
BNC connectors at the rear; 1 = Out 1 / Trig Out,  
2 = Trig In / Out 2

**Parameters:**

<value> Range: -1e18 to 1e18  
\*RST: 10.0  
Default unit: -

**Manual operation:** See ["2.5 V Equivalent"](#) on page 153

**OUTPut:RECOder<output>:LIMit:UPPer:RATio[:VALue]** <value>

Effective if `OUTPut:MODE<output>` is set to:

REC, FREC or RREC

Sets the power ratio measurement value that corresponds to 2.5 V output voltage.

If you enter a value without unit, the unit is defined by `UNIT<Measurement>:POWER:RATio`. For further information, see [Chapter 12.6.1.3, "Units"](#), on page 229.

**Suffix:**

<output> 1 to 2  
BNC connectors at the rear; 1 = Out 1 / Trig Out,  
2 = Trig In / Out 2

**Parameters:**

<value> Range: -180.0 dB to +180.0 dB  
\*RST: +10.0 dB  
Default unit: dB

**Manual operation:** See ["2.5 V Equivalent"](#) on page 153

**OUTPut:TRIGger:SOURce** <source>

Effective if `OUTPut:MODE<output>` TOUT is set.

Sets the trigger source.

**Parameters:**

<source> SENS1 | SENS2 | SENS3 | SENS4 | EXTERNAL | CHKSource  
\*RST: EXTERNAL

**Manual operation:** See ["Trigger Source for Trigger Output"](#) on page 154

## 12.11 Zeroing

Further information:

- [Chapter 9, "Zeroing sensors"](#), on page 140

<a href="#">CALibration&lt;Sensor&gt;:ZERO</a> .....	405
<a href="#">CALibration&lt;Sensor&gt;:ZERO:AUTO</a> .....	405
<a href="#">CALibration&lt;undef&gt;:ALL:ZERO:AUTO</a> .....	406
<a href="#">CALibration&lt;Sensor&gt;:ZERO:FAST:AUTO</a> .....	406
<a href="#">CALibration&lt;undef&gt;:ALL:ZERO:FAST:AUTO</a> .....	406

---

### **CALibration<Sensor>:ZERO** [<auto>]

Performs zeroing for the sensor that is connected to the selected port.

Turn off all test signals before zeroing. An active test signal during zeroing causes an error.

While zero calibration is in progress, no queries or other setting commands are allowed, since the command is synchronous. Any communication attempt can run into a timeout. Use [\\*WAI](#) to recognize the end of a zeroing procedure.

#### **Suffix:**

<Sensor>                    1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

#### **Parameters:**

<auto>                    ON | OFF | ONCE | LFR | UFR

**ON**  
Return value if a calibration is in progress.

**OFF**  
Return value if no calibration is in progress.

**ONCE**  
Starts zeroing.

**LFR | UFR**  
Starts zeroing in a lower frequency range (LRF) or upper frequency range (UFR), thus reducing the required time by half. Not accepted by all sensors. Consult the manual of the sensor concerned.

---

### **CALibration<Sensor>:ZERO:AUTO** [<auto>]

Performs zeroing using the signal at the sensor input.

Turn off all test signals before zeroing. An active test signal during zeroing causes an error.

While zero calibration is in progress, no queries or other setting commands are allowed, since the command is synchronous. Any communication attempt can run into a timeout. Use [\\*WAI](#) to recognize the end of a zeroing procedure.

The command is not fully R&S NRP2 compatible. If port 1 is assigned to measurement 1, and so on, the command works. If port 1 is assigned to measurement 2, for example, enable the R&S NRP2 emulation by using `SYSTem:LANGuage "NRP2"`.

**Suffix:**

<Sensor>                    1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<auto>                    ON | OFF | ONCE | LFR | UFR  
See `CALibration<Sensor>:ZERO` on page 405.

**CALibration<undef>:ALL:ZERO:AUTO** [<auto>]

Applies to all connected sensors. See `CALibration<Sensor>:ZERO:AUTO` on page 405.

**Suffix:**

<undef>                    1 to n  
No suffix required.

**Parameters:**

<auto>                    ON | OFF | ONCE | LFR | UFR

**CALibration<Sensor>:ZERO:FAST:AUTO** [<auto>]

Effective for trace measurements.

Performs fast zeroing. Since the commands are processed quickly, they are not overlapped.

The command is not fully R&S NRP2 compatible. If port 1 is assigned to measurement 1, and so on, the command works. If port 1 is assigned to measurement 2, for example, enable the R&S NRP2 emulation by using `SYSTem:LANGuage "NRP2"`.

**Suffix:**

<Sensor>                    1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<auto>                    ON | OFF | ONCE | LFR | UFR  
See `CALibration<Sensor>:ZERO` on page 405.

**CALibration<undef>:ALL:ZERO:FAST:AUTO** [<auto>]

Applies to all connected sensors. See `CALibration<Sensor>:ZERO:FAST:AUTO` on page 406.

<b>Suffix:</b>	
<undef>	1 to n No suffix required.
<b>Parameters:</b>	
<auto>	ON   OFF   ONCE   LFR   UFR

## 12.12 Running self-tests

Used for testing the connected sensors and the R&S NRX.

Further information:

- [Chapter 10.5, "User interface tests"](#), on page 180

<a href="#">CALibration&lt;Sensor&gt;:TEST?</a> .....	407
<a href="#">CALibration&lt;Sensor&gt;:TEST:DEVIation?</a> .....	407
<a href="#">CALibration&lt;Sensor&gt;:TEST:REFerence?</a> .....	408
<a href="#">DIAGnostic:INFO:OTIME?</a> .....	408
<a href="#">TEST:DEVIce:RESult?</a> .....	408
<a href="#">TEST:DEVIce[:ALL]</a> .....	408
<a href="#">TEST:USB:STORAge?</a> .....	409
<a href="#">TEST:SENSor&lt;Sensor&gt;?</a> .....	409
<a href="#">SYSTem:SENSor&lt;Sensor&gt;:TEST?</a> .....	409

---

### **CALibration<Sensor>:TEST?**

Requires a thermal power sensor, equipped with an additional test heater.

Queries the power difference in W when measuring with the external heater enabled and disabled.

<b>Suffix:</b>	
<Sensor>	1 to 128 Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Usage:** Query only

---

### **CALibration<Sensor>:TEST:DEVIation?**

Requires a thermal power sensor, equipped with an additional test heater.

Queries the relative deviation of the current power difference from the reference value stored in the calibration data set. The relative deviation is calculated as follows:

$$\langle \text{relative deviation} \rangle = (\langle \text{current power difference} \rangle / \langle \text{reference value} \rangle) - 1$$

with

<current power difference>: [CALibration<Sensor>:TEST?](#)

<reference value>: [CALibration<Sensor>:TEST:REFerence?](#)

**Suffix:**  
 <Sensor> 1 to 128  
 Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Usage:** Query only

#### **CALibration<Sensor>:TEST:REfERENCE?**

Requires a thermal power sensor, equipped with an additional test heater.

Queries the reference value of the power difference in W when measuring with the external heater enabled and disabled. The reference value is determined during the calibration process and stored in the calibration data set.

**Suffix:**  
 <Sensor> 1 to 128  
 Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Usage:** Query only

#### **DIAGnostic:INFO:OTIME?**

Queries the count of the built-in elapsed-time meter. The count is always output in hours [h] and cannot be changed.

**Usage:** Query only

#### **TEST:DEvIce:RESult?**

Queries the test results of `TEST:DEvIce[:ALL]`.

**Usage:** Query only

#### **TEST:DEvIce[:ALL] [<argument>]**

Performs tests for the keyboard, display and touch panel.

**Parameters:**  
 <argument> The tests can be performed as single tests or as combined tests.

**"SubSystemGui:KeyboardTest"**  
 Keyboard test

**"SubSystemGui:DisplayTest"**  
 Display test

**"SubSystemGui:TouchTest"**  
 Touch test

**Example:** `TEST:DEV "SubSystemGui:KeyboardTest;DisplayTest;TouchTest";*OPC`  
 Performs a combined test.



---

**TEST:USB:STORage?** [<argument>]

Checks the connected memory stick.

**Query parameters:**

<argument>	<b>0</b>	Test passed
	<b>1</b>	Test failed; no memory stick connected or memory stick does not respond.

**Usage:** Query only

---

**TEST:SENSor<Sensor>?** [<argument>]

Starts a self-test of the selected sensor and returns the result. In contrast to [\\*TST?](#), this command returns detailed information that you can use for troubleshooting.

The response is sensor-dependent. It always contains an identification string for the sensor with the type name and the firmware version number. If an error has occurred, the response also contains the error message in plain text.

**Suffix:**

<Sensor>	1 to 128	Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100
----------	----------	---

**Query parameters:**

<argument>	Specifies a part of the self-test. If you add this string, the sensor performs only the specified part of the self-test. The string is sensor-specific.
------------	---

**Usage:** Query only

**Manual operation:** See "[Sensor Test](#)" on page 160

---

**SYSTem:SENSor<Sensor>:TEST?** [<argument>]

See [TEST:SENSor<Sensor>?](#) on page 409.

**Suffix:**

<Sensor>	1 to 128	Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100
----------	----------	---

**Query parameters:**

<argument>

**Usage:** Query only

**Manual operation:** See "[Sensor Test](#)" on page 160

## 12.13 Managing setups and correction tables

Manages setups and frequency-dependent correction tables.

Further information:

- Chapter 8, "Saving and recalling settings", on page 138
- "Frequency Dependent Offset" on page 124

MEMory:CATalog:STATe?.....	410
MEMory:CATalog:TABLE?.....	410
MEMory:CATalog[:ALL]?.....	411
MEMory:CLEar:TABLE.....	411
MEMory:CLEar[:NAME].....	411
MEMory:FREE:STATe?.....	412
MEMory:FREE:TABLE?.....	412
MEMory:FREE[:ALL]?.....	412
MEMory:NSTates?.....	412
MEMory:STATe:CATalog?.....	413
MEMory:STATe:DEFine.....	413
MEMory:STATe:MAP.....	413
MEMory:STATe:RESet.....	413
MEMory:TABLE:DATA?.....	413
MEMory:TABLE:DATA:POINts?.....	414
MEMory:TABLE:FREQuency.....	414
MEMory:TABLE:FREQuency:POINts?.....	414
MEMory:TABLE:GAIN:POINts?.....	414
MEMory:TABLE:GAIN[:MAGNitude].....	415
MEMory:TABLE:MAP.....	415
MEMory:TABLE:MOVE.....	415
MEMory:TABLE:RESet.....	416
MEMory:TABLE:SELect.....	416

---

### MEMory:CATalog:STATe?

Queries information on the available setups stored on the R&S NRX.

The response consists of:

<used disk space>, <remaining disk space>, "<setup 1>", "<setup 2>", "<setup 3>", ...

Each <setup> consists of:

<name>,<data type>,<required disk space in bytes>

Example: "Setup 1,STAT,1212479"

**Usage:** Query only

---

### MEMory:CATalog:TABLE?

Queries information on the available frequency-dependent correction tables stored on the R&S NRX.

The response consists of:

<used disk space>, <remaining disk space>, "<table 1>", "<table 2>", "<table 3>", ...

Each <table> consists of:

<name>,<data type>,<required disk space in bytes>

Example: "Table 2, TABL, 84"

**Usage:** Query only

### MEMory:CATalog[:ALL]?

Queries information on the available setups and frequency-dependent correction tables stored on the R&S NRX. Combines the information queried by.

- [MEMory:CATalog:STATe?](#)
- [MEMory:CATalog:TABLE?](#)

The response consists of:

<used disk space>, <remaining disk space>, "<setup 1>", "<setup 2>", "<setup 3>", ..., "<table 1>", "<table 2>", "<table 3>", ...

Each <setup> and <table> consists of:

<name>,<data type>,<required disk space in bytes>

Example for <setup>: "Setup 1, STAT, 1212479"

Example for <table>: "Table 2, TABL, 84"

**Usage:** Query only

### MEMory:CLEar:TABLE

Deletes the content of the selected correction table.

Use [MEMory:TABLE:SElect](#) to select the table.

Notice: Once send, you cannot cancel this command. Cleared values are irretrievably lost.

Alternatively, you can use [MEMory:CLEar\[:NAME\]](#).

**Example:** MEM:CLE:TABL

**Usage:** Event

### MEMory:CLEar[:NAME] <name>>

Deletes the content of the correction table or setup carrying the specified name.

Notice: Once send, you cannot cancel this command. Cleared values are irretrievably lost.

**Setting parameters:**

<<name>> Name of the correction table or setup

**Example:** MEM:CLE "Setup 9"

**Usage:** Setting only

---

**MEMory:FREE:STATe?**

Queries the used and remaining disk space for setups.

**Example:** MEM:FREE:STAT?  
Query  
1358442496,8337127  
Response

**Usage:** Query only

---

**MEMory:FREE:TABLE?**

Queries the used and remaining disk space for frequency-dependent correction tables.

**Example:** MEM:FREE:TABLE?  
Query  
1358442496,267  
Response

**Usage:** Query only

---

**MEMory:FREE[:ALL]?**

Queries the used and remaining disk space for setups and frequency-dependent correction tables. Combines the information queried by:

- [MEMory:FREE:STATe?](#)
- [MEMory:FREE:TABLE?](#)

**Example:** MEM:FREE?  
Query  
1358442496,8337394  
Response

**Usage:** Query only

---

**MEMory:NStates?**

Queries the number of available setups.

**Example:** MEM:NST?  
Query  
20  
Response

**Usage:** Query only

### MEMory:STATe:CATalog?

Queries the names of the available setups stored on the R&S NRX.

**Usage:** Query only

**MEMory:STATe:DEFine** <register\_name>[, <register\_number>]

**MEMory:STATe:MAP** <register\_name>[, <register\_number>]

Assigns a name to the setup stored in the memory location.

Take care to use recognizable names. The R&S NRX does not check whether a name is unique. If you want to reset the factory default, use [MEMory:STATe:RESet](#).

The query returns the memory location that is assigned to the setup name.

#### Parameters:

<register\_name> Setup name; allowed are alphanumeric characters and special characters.

<register\_number> Memory location of the setup

**0**

Factory-set setup that cannot be changed.

**1 to 19**

Available memory locations

**Example:** `MEM:STAT:MAP "test",5`

**Example:** `MEM:STAT:MAP? "test"`

**Manual operation:** See ["Save / Recall Setup"](#) on page 139  
See ["Setup Name"](#) on page 139

### MEMory:STATe:RESet

Resets the setup names to factory default, "Setup 1", "Setup 2" and so on.

**Usage:** Event

### MEMory:TABLE:DATA?

Queries the content of the selected table.

Use [MEMory:TABLE:SElect](#) to select the table.

The response consists of data pairs (frequency - offset):

<frequency 1>,<offset 1>,<frequency 2>,<offset 2>,<frequency 3>,<offset 3>, ...

Frequency in Hz, offset in dB.

**Example:** MEM: TABL: DATA?  
 Query  
 1.000000E+02, 0.000000E+00, 2.000000E+03,  
 0.000000E+00, 3.000000E+04, 0.000000E+00  
 Response

**Usage:** Query only

---

**MEMory:TABLE:DATA:POINTs?**

Queries the number of data pairs (frequency - offset) in the selected table.

Use [MEMory:TABLE:SElect](#) to select the table.

**Usage:** Query only

---

**MEMory:TABLE:FREQuency <value>...**

Defines the frequency values in the selected correction table. Existing data is overwritten. Take care that the number of frequency values matches the number of offset values, defined by [MEMory:TABLE:GAIN\[:MAGNitude\]](#). If the numbers differ, excess values are ignored.

Use [MEMory:TABLE:SElect](#) to select the table.

**Parameters:**

<value> Numeric values with a maximum of 2 digits after the decimal point, separated by commas. Values with more than 2 decimal places are rounded.  
 Default unit: Hz

**Example:** MEM: TABL: FREQ 50.00, 60, 70.3456  
 Sets 3 frequency values; 50.00 Hz, 60.00 Hz, 70.35 Hz.

**Manual operation:** See ["Edit table "<table name>"](#) on page 124

---

**MEMory:TABLE:FREQuency:POINTs?**

Queries the number of frequency values in the selected correction table.

Use [MEMory:TABLE:SElect](#) to select the table.

**Usage:** Query only

**Manual operation:** See ["Edit table "<table name>"](#) on page 124

---

**MEMory:TABLE:GAIN:POINTs?**

Queries the number of offset values in the selected correction table.

Use [MEMory:TABLE:SElect](#) to select the table.

**Usage:** Query only

**Manual operation:** See "Edit table "<table name>" on page 124

---

### MEMory:TABLE:GAIN[:MAGNitude] <value>...

Defines the offset values in the selected correction table. Existing data is overwritten. Take care that the number of frequency values matches the number of offset values, defined by `MEMory:TABLE:FREQuency`. If the numbers differ, excess values are ignored.

Use `MEMory:TABLE:SElect` to select the table.

#### Parameters:

<value> Numeric values with a maximum of 3 digits after the decimal point, separated by commas. Values with more than 3 decimal places are rounded.  
Default unit: dB

**Example:** `MEM:TABLE:GAIN 0,0.0033,0.04`  
Sets 3 offset values; 0.000 dB, 0.003 dB, 0.040 dB.

**Manual operation:** See "Edit table "<table name>" on page 124

---

### MEMory:TABLE:MAP <register\_name>[, <register\_number>]

Assigns a name to the correction table stored in the memory location.

Take care to use recognizable names. The R&S NRX does not check whether a name is unique. If you want to reset the factory default, use `MEMory:STATE:RESet`.

The query returns the memory location that is assigned to the setup name.

#### Parameters:

<register\_name> Name of the correction table; allowed are alphanumeric characters and special characters.

<register\_number> Memory location of the correction table  
**0**  
Factory-set correction table that cannot be changed.  
**1 to 9**  
Available memory locations

**Example:** `MEM:TABLE:MAP "test5",5`

**Example:** `MEM:TABLE:MAP? "test5"`

**Manual operation:** See "Edit table name" on page 124

---

### MEMory:TABLE:MOVE <string>...

Renames of the selected correction table.

Use `MEMory:TABLE:SElect` to select the table.

**Setting parameters:**

<string> "<old name>","<new name>"  
If the old name is incorrect, an error occurs.

**Example:** MEM:TABL:MOVE "Test 1", "test\_5#"

**Usage:** Setting only

**MEMory:TABLE:RESet**

Deletes the content of all frequency-dependent correction tables and resets the names to factory default, "Table 1", "Table 2" and so on.

To delete the content of a specific table, use [MEMory:CLEar:TABLE](#).

**Usage:** Event

**MEMory:TABLE:SElect <name>>**

Selects one of the available offset tables for the following commands:

- [MEMory:TABLE:GAIN\[:MAGNitude\]](#)
- [MEMory:TABLE:GAIN:POINTs?](#)
- [MEMory:TABLE:FREQuency:POINTs?](#)
- [MEMory:TABLE:FREQuency](#)
- [MEMory:TABLE:DATA?](#)
- [MEMory:TABLE:DATA:POINTs?](#)

Alternatively, you can use [CALCulate<Measurement>\[:CHANnel<Channel>\]:CORRection:OFFSet:TABLE:INDEX](#).

**Parameters:**

<<name>> "<table name>"  
You can query the table names using [MEMory:CATalog:TABLE?](#).

**Example:** MEM:TABL:SEL "Table 1"

**Manual operation:** See "[Frequency dependent offset table](#)" on page 124

## 12.14 System information and configuration

The `SYSTEM` subsystem contains a series of commands for general functions that do not directly affect the measurement.

Further information:

- [Chapter 10, "System settings"](#), on page 142



### 12.14.1 Preset

<code>SYSTem:PRESet</code> .....	417
<code>SYSTem:SENSor&lt;Sensor&gt;:RESet</code> .....	417

---

#### SYSTem:PRESet

Sets the R&S NRX to a defined initial state. The default settings are indicated in the description of commands as \*RST value.

With the exceptions listed in [Table 12-18](#), this command corresponds to \*RST.

*Table 12-18: Differences between \*RST and SYSTem:PRESet*

Command	*RST	SYSTem:PRESet
<code>[SENSe&lt;Sensor&gt;:]AVERAge:TCONtrol</code>	REPeat	MOVing
<code>CALCulate&lt;Measurement&gt;[: CHANnel&lt;Channel&gt;]:AVERAge:TCONtrol[:ENUM]</code>	REPeat	MOVing
<code>CALCulate&lt;Measurement&gt;[: CHANnel&lt;Channel&gt;]:TRACe:AVERAge: TCONtrol[:ENUM]</code>	REPeat	MOVing
<code>INITiate&lt;Measurement&gt;:CONTinuous</code>	OFF	ON

**Usage:** Event

**Manual operation:** See "[Preset](#)" on page 139

---

#### SYSTem:SENSor<Sensor>:RESet

Sets the selected sensor to a defined initial state.

**Suffix:**

<Sensor> 1 to 128

Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Usage:** Event

### 12.14.2 Shutdown and reboot

<code>SYSTem:REBoot</code> .....	417
<code>SYSTem:SENSor&lt;Sensor&gt;:REBoot</code> .....	418
<code>SYSTem:SHUTdown</code> .....	418

---

#### SYSTem:REBoot

Reboots the R&S NRX.

**Usage:** Event

**SYSTem:SENSor<Sensor>:REBoot**

Reboots the selected sensor.

**Suffix:**

<Sensor>                    1 to 128  
 Configured sensor connected at: port A = 1, ... , port D = 4, R&S  
 NRX-B9 = 101, USB and LAN port = 5 to 100

**Usage:**                    Event

**SYSTem:SHUTdown**

Shuts down the R&S NRX.

**Usage:**                    Event

**12.14.3 Firmware update**

You can integrate a firmware update function in an application.

**Example: Integrating a firmware update of the R&S NRX**

You want to update your R&S NRX with the `NRX_18.01.22.02.rsu` file. This file has a size of 10242884 bytes.

To send the file to the R&S NRX for updating the firmware, your application has to assemble a memory block containing:

```
SYST:FWUP <block_data>
```

The <block\_data> are definite length arbitrary block data as described in [SYSTem:FWUPdate](#) on page 419.

The size of the file is 10242884. This number has 8 digits. Thus, the <block\_data> consist of the following:

- #
- 8  
How many digits follow to specify the file size.
- 10242884  
Number that specifies the file size.
- <file\_contents>  
Contents of the \*.rsu file, byte-by-byte
- 0x0a  
Delimiter

In this example, you write exactly 10242905 bytes to the R&S NRX, for example by using a 'viWrite()' function.

The 10242905 bytes result from the values of the list above:

$$9 + 1 + 1 + 1 + 1 + 8 + 10242884 + 1$$

In a (pseudo) string notation, the memory block looks as follows:

```
SYST:FWUP #810242884<file_contents>0x0a,
```

### 12.14.3.1 Updating the R&S NRX

[SYSTem:FWUPdate](#)..... 419

[SYSTem:FWUPdate:STATus?](#)..... 419

---

#### **SYSTem:FWUPdate** <fwudata>

Loads new operating firmware into the R&S NRX. Rohde & Schwarz provides the update file. For further details, see [Chapter 11, "Firmware update"](#), on page 184.

If you want to integrate a firmware update function in an application, see the example given in [Chapter 12.14.3, "Firmware update"](#), on page 418.

#### **Setting parameters:**

```
<<fwudata>>      <block_data>
                  Definite length arbitrary block data containing the direct copy of
                  the binary *.rsu file in the following format:
                  #
                  Single digit indicating how many digits follow to specify the size
                  of the binary file.
                  Number that specifies the size of the binary file.
                  Binary data
                  0x0a as appended delimiter for line feed
```

**Usage:** Setting only

---

#### **SYSTem:FWUPdate:STATus?**

Queries the result of the firmware update, returned as a readable string.

Further information.

- [SYSTem:FWUPdate](#) on page 419
- [Chapter 11, "Firmware update"](#), on page 184

**Example:**

```
SYST:FWUP:STAT?
Query
"Success"
Response
```

**Usage:** Query only

### 12.14.3.2 Updating a connected sensor

Prerequisite: The sensor is connected as described in [Chapter 3.1.8, "Connecting sensors"](#), on page 23.

<a href="#">SENSe&lt;Sensor&gt;:SYSTem:FWUPdate</a> .....	420
<a href="#">SENSe&lt;Sensor&gt;:SYSTem:FWUPdate:STATus?</a> .....	420

#### **SENSe<Sensor>:SYSTem:FWUPdate <fwudata>>**

Loads new operating firmware into the selected sensor. Rohde & Schwarz provides the update file. For further details, see [Chapter 11, "Firmware update"](#), on page 184.

If you want to integrate a firmware update function in an application, see the example given in [Chapter 12.14.3, "Firmware update"](#), on page 418.

#### **Suffix:**

<Sensor>                    1 to 128  
 Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

#### **Setting parameters:**

<<fwudata>>                <block\_data>  
 See [SYSTem:FWUPdate](#) on page 419.

**Usage:**                    Setting only

#### **SENSe<Sensor>:SYSTem:FWUPdate:STATus?**

Queries the result of the firmware update, returned as a readable string.

Further information.

- [SENSe<Sensor>:SYSTem:FWUPdate](#) on page 420
- [Chapter 11, "Firmware update"](#), on page 184

#### **Suffix:**

<Sensor>                    1 to 128  
 Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

#### **Example:**

```
SENS:SYST:FWUP:STAT?
Query
"Success"
Response
```

**Usage:**                    Query only

## 12.14.4 Password management

See also [Chapter 10.3, "Instrument security management"](#), on page 167.

<a href="#">SYSTem:SECurity:PASSword:SECurity</a> .....	421
<a href="#">SYSTem:SECurity:PASSword:USER</a> .....	421

**SYSTem:SECurity:PASSword:SECurity** <pwd1>, <pwd2>

Sets a new security password.

The command is restricted to remote control over the USB interface (USBTMC).

**Setting parameters:**

<pwd1> Old security password, entered as a string.

<pwd2> New security password, entered as a string.

**Example:** SYST:SEC:PASS:SEC "100095", "100096"

**Usage:** Setting only

**Manual operation:** See ["Change Password"](#) on page 176

**SYSTem:SECurity:PASSword:USER** <pwd1>, <pwd2>

Sets a new user password, also called instrument password.

The command is restricted to remote control over the USB interface (USBTMC).

**Setting parameters:**

<pwd1> Old user password, entered as a string.

<pwd2> New user password, entered as a string.

**Example:** SYST:SEC:PASS:USER "instrument",  
"rohdeandschwarz"

**Usage:** Setting only

**Manual operation:** See ["Change Password"](#) on page 175

## 12.14.5 Locking

<a href="#">SYSTem:KLOCK</a> .....	421
<a href="#">SYSTem:LOCK:SHARed:STRing?</a> .....	421
<a href="#">SYSTem:LOCK:TIMeout</a> .....	422

**SYSTem:KLOCK** <klock>

Disables or enables the front panel keyboard of the instrument including the [LOCAL] key.

**Parameters:**

<klock> OFF | ON

**SYSTem:LOCK:SHARed:STRing?**

Queries the lock string assigned to the locking group if shared locking is enabled.

Writes an error in the error queue if shared locking is not enabled.

**Return values:**

&lt;result&gt;

**Usage:**

Query only

**SYSTem:LOCK:TIMEout** <timeout>

When processing a command, sets the maximum time to wait before the command is discarded and an error is written to the error queue if the following applies:

- Instrument is locked.
- Sender of the command is not the owner of the lock.

**Setting parameters:**

&lt;timeout&gt;

**<integer>**

Waiting time in milliseconds

**INFinite**

No timeout

**Return values:**

&lt;result&gt;

## 12.14.6 Network settings

SYSTem:COMMunicate:INET[:SELF]:ADDRESS.....	422
SYSTem:COMMunicate:NETWork[:IPAddress][:ADDRESS].....	422
SYSTem:COMMunicate:INET[:SELF]:DNS:ADDRESS.....	423
SYSTem:COMMunicate:NETWork[:IPAddress]:DNS.....	423
SYSTem:COMMunicate:INET[:SELF]:DNS:SUFFix.....	423
SYSTem:COMMunicate:NETWork[:COMMON]:DOMain.....	423
SYSTem:COMMunicate:INET[:SELF]:GATeway:ADDRESS.....	423
SYSTem:COMMunicate:NETWork[:IPAddress]:GATeway.....	423
SYSTem:COMMunicate:INET[:SELF]:MODE.....	423
SYSTem:COMMunicate:NETWork[:IPAddress]:MODE.....	423
SYSTem:COMMunicate:INET[:SELF]:SUBNetmask:ADDRESS.....	424
SYSTem:COMMunicate:NETWork[:IPAddress]:SUBNet:MASK.....	424
SYSTem:COMMunicate:NETWork[:COMMON]:HOSTname.....	424
SYSTem:COMMunicate:NETWork[:COMMON]:WORKgroup.....	424
SYSTem:COMMunicate:NETWork:MACaddress?.....	424
SYSTem:COMMunicate:NETWork:REStart.....	425
SYSTem:COMMunicate:NETWork:STATus?.....	425

**SYSTem:COMMunicate:INET[:SELF]:ADDRESS** <address>**SYSTem:COMMunicate:NETWork[:IPAddress][:ADDRESS]** <IPaddress>Effective if `SYSTem:COMMunicate:NETWork[:IPAddress]:MODE STATic` is set.

Sets the IP address of the R&amp;S NRX

**Parameters:**

<IPAddress> Consists of four blocks separated by dots, consisting of up to 3 digits. Example: 108.0.0.255  
Range: 0 to 255 for each block

**Manual operation:** See "[IPv4 Address](#)" on page 146

---

**SYSTem:COMMunicate:INET[:SELF]:DNS:ADDRess** <server>

**SYSTem:COMMunicate:NETWork[:IPADDRESS]:DNS** <DNS>

Effective if `SYSTem:COMMunicate:NETWork[:IPADDRESS]:MODE` `STATIC` is set.

Sets the DNS server address of your local subnet.

**Parameters:**

<DNS> Consists of four blocks separated by dots, consisting of up to 3 digits. Example: 123.456.0.1  
Range: 0 to 255 for each block

**Manual operation:** See "[DNS Server](#)" on page 146

---

**SYSTem:COMMunicate:INET[:SELF]:DNS:SUFFix** <suffix>

**SYSTem:COMMunicate:NETWork[:COMMON]:DOMain** <Domain>

Sets the primary DNS suffix that means the domain name. DNS uses the suffix for registration and name resolution to identify the R&S NRX uniquely in the entire network.

**Parameters:**

<Domain>

**Manual operation:** See "[DNS Suffix](#)" on page 145

---

**SYSTem:COMMunicate:INET[:SELF]:GATeway:ADDRess** <gateway>

**SYSTem:COMMunicate:NETWork[:IPADDRESS]:GATeway** <Gateway>

Effective if `SYSTem:COMMunicate:NETWork[:IPADDRESS]:MODE` `STATIC` is set.

Sets the IP address of the default gateway.

**Parameters:**

<Gateway> Consists of four blocks separated by dots, consisting of up to 3 digits. Example: 192.168.10.254  
Range: 0 to 255 for each block

**Manual operation:** See "[Default Gateway](#)" on page 146

---

**SYSTem:COMMunicate:INET[:SELF]:MODE** <state>

**SYSTem:COMMunicate:NETWork[:IPADDRESS]:MODE** <mode>

Sets how the IP address is assigned.

**Parameters:**

<mode> AUTO | `STATIC`

**AUTO**

Assigns the IP address automatically, provided the network supports the dynamic host configuration protocol (DHCP).

**STATIC**

Enables assigning the IP address manually.

\*RST:        AUTO

**Manual operation:** See "[Address Mode](#)" on page 145

**SYSTem:COMMunicate:INET[:SELF]:SUBNetmask:ADDRes** <netmask>

**SYSTem:COMMunicate:NETWork[:IPADdress]:SUBNet:MASK** <Mask>

Effective if `SYSTem:COMMunicate:NETWork[:IPADdress]:MODE` `STATIC` is set.

Sets the subnet mask of your local subnet.

**Parameters:**

<Mask>                    Consists of four blocks separated by dots, consisting of up to 3 digits. Example: 255.255.255.0

Range:        0 to 255 for each block

**Manual operation:** See "[Subnet Mask](#)" on page 146

**SYSTem:COMMunicate:NETWork[:COMMON]:HOSTName** <Hostname>

Sets the individual hostname of the R&S NRX.

It is recommended that you do not change the default hostname to avoid problems with the network connection. However, if you change the hostname, be sure to use a unique name.

**Parameters:**

<Hostname>

**Manual operation:** See "[Host Name](#)" on page 144

**SYSTem:COMMunicate:NETWork[:COMMON]:WORKGroup** <Workgroup>

Sets an individual workgroup name for the R&S NRX.

**Parameters:**

<Workgroup>

**SYSTem:COMMunicate:NETWork:MACaddress?**

Queries the MAC address of the network adapter.

**Usage:**                Query only



---

**SYSTem:COMMunicate:NETWork:REStart**

Restarts the network connection to the R&S NRX, i.e. terminates the connection and sets it up again.

**Usage:** Event

---

**SYSTem:COMMunicate:NETWork:STATus?**

Queries the network configuration state.

**Usage:** Query only

---

## 12.14.7 Remote settings

<a href="#">SYSTem:COMMunicate:GPIB[:SELF]:ADDRess</a> .....	425
<a href="#">SYSTem:HELP:HEADers?</a> .....	425
<a href="#">SYSTem:HELP:SYNTax?</a> .....	426
<a href="#">SYSTem:HELP:SYNTax:ALL?</a> .....	426
<a href="#">SYSTem:IDN:ANSWer</a> .....	426
<a href="#">SYSTem:IDN:AUTO</a> .....	426
<a href="#">SYSTem:IDN:MODE</a> .....	427
<a href="#">SYSTem:LANGuage</a> .....	427
<a href="#">SYSTem:OPT:ANSWer</a> .....	427
<a href="#">SYSTem:OPT:AUTO</a> .....	428
<a href="#">SYSTem:OPT:MODE</a> .....	428
<a href="#">SYSTem:VERSion?</a> .....	428

---

**SYSTem:COMMunicate:GPIB[:SELF]:ADDRess** <address>

Sets the GPIB address.

**Parameters:**

<address>	Range:	1 to 30
	*RST:	20

**Manual operation:** See "[GPIB Address](#)" on page 148

---

**SYSTem:HELP:HEADers?** [<Parser>]

Returns a list of all SCPI commands supported by the R&S NRX.

**Query parameters:**

<Parser>

**Return values:**

<Headers>                    <dblock>

**Usage:** Query only

---

**SYSTem:HELP:SYNTax?** <Header>

Returns the relevant parameter information for the specified SCPI command.

**Query parameters:**

<Header> Long or short form of the SCPI command.

**Return values:**

<Syntax> <dblock>

**Example:**

```
SYST:HELP:SYNT? "SYST:KLOC"
```

Query

```
"SYSTem:KLOCK[?] <boolean>"
```

Response

**Usage:** Query only

---

**SYSTem:HELP:SYNTax:ALL?**

Queries the implemented SCPI commands and their parameters. Returns the result as block data.

**Return values:**

<Syntax> <dblock>

**Usage:** Query only

---

**SYSTem:IDN:ANSWer** <string>

Effective if [SYSTem:IDN:MODE USER](#) is set.

Sets the customized instrument identification string so that you can identify each R&S NRX individually.

You can query the defined string using [\\*IDN?](#).

**Parameters:**

<string> Identification string. Maximum string length is 128 characters.

**Manual operation:** See "[Custom IDN String](#)" on page 149

---

**SYSTem:IDN:AUTO** <status>

Enables or disables the automatic instrument identification for [\\*IDN?](#).

**Parameters:**

<status> ON | OFF

\*RST: 1

**Manual operation:** See "[Customization of \\*IDN?](#)" on page 149

---

**SYSTem:IDN:MODE** <mode>

Sets which identification string is used.

**Parameters:**

<mode> AUTO | USER

**AUTO**

Automatic instrument identification.

**USER**

Customized identification string. Define the string using [SYSTem:IDN:ANSWer](#).

\*RST: AUTO

**Manual operation:** See "[Customization of \\*IDN?](#)" on page 149

---

**SYSTem:LANGUage** <language>

Sets the native remote command set or an emulation of a predecessor or a power meter from another manufacturer. See also [Chapter 12.16, "Remote emulation"](#), on page 441.

**Setting parameters:**

<language> String

**SCPI | NRX**

Native remote command set of the R&S NRX.

**NRP2 | NRP**

Emulation of the selected predecessors.

**N432A | N1911A | N1912A | E4418B | E4419B**

Requires the R&S NRX-K301 Keysight emulation mode. Emulation of the selected Keysight power meter.

**Query parameters:**

<language> String

**SCPI | NRP2 | NRP | N432A | N1911A | N1912A | E4418B | E4419B**

\*RST: SCPI

**Manual operation:** See "[Language](#)" on page 148

---

**SYSTem:OPT:ANSWer** <string>

Effective if [SYSTem:OPT:MODE](#) USER is set.

Sets the customized option identification string.

You can query the defined string using [\\*OPT?](#).

**Parameters:**

<string> Option string. Maximum string length is 128 characters.

**Manual operation:** See "[Custom OPT String](#)" on page 149

---

**SYSTem:OPT:AUTO** <status>

Enables or disables the automatic instrument identification for \*OPT?.

**Parameters:**

<status>                    ON | OFF  
                              \*RST:        1

**Manual operation:**    See "[Customization of \\*OPT?](#)" on page 149

---

**SYSTem:OPT:MODE** <mode>

Sets which option string is used.

**Parameters:**

<mode>                    AUTO | USER  
**AUTO**  
Automatic option identification string.  
**USER**  
Customized option string. Define the string using [SYSTem:OPT:ANSWer](#).  
\*RST:                    AUTO

**Manual operation:**    See "[Customization of \\*OPT?](#)" on page 149

---

**SYSTem:VERSIon?**

Queries the SCPI version that the command set of the R&S NRX complies with.

**Return values:**

<version>

**Usage:**                    Query only

---

## 12.14.8 Sensor management

[\[SENSe<Sensor>:\]ADD](#)..... 428  
[SYSTem:SENSor<Sensor>:INFO?](#)..... 429

---

**[SENSe<Sensor>:]ADD** <sensor>

Adds a LAN sensor. See "[To add a LAN sensor](#)" on page 156.

**Suffix:**

<Sensor>                    1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Setting parameters:**

<sensor>                    Hostname of the sensor.

**Example:** ADD "NRQ6-101435"  
**Usage:** Setting only  
**Manual operation:** See ["Add Sensor"](#) on page 159

### SYSTem:SENSor<Sensor>:INFO? [<argument>]

Queries information about the selected sensor, including calibration data.

**Suffix:**

<Sensor> 1 to 128  
 Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Query parameters:**

<argument> Default unit: Impedance in ohm, frequency in Hz, power in watt, resolution in seconds

**Example:**

```
SYST:SENS2:INFO?
Query
"Cal. Abs.:2015-07-08 ", "Cal. Due Date:
2017-07 ", "Cal. Lin.:
not applicable ", "Cal. Misc.:
2015-07-08 ", "Cal. Refl.:
2015-07-08 ", "Cal. S-Para.:
not applicable ", "Cal. S-Para. (User):
not applicable ", "Cal. Temp.:
not applicable ", "Coupling:AC ", "Function:
Power Terminating ", "Hostname:
nrp33sn-900444 ", "IP Address:
0.0.0.0 ", "Impedance:
50 ", "Manufacturer:Rohde & Schwarz ", "MaxFreq:
3.3e+10 ", "MaxPower:0.2 ", "MinFreq:
1e+07 ", "MinPower:1e-10 ", "Resolution:
5e-07 ", "SPD Mnemonic: ", "SW Build:
18.06.14.01 ", "Sensor Name:
NRP33SN-900004 ", "Serial:
900444 ", "Stock Number:
1419.7777K02 ", "Technology:
3-Path Diode ", "TestLimit:
0.160 dB ", "TestLimit pd:
0.160 dB ", "Type:NRP33SN ", "Uptime:904 "
```

**Usage:** Query only  
**Manual operation:** See ["Sensor Info"](#) on page 160

## 12.14.9 Instrument information

[SYSTem:DID?](#)..... 430  
[SYSTem:DEVIce:ID?](#)..... 430

SYSTem:DFPRint.....	430
SYSTem:DFPRint:HISTory:COUNT?.....	430
SYSTem:DFPRint:HISTory:ENTRy?.....	430
SYSTem:INFO:TERMchar.....	431
SYSTem:INFO[:INFO]?.....	431

**SYSTem:DID?****SYSTem:DEVIce:ID?**

Queries the Rohde & Schwarz instrument ID.

**Return values:**

<DeviceID>

**Usage:** Query only

**Manual operation:** See "[System Info](#)" on page 163

**SYSTem:DFPRint [<Path>]**

Generates the device footprint.

**Setting parameters:**

<Path>

**Return values:**

<XMLDeviceFootprint><dblock>

**SYSTem:DFPRint:HISTory:COUNT?**

Queries the number of device footprints in the history.

**Return values:**

<Count>

**Usage:** Query only

**SYSTem:DFPRint:HISTory:ENTRy? <index>**

Queries a device footprint from the history.

**Query parameters:**

<index>                   **0**  
                                   Most recent device footprint

**Return values:**

<XmlDeviceFootprint><dblock>

**Usage:** Query only

**SYSTem:INFO:TERMchar** <termination>

Selects the termination characters for information returned by:

- `SYSTem:INFO[:INFO]?`.
- `[SENSe<Sensor>:]CATalog?`
- `[SENSe<Sensor>:]INformation?`

**Parameters:**

<termination>      CR | LF | CRLF | STRS  
\*RST:                STRS

**SYSTem:INFO[:INFO]?** [<argument>]

Queries information on the R&S NRX. See "[System Info](#)" on page 163.

If queried without parameters, the command returns all available information in the form of a list of strings separated by commas.

If you want to query specific information, add the query parameter:

`SYST:INFO? "<string>"`

**Query parameters:**

<argument>      'Manufacturer', 'Type', 'Stock Number', 'Serial', 'SW Build', 'MAC Address', 'Hostname', 'IP Address', 'Domain', 'Subnetmask', 'Gateway', 'Mode', 'Status', 'Sensor Name', 'Technology', 'Function', 'MinPower', 'MaxPower', 'MinFreq', 'MaxFreq', 'Impedance', 'Coupling', 'Uptime', 'Cal. Misc.', 'Cal. Abs.', 'Cal. Refl.', 'Cal. Temp.', 'Cal. Lin.', 'Cal. S-Para.', 'Cal. S-Para. (User)', 'SPD Mnemonic', 'Cal. Due Date', 'Certificate No', 'Limit', 'TestLimit', 'TestLimit pd'

**Usage:**                Query only

**Manual operation:**   See "[System Info](#)" on page 163

**12.14.10 Date and time settings**

<code>SYSTem:DATE</code> .....	432
<code>SYSTem:DATE:UTC</code> .....	432
<code>SYSTem:DATE:LOCal</code> .....	432
<code>SYSTem:TIME</code> .....	432
<code>SYSTem:TIME:UTC</code> .....	432
<code>SYSTem:TIME:LOCal</code> .....	432
<code>SYSTem:TIME:DSTime:MODE</code> .....	433
<code>SYSTem:TIME:DSTime:RULE</code> .....	433
<code>SYSTem:TIME:DSTime:RULE:CATalog?</code> .....	433
<code>SYSTem:TIME:HRTimer:ABSolute:SET</code> .....	433
<code>SYSTem:TZONE</code> .....	434

---

**SYSTem:DATE** <year>, <month>, <day>

**SYSTem:DATE:UTC** <year>, <month>, <day>

Sets the date in coordinated universal time (UTC).

[SYSTem:DATE:LOCa1](#) is changed accordingly.

**Parameters:**

<year>                    YYYY

<month>                 Range:     1 to 12

<day>                    Range:     1 to 31

**Manual operation:**   See "[Date](#)" on page 164

---

**SYSTem:DATE:LOCa1** <year>, <month>, <day>

Sets the local date.

[SYSTem:DATE:UTC](#) is changed accordingly.

**Parameters:**

<year>                    YYYY

<month>                 Range:     1 to 12

<day>                    Range:     1 to 31

**Manual operation:**   See "[Date](#)" on page 164

---

**SYSTem:TIME** <hour>, <min>, <sec>

**SYSTem:TIME:UTC** <hour>, <minute>, <second>

Sets the time in the coordinated universal time (UTC).

[SYSTem:TIME:LOCa1](#) is changed accordingly.

**Parameters:**

<hour>                    hh

<minute>                mm

<second>                ss

**Manual operation:**   See "[Time](#)" on page 165

---

**SYSTem:TIME:LOCa1** <hour>, <minute>, <second>

Sets the local time.

[SYSTem:TIME:UTC](#) is changed accordingly.

**Parameters:**

<hour>                    hh

<minute>                mm



<second>            ss

**Manual operation:**    See "Time" on page 165

#### **SYSTem:TIME:DSTime:MODE** <dst>

Enables or disables the automatic clock adjustment for daylight saving time (DST). The automatic clock adjustment depends on the configured time zone, see [SYSTem:TIME:DSTime:RULE](#) on page 433.

If disabled, the local time is calculated as:

Local time = UTC + time zone offset

**Parameters:**

<dst>                    OFF | ON

#### **SYSTem:TIME:DSTime:RULE** <rule>

Sets the time zone. You can query the list of the available time zones with [SYSTem:TIME:DSTime:RULE:CATalog?](#).

**Parameters:**

<rule>

**Manual operation:**    See "Time Zone Region" on page 165  
                               See "Time Zone" on page 165

#### **SYSTem:TIME:DSTime:RULE:CATalog?**

Queries the list of available time zones.

**Return values:**

<cat>

**Usage:**                    Query only

**Manual operation:**    See "Time Zone Region" on page 165  
                               See "Time Zone" on page 165

#### **SYSTem:TIME:HRTimer:ABSolute:SET**

Sets the start time for an absolute timer.

**Return values:**

<year>                    YYYY

<month>                  MM

<day>                     DD

<hour>                    hh

<min>                     mm

<sec>                    ss  
 <msec>

---

### **SYSTem:TZONE** <hour>, <minute>

Sets the offset of the local time to the UTC time, due to the time zone. There can be an additional offset due to daylight saving time (DST).

#### **Parameters:**

<hour>                    Range:     -12 to 15  
 <minute>                 Range:     -59 to 59

## 12.14.11 Notifications and errors

The R&S NRX handles events and errors in 2 different queues, depending on their context:

- [System event queue](#)  
   SYSTem:SERRor commands
- [SCPI communication error queue](#)  
   SYSTem:ERRor commands

In the following, the expressions "error number" and "error code" are used synonymously.

### 12.14.11.1 System event queue

This system list contains notices, warnings and static errors that happen in setup.

A static error remains in the queue until you solve it. It prevents the execution of normal measurements. For example, if a sensor overload occurs, you need to lower the input power to the sensor. When you have done that, the static error disappears.

Warnings and static errors, you can remove from the queue using [SYSTem:SERRor:REMove](#).

For further information, see [Chapter 14.2.1, "Interpreting notifications and their number"](#), on page 505.

Currently, the event type is not included in the description of the event.

<a href="#">SYSTem:SERRor[:ALL]?.....</a>	434
<a href="#">SYSTem:SERRor:REMove.....</a>	435

---

### **SYSTem:SERRor[:ALL]?**

Queries all events from the system event queue.

Returns a comma-separated list of unique event numbers.

**Usage:**                    Query only

**SYSTem:SERRor:REMove** <num>

Removes a notice or warning from the system event queue. You identify it by its unique number. To find out the unique number of an event, use [SYSTem:SERRor\[:ALL\]?](#).

**Setting parameters:**

<num> Unique number of the event  
\*RST: 0

**Example:**

```
SYST:SERR:REM 3004
```

Removes the notice that a newer version of the R&S NRX-B1 sensor check source is available: [#3004 - version <no.> available for R&S NRX-B1 sensor check source](#)

**Example:**

```
SYST:SERR:REM 2007
```

This number belongs to a static error: [#2007 - sensor overload](#). You cannot remove a static error from the queue, thus a "Parameter not allowed" error condition occurs. See also [Chapter 12.14.11.1, "System event queue"](#), on page 434.

**Usage:** Setting only

**12.14.11.2 Changes in the system event queue**

This SCPI list shows changes in the system event queue. An entry is created when an event is reported or removed. Thus, deleting an event using [SYSTem:SERRor:REMove](#) also causes an entry in this list.

```
SYSTem:SERRor:LIST:ALL?..... 435
SYSTem:SERRor:LIST:NEXT?..... 435
```

**SYSTem:SERRor:LIST:ALL?**

Queries all changes in the system event queue that have not been read yet and removes them from the queue.

**Usage:** Query only

**SYSTem:SERRor:LIST:NEXT?**

Queries the list of system event changes for the oldest entry and removes it from the queue.

Returns an error number and a short description of the error. 0 means that no errors have occurred since the error queue was last read out.

**Usage:** Query only

### 12.14.11.3 SCPI communication error queue

This list contains errors in SCPI communication, for example, unknown commands or syntax errors. Generally, a single parameter or setting is affected.

<a href="#">SYSTem:ERRor:ALL?</a> .....	436
<a href="#">SYSTem:ERRor:CODE:ALL?</a> .....	436
<a href="#">SYSTem:ERRor:CODE[:NEXT]?</a> .....	436
<a href="#">SYSTem:ERRor:COUnT?</a> .....	437
<a href="#">SYSTem:ERRor:EXTEnded[:STATe]</a> .....	437
<a href="#">SYSTem:ERRor[:NEXT]?</a> .....	437

---

#### SYSTem:ERRor:ALL?

Queries all errors in SCPI communication that have not been read yet and removes them from the queue.

Returns a comma-separated list of error numbers and a short error description in the first-in first-out order.

##### Return values:

<ErrorNumber>	<n> Number as defined in the SCPI standard
	<b>0</b> No errors have occurred since the error queue was last read out.
<ErrorText>	Short error description

**Usage:** Query only

---

#### SYSTem:ERRor:CODE:ALL?

Queries all errors in SCPI communication that have not been read yet and removes them from the queue.

Returns a comma-separated list of error numbers, but no error description.

##### Return values:

<ErrorCode>	<n> Number as defined in the SCPI standard
	<b>0</b> No errors have occurred since the error queue was last read out.

**Usage:** Query only

---

#### SYSTem:ERRor:CODE[:NEXT]?

Queries the SCPI communication error queue for the oldest entry and removes it from the queue.

Returns the error number, but no error description.

**Return values:**

<Error>	<n>	Number as defined in the SCPI standard
	0	No errors have occurred since the error queue was last read out.

**Usage:** Query only

**SYSTem:ERRor:COUNT?**

Queries the number of entries in the SCPI communication error queue.

**Return values:**

<ErrorCount>	Total number of entries
--------------	-------------------------

**Example:**

SYST:ERR:COUNT?

Queries the number of entries in the error queue.

1

Response: One error has occurred since the error queue was last read out.

**Usage:** Query only

**SYSTem:ERRor:EXTended[:STATe] <state>**

Enables or disables the extended error messages that provide more information than [SYSTem:ERRor\[:NEXT\]?](#). The location of errors in the parsed command strings is also shown.

**Parameters:**

<state>	*RST:	ON
---------	-------	----

**SYSTem:ERRor[:NEXT]?**

Queries the SCPI communication error queue for the oldest entry and removes it from the queue.

Returns an error number and a short description of the error.

**Return values:**

<ErrorCode>	<n>	Number as defined in the SCPI standard
	0	No errors have occurred since the error queue was last read out.

<ErrorDescription>	Short error description
--------------------	-------------------------

**Usage:** Query only

## 12.15 Using the status register

Further information:

- [Chapter 13.2, "Status reporting system"](#), on page 485
- [General status register commands](#)..... 438
- [Reading the CONDition part](#)..... 438
- [Reading the EVENT part](#)..... 439
- [Controlling the ENABLE part](#)..... 439
- [Controlling the negative transition part](#)..... 440
- [Controlling the positive transition part](#)..... 441

### 12.15.1 General status register commands

<a href="#">STATus:PRESet</a> .....	438
<a href="#">STATus:QUEue[:NEXT]?</a> .....	438

---

#### STATus:PRESet

Resets the edge detectors and `ENABLE` parts of all registers to a defined value.

**Usage:**                      Event

---

#### STATus:QUEue[:NEXT]?

Queries the most recent error queue entry and deletes it.

**Return values:**

<ErrorCode>	Numeric value
	<b>&lt;positive error number&gt;</b>
	Sensor-specific error
	<b>&lt;negative error number&gt;</b>
	SCPI error message
	<b>0</b>
	Error queue is empty.
<ErrorDescription>	String describing the error, example:
	<b>"No error"</b>
	Error queue is empty.

**Usage:**                      Query only

### 12.15.2 Reading the CONDition part

---

**STATus:DEvIce:CONDition?**  
**STATus:OPERation:BIT<bitno>:CONDition?**  
**STATus:OPERation:CALibrating[:SUMMary]:CONDition?**  
**STATus:OPERation:CONDition?**

**STATus:OPERation:LLFail<RegisterIndex>[:SUMMary]:CONDition?**  
**STATus:OPERation:MEASuring[:SUMMary]:CONDition?**  
**STATus:OPERation:MEASuring:EXTension<RegisterIndex>:CONDition?**  
**STATus:OPERation:SENSe[:SUMMary]:CONDition?**  
**STATus:OPERation:TRIGger[:SUMMary]:CONDition?**  
**STATus:OPERation:TRIGger:EXTension<RegisterIndex>:CONDition?**  
**STATus:OPERation:ULFail<RegisterIndex>[:SUMMary]:CONDition?**  
**STATus:QUESTionable:BIT<bitno>:CONDition?**  
**STATus:QUESTionable:CALibration[:SUMMary]:CONDition?**  
**STATus:QUESTionable:CONDition?**  
**STATus:QUESTionable:MEASure<RegisterIndex>:CONDition?**  
**STATus:QUESTionable:POWER[:SUMMary]:CONDition?**  
**STATus:QUESTionable:WINDow<RegisterIndex>:CONDition?**  
**Suffix:**  
 <RegisterIndex>      1 to 8  
                                  Register  
**Usage:**                      Query only

### 12.15.3 Reading the EVENT part

---

**STATus:DEVIce[:EVENT]?**  
**STATus:OPERation[:EVENT]?**  
**STATus:OPERation:BIT<bitno>[:EVENT]?**  
**STATus:OPERation:CALibrating[:SUMMary][[:EVENT]?**  
**STATus:OPERation:LLFail<RegisterIndex>[:SUMMary][[:EVENT]?**  
**STATus:OPERation:MEASuring[:SUMMary][[:EVENT]?**  
**STATus:OPERation:MEASuring:EXTension<RegisterIndex>[:SUMMary][[:EVENT]?**  
**STATus:OPERation:SENSe[:SUMMary][[:EVENT]?**  
**STATus:OPERation:TRIGger[:SUMMary][[:EVENT]?**  
**STATus:OPERation:TRIGger:EXTension<RegisterIndex>[:SUMMary][[:EVENT]?**  
**STATus:OPERation:ULFail<RegisterIndex>[:SUMMary][[:EVENT]?**  
**STATus:QUESTionable[:EVENT]?**  
**STATus:QUESTionable:BIT<bitno>[:EVENT]?**  
**STATus:QUESTionable:CALibration[:SUMMary][[:EVENT]?**  
**STATus:QUESTionable:MEASure<RegisterIndex>[:SUMMary][[:EVENT]?**  
**STATus:QUESTionable:POWER[:SUMMary][[:EVENT]?**  
**STATus:QUESTionable:WINDow<RegisterIndex>[:SUMMary][[:EVENT]?**  
**Suffix:**  
 <RegisterIndex>      1 to 8  
                                  Register  
**Usage:**                      Query only

### 12.15.4 Controlling the ENABLE part

---

**STATus:DEVIce:ENABLE <value>**  
**STATus:OPERation:BIT<bitno>:ENABLE <RegisterBit>**

**STATus:OPERation:CALibrating[:SUMMARY]:ENABLE** <value>  
**STATus:OPERation:ENABLE** <RegisterValue>  
**STATus:OPERation:LLFail<RegisterIndex>[:SUMMARY]:ENABLE** <value>  
**STATus:OPERation:MEASuring[:SUMMARY]:ENABLE** <value>  
**STATus:OPERation:MEASuring:EXTension<RegisterIndex>:ENABLE** <value>  
**STATus:OPERation:SENSe[:SUMMARY]:ENABLE** <value>  
**STATus:OPERation:TRIGger[:SUMMARY]:ENABLE** <value>  
**STATus:OPERation:TRIGger:EXTension<RegisterIndex>:ENABLE** <value>  
**STATus:OPERation:ULFail<RegisterIndex>[:SUMMARY]:ENABLE** <value>  
**STATus:QUESTionable:BIT<bitno>:ENABLE** <RegisterBit>  
**STATus:QUESTionable:CALibration[:SUMMARY]:ENABLE** <value>  
**STATus:QUESTionable:ENABLE** <RegisterValue>  
**STATus:QUESTionable:MEASure<RegisterIndex>:ENABLE** <value>  
**STATus:QUESTionable:POWER[:SUMMARY]:ENABLE** <value>  
**STATus:QUESTionable:WINDow<RegisterIndex>:ENABLE** <value>  
**Suffix:**  
 <RegisterIndex>      1 to 8  
                               Register  
**Parameters:**  
 <value>                \*RST:      0

### 12.15.5 Controlling the negative transition part

---

**STATus:DEvice:NTRansition** <value>  
**STATus:OPERation:BIT<bitno>:NTRansition** <RegisterBit>  
**STATus:OPERation:CALibrating[:SUMMARY]:NTRansition** <value>  
**STATus:OPERation:LLFail<RegisterIndex>[:SUMMARY]:NTRansition** <value>  
**STATus:OPERation:MEASuring[:SUMMARY]:NTRansition** <value>  
**STATus:OPERation:MEASuring:EXTension<RegisterIndex>:NTRansition** <value>  
**STATus:OPERation:NTRansition** <RegisterValue>  
**STATus:OPERation:SENSe[:SUMMARY]:NTRansition** <value>  
**STATus:OPERation:TRIGger[:SUMMARY]:NTRansition** <value>  
**STATus:OPERation:TRIGger:EXTension<RegisterIndex>:NTRansition** <value>  
**STATus:OPERation:ULFail<RegisterIndex>[:SUMMARY]:NTRansition** <value>  
**STATus:QUESTionable:BIT<bitno>:NTRansition** <RegisterBit>  
**STATus:QUESTionable:CALibration[:SUMMARY]:NTRansition** <value>  
**STATus:QUESTionable:NTRansition** <RegisterValue>  
**STATus:QUESTionable:MEASure<RegisterIndex>:NTRansition** <value>  
**STATus:QUESTionable:POWER[:SUMMARY]:NTRansition** <value>  
**STATus:QUESTionable:WINDow<RegisterIndex>:NTRansition** <value>  
**Suffix:**  
 <RegisterIndex>      1 to 8  
                               Register  
**Parameters:**  
 <value>                \*RST:      0



## 12.15.6 Controlling the positive transition part

---

**STATus:DEvIce:PTRansition** <value>  
**STATus:OPERation:BIT<bitno>:PTRansition** <RegisterBit>  
**STATus:OPERation:CALibrating[:SUMMary]:PTRansition** <value>  
**STATus:OPERation:LLFail<RegisterIndex>[:SUMMary]:PTRansition** <value>  
**STATus:OPERation:MEASuring[:SUMMary]:PTRansition** <value>  
**STATus:OPERation:PTRansition** <RegisterValue>  
**STATus:OPERation:MEASuring:EXTension<RegisterIndex>:PTRansition** <value>  
**STATus:OPERation:SENSe[:SUMMary]:PTRansition** <value>  
**STATus:OPERation:TRIGger[:SUMMary]:PTRansition** <value>  
**STATus:OPERation:TRIGger:EXTension<RegisterIndex>:PTRansition** <value>  
**STATus:OPERation:ULFail<RegisterIndex>[:SUMMary]:PTRansition** <value>  
**STATus:QUESTionable:BIT<bitno>:PTRansition** <RegisterBit>  
**STATus:QUESTionable:CALibration[:SUMMary]:PTRansition** <value>  
**STATus:QUESTionable:MEASure<RegisterIndex>:PTRansition** <value>  
**STATus:QUESTionable:POWER[:SUMMary]:PTRansition** <value>  
**STATus:QUESTionable:PTRansition** <RegisterValue>  
**STATus:QUESTionable:WINDow<RegisterIndex>:PTRansition** <value>  
**Suffix:**  
 <RegisterIndex>      1 to 8  
                               Register  
  
**Parameters:**  
 <value>                \*RST:        65535

## 12.16 Remote emulation

The R&S NRX offers a remote emulation feature that makes it possible to control the instrument by commands other than the built-in native SCPI commands. This feature allows you to replace power meters, e.g. power meters from other manufacturers or predecessors, with the R&S NRX without having to change the remote control code.

The application note 1GP83\_1E at [www.rohde-schwarz.com/application/NRX](http://www.rohde-schwarz.com/application/NRX) describes how to use the remote emulation feature for power meters from other manufacturers. It also describes the remote emulation for each supported instrument, limitations of the individual emulations and the remaining differences between the emulated and the original commands.

The supported remote commands of the predecessors are described in [Chapter 12.16.1, "R&S NRP2 compatibility"](#), on page 442.

### To select an emulation of a different command set

- ▶ [System] > "Connections" > "Remote" > [Emulations tab](#)
- ▶ Remote control: [SYSTEM:LANGuage](#)



For emulating Keysight power meters, you need the R&S NRX-K301 Keysight emulation mode.

## 12.16.1 R&S NRP2 compatibility

This section describes all R&S NRP2 remote commands that are still functional but not recommended to use if you start afresh. If you want to reuse programming from the R&S NRP2, you can use these commands. But if you start with the R&S NRX without inherited liabilities, only use the commands recommended for the R&S NRX.

### 12.16.1.1 CALCulate commands

<code>CALCulate&lt;Measurement&gt;:LIMit&lt;undef&gt;:BEEP[:STATe]</code> .....	442
<code>CALCulate&lt;Measurement&gt;:STATistics:MARKer:HORizontal:POSition[:X][:POWer]</code> .....	442
<code>CALCulate&lt;Measurement&gt;:STATistics:MARKer:VERTical:POSition[:Y]</code> .....	443
<code>CALCulate&lt;Measurement&gt;:TRACe:MARKer&lt;Marker&gt;:XPOSition</code> .....	443

---

#### `CALCulate<Measurement>:LIMit<undef>:BEEP[:STATe]` <state>

Available for R&S NRP2 compatibility, but the command has no functionality in the R&S NRX.

##### Suffix:

<code>&lt;Measurement&gt;</code>	1 to 8 Measurement
<code>&lt;undef&gt;</code>	1 to n No suffix required.

##### Parameters:

<code>&lt;state&gt;</code>	*RST:      OFF
----------------------------	----------------

---

#### `CALCulate<Measurement>:STATistics:MARKer:HORizontal:POSition[:X][:POWer]` <value>

Available for compatibility. Recommended sensor command:

`CALCulate<Measurement>:STATistics:MARKer:X:POSition[:ABSolute]`

The command is not fully R&S NRP2 compatible. If port 1 is assigned to measurement 1, and so on, the command works. If port 1 is assigned to measurement 2, for example, enable the R&S NRP2 emulation by using `SYSTEM:LANGUage "NRP2"`.

##### Suffix:

<code>&lt;Measurement&gt;</code>	1 to 8 Measurement
----------------------------------	-----------------------

##### Parameters:

`<value>`

**CALCulate<Measurement>:STATistics:MARKer:VERTical:POSition[:Y] <value>**

Available for compatibility. Recommended sensor command:

`CALCulate<Measurement>:STATistics[:CDF]:MARKer:Y:POSition`

`CALCulate<Measurement>:STATistics:PDF:MARKer:Y:POSition`

The command is not fully R&S NRP2 compatible. If port 1 is assigned to measurement 1, and so on, the command works. If port 1 is assigned to measurement 2, for example, enable the R&S NRP2 emulation by using `SYSTem:LANGUage "NRP2"`.

**Suffix:**

<Measurement>      1 to 8  
Measurement

**Parameters:**

<value>

**CALCulate<Measurement>:TRACe:MARKer<Marker>:XPOSITION <value>**

Available for compatibility. Recommended sensor command:

`DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:TIME`

**Suffix:**

<Measurement>      1 to 8  
Measurement

<Marker>            1 to 4  
Marker (M1 to M4)

**Parameters:**

<value>            Default unit: s

**12.16.1.2 DISPlay commands**

<code>DISPlay:ILLumination</code> .....	444
<code>DISPlay[:WINDow]:SELect</code> .....	444
<code>DISPlay[:WINDow]:SIZE</code> .....	444
<code>DISPlay[:WINDow&lt;Window&gt;]:ANALog:LOWer:POWER</code> .....	444
<code>DISPlay[:WINDow&lt;Window&gt;]:ANALog:LOWer:RATio</code> .....	444
<code>DISPlay[:WINDow&lt;Window&gt;]:ANALog:UPPer:POWER</code> .....	445
<code>DISPlay[:WINDow&lt;Window&gt;]:ANALog:UPPer:RATio</code> .....	445
<code>DISPlay[:WINDow&lt;Window&gt;]:AVALue</code> .....	445
<code>DISPlay[:WINDow&lt;Window&gt;]:FORMat</code> .....	446
<code>DISPlay[:WINDow&lt;Window&gt;]:METer:LOWer:POWER</code> .....	446
<code>DISPlay[:WINDow&lt;Window&gt;]:METer:LOWer:RATio</code> .....	446
<code>DISPlay[:WINDow&lt;Window&gt;]:METer:UPPer:POWER</code> .....	446
<code>DISPlay[:WINDow&lt;Window&gt;]:METer:UPPer:RATio</code> .....	447
<code>DISPlay[:WINDow&lt;Window&gt;][:NUMeric&lt;Numeric&gt;]:RESolution</code> .....	447

<a href="#">DISPlay[:WINDow&lt;Window&gt;]:TRACe:LOWer.....</a>	447
<a href="#">DISPlay[:WINDow&lt;Window&gt;]:TRACe:UPPer.....</a>	448
<a href="#">DISPlay[:WINDow&lt;Window&gt;]:TSLot.....</a>	448

---

### DISPlay:ILLumination <state>

Available for compatibility. Recommended sensor command:

[DISPlay:BRIGthness](#)

#### Parameters:

<state>                    \*RST:        ON

---

### DISPlay[:WINDow]:SElect <window>

Available for compatibility. Recommended sensor command:

None. The commands of the DISPlay system conform to the R&S NRX concept.

#### Parameters:

<window>                    Range:        1 to 4  
                                  \*RST:        1

---

### DISPlay[:WINDow]:SIZE <size>

Available for compatibility. Recommended sensor command:

None. The commands of the DISPlay system conform to the R&S NRX concept.

#### Parameters:

<size>                        NORMal | ZOOMed  
                                  \*RST:        NORMal

---

### DISPlay[:WINDow<Window>]:ANALog:LOWer:POWer <value>

Available for compatibility. Recommended sensor command:

[CALCulate<Measurement>:METer<DirectionalChannel>:LOWer\[:DATA\]\[:POWer\]](#) on page 219

#### Suffix:

<Window>                    1 to 8  
                                  Measurement

#### Parameters:

<value>

---

### DISPlay[:WINDow<Window>]:ANALog:LOWer:RATio <value>

Available for compatibility. Recommended sensor command:

[CALCulate<Measurement>:METer<DirectionalChannel>:LOWer\[:DATA\]:RATio\[:VALue\]](#) on page 219

**Suffix:**

<Window>            1 to 8  
Measurement

**Parameters:**

<value>

**DISPlay[:WINDow<Window>]:ANALog:UPPer:POWer** <value>

Available for compatibility. Recommended sensor command:

[CALCulate<Measurement>:METer<DirectionalChannel>:UPPer\[:DATA\]\[:POWer\]](#) on page 222

**Suffix:**

<Window>            1 to 8  
Measurement

**Parameters:**

<value>            <block\_data>

**DISPlay[:WINDow<Window>]:ANALog:UPPer:RATio** <value>

Available for compatibility. Recommended sensor command:

[CALCulate<Measurement>:METer<DirectionalChannel>:UPPer\[:DATA\]:RATio\[:VALue\]](#) on page 222

**Suffix:**

<Window>            1 to 8  
Measurement

**Parameters:**

<value>            <block\_data>

**DISPlay[:WINDow<Window>]:AVALue** <auxiliaries>

Available for compatibility. Recommended sensor command:

[CALCulate<Measurement>:AVALue](#)

**Suffix:**

<Window>            1 to 4  
Measurement pane

**Parameters:**

<auxiliaries>        NONE | NORMAL | EXTRemes | STATistics  
\*RST:            NONE

---

**DISPlay[:WINDow<Window>]:FORMat <format>**

Available for compatibility. Recommended sensor command:

`CALCulate<Measurement>:DMODE`

The command is only fully R&S NRP2 compatible, if `SYSTem:LANGuage NRP2` is set.

**Suffix:**

<Window>                    1 to 4  
                                 Measurement pane

**Parameters:**

<format>                    DIGital | ANALog | GRAPhical  
\*RST:                        DIGital

---

**DISPlay[:WINDow<Window>]:METer:LOWer:POWer <value>**

Available for compatibility. Recommended sensor command:

`CALCulate<Measurement>:METer<DirectionalChannel>:LOWer[:DATA]:  
POWer]` on page 219

**Suffix:**

<Window>                    1 to 4  
                                 Measurement pane

**Parameters:**

<value>

---

**DISPlay[:WINDow<Window>]:METer:LOWer:RATio <value>**

Available for compatibility. Recommended sensor command:

`CALCulate<Measurement>:METer<DirectionalChannel>:LOWer[:DATA]:  
RATio[:VALue]` on page 219

**Suffix:**

<Window>                    1 to 4  
                                 Measurement pane

**Parameters:**

<value>

---

**DISPlay[:WINDow<Window>]:METer:UPPer:POWer <value>**

Available for compatibility. Recommended sensor command:

`CALCulate<Measurement>:METer<DirectionalChannel>:UPPer[:DATA]:  
POWer]` on page 222

**Suffix:**

<Window>                    1 to 4  
                                 Measurement pane

**Parameters:**

&lt;value&gt;

**DISPlay[:WINDow<Window>]:METer:UPPer:RATio <value>**

Available for compatibility. Recommended sensor command:

CALCulate<Measurement>:METer<DirectionalChannel>:UPPer[:DATA]:  
RATio[:VALue] on page 222

**Suffix:**

<Window>                    1 to 4  
                                  Measurement pane

**Parameters:**

&lt;value&gt;

**DISPlay[:WINDow<Window>][:NUMeric<Numeric>]:RESolution <resolution>**

Available for compatibility. Recommended sensor command:

CALCulate<Measurement>:RESolution

**Suffix:**

<Window>                    1 to 4  
                                  Measurement pane

<Numeric>                    1 to 2  
                                  No suffix required.

**Parameters:**

<resolution>                Range:     0.001 | 0.01 | 0.1 | 1  
                                  \*RST:     0.01

**DISPlay[:WINDow<Window>]:TRACe:LOWer <value>**

Available for compatibility. Recommended sensor command:

CALCulate<Measurement>:TRACe:Y[:SCALE]:SPAN:DB

CALCulate<Measurement>:TRACe:Y[:SCALE]:SPAN:DBM

CALCulate<Measurement>:TRACe:Y[:SCALE]:SPAN:DBUV

CALCulate<Measurement>:TRACe:Y[:SCALE]:SPAN:DPCT

CALCulate<Measurement>:TRACe:Y[:SCALE]:SPAN:ONE

CALCulate<Measurement>:TRACe:Y[:SCALE]:SPAN:WATT

CALCulate<Measurement>:TRACe:Y[:SCALE]:TOP:DB

CALCulate<Measurement>:TRACe:Y[:SCALE]:TOP:DBM

CALCulate<Measurement>:TRACe:Y[:SCALE]:TOP:DBUV

CALCulate<Measurement>:TRACe:Y[:SCALe]:TOP:DPCT

CALCulate<Measurement>:TRACe:Y[:SCALe]:TOP:ONE

CALCulate<Measurement>:TRACe:Y[:SCALe]:TOP:WATT

**Suffix:**

<Window>                    1 to 4  
Measurement pane

**Parameters:**

<value>

**DISPlay[:WINDow<Window>]:TRACe:UPPer <value>**

Available for compatibility. Recommended sensor command:

CALCulate<Measurement>:TRACe:Y[:SCALe]:SPAN:DB

CALCulate<Measurement>:TRACe:Y[:SCALe]:SPAN:DBM

CALCulate<Measurement>:TRACe:Y[:SCALe]:SPAN:DBUV

CALCulate<Measurement>:TRACe:Y[:SCALe]:SPAN:DPCT

CALCulate<Measurement>:TRACe:Y[:SCALe]:SPAN:ONE

CALCulate<Measurement>:TRACe:Y[:SCALe]:SPAN:WATT

CALCulate<Measurement>:TRACe:Y[:SCALe]:TOP:DB

CALCulate<Measurement>:TRACe:Y[:SCALe]:TOP:DBM

CALCulate<Measurement>:TRACe:Y[:SCALe]:TOP:DBUV

CALCulate<Measurement>:TRACe:Y[:SCALe]:TOP:DPCT

CALCulate<Measurement>:TRACe:Y[:SCALe]:TOP:ONE

CALCulate<Measurement>:TRACe:Y[:SCALe]:TOP:WATT

**Suffix:**

<Window>                    1 to 4  
Measurement pane

**Parameters:**

<value>

**DISPlay[:WINDow<Window>]:TSLot <slot>**

Available for compatibility. Recommended sensor command:

CALCulate<Measurement>[:POWER]:TSLot[:AVG]:SElection

**Suffix:**

<Window>                    1 to 8  
Measurement



**Parameters:**

<slot>                    Range:     1 to 4  
                              \*RST:     1

**12.16.1.3 OUTPut commands**

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**OUTPut:REcOrder<output>[:STATe] <state>**

Available for compatibility. Recommended sensor command:

`OUTPut:MODE<output>`

**Suffix:**

<output>                    1 to 2  
                              BNC connectors at the rear; 1 = Out 1 / Trig Out,  
                              2 = Trig In / Out 2

**Parameters:**

<state>

**OUTPut:REcOrder<output>:FEED[:VALue] <string>**

Available for compatibility. Recommended sensor command:

`OUTPut:REcOrder<output>:FEED:INDEX`

**Suffix:**

<output>                    1 to 2  
                              BNC connectors at the rear; 1 = Out 1 / Trig Out,  
                              2 = Trig In / Out 2

**Parameters:**

<string>

**OUTPut:ROSCillator[:STATe] <state>**

Available for compatibility. Recommended sensor command:

`OUTPut:SOURce:STATe`

**Parameters:**

<state>

---

**OUTPut:TRIGger[:STATe] <state>**

Available for compatibility. Recommended sensor command:

`OUTPut:MODE<output>`

**Parameters:**

<state>

---

**OUTPut:TTL<output>:ACTive <mode>**

Available for compatibility. Recommended sensor command:

`OUTPut:LIMit:FAIL`

**Suffix:**

<output>                    1...2  
                                 1 to 2

**Parameters:**

<mode>                    LOW | HIGH

---

**OUTPut:TTL<output>:FAIL <mode>**

Available for compatibility. Recommended sensor command:

`OUTPut:LIMit:FAIL`

**Suffix:**

<output>                    1...2  
                                 1 to 2

**Parameters:**

<mode>                    LOW | HIGH

---

**OUTPut:TTL<output>:FEED <feed>**

Available for compatibility. Recommended sensor command:

`OUTPut:LIMit:FEED:INDEX`

**Suffix:**

<output>                    1...2  
                                 1 to 2

**Parameters:**

<feed>

---

**OUTPut:TTL<output>[:STATe] <state>**

Available for compatibility. Recommended sensor command:

`OUTPut:MODE<output>`

**Suffix:**

<output>                    1...2  
                                  1 to 2

**Parameters:**

<state>

**12.16.1.4 SENSE commands**

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---

### [SENSe<Sensor>:]AVERAge:COUNT:AUTO:MTIME <maximum\_time>

Available for compatibility. Recommended sensor command:

CALCulate<Measurement>[:CHANnel<Channel>]:AVERAge:COUNT:AUTO:MTIME

#### Suffix:

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

#### Parameters:

<maximum\_time> Range: 0.01 s to 1000.0 s  
\*RST: 4.00 s  
Default unit: s

---

### [SENSe<Sensor>:]AVERAge:COUNT:AUTO:NSRatio <nsr>

Available for compatibility. Recommended sensor command:

CALCulate<Measurement>[:CHANnel<Channel>]:AVERAge:COUNT:AUTO:NSRatio

#### Suffix:

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

#### Parameters:

<nsr> Range: 100e-6 dB to 1.0 dB  
\*RST: 0.01 dB  
Default unit: dB

---

### [SENSe<Sensor>:]AVERAge:COUNT:AUTO:SLOT <slot>

Available for compatibility. Recommended sensor command:

CALCulate<Measurement>[:CHANnel<Channel>]:AVERAge:COUNT:AUTO:SLOT

#### Suffix:

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<slot>                    Range:     1 to 128  
                              \*RST:       1

**[SENSe<Sensor>:]AVERage:COUNT:AUTO:TYPE <type>**

Available for compatibility. Recommended sensor command:

CALCulate<Measurement>[:CHANnel<Channel>]:AVERage:COUNT:AUTO:TYPE

**Suffix:**

<Sensor>                    1 to 128  
 Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<type>                      RESolution | NSRatio  
                              \*RST:       RESolution

**[SENSe<Sensor>:]AVERage:COUNT:AUTO[:STATE] <state>**

Available for compatibility. Recommended sensor command:

CALCulate<Measurement>[:CHANnel<Channel>]:AVERage:COUNT:AUTO[:STATE]

**Suffix:**

<Sensor>                    1 to 128  
 Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<state>                      | OFF | ON | ONCE

**[SENSe<Sensor>:]AVERage:COUNT:ENUM <value>**

Available for compatibility. Recommended sensor command:

CALCulate<Measurement>[:CHANnel<Channel>]:AVERage:COUNT:ENUM

**Suffix:**

<Sensor>                    1 to 128  
 Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<value>                      E1 | E2 | E4 | E8 | E16 | E32 | E64 | E128 | E256  
                              \*RST:       E4

**[SENSe<Sensor>:]AVERAge:COUNT[:VALue]** <count>

Available for compatibility. Recommended sensor command:

`CALCulate<Measurement>[:CHANnel<Channel>]:AVERAge:COUNT[:VALue]`

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<count> Range: 1 to 1048576 or smaller, depending on the power sensor.  
\*RST: 4

**[SENSe<Sensor>:]AVERAge:TCONtrol** <mode>

Available for compatibility. Recommended sensor command:

`CALCulate<Measurement>[:CHANnel<Channel>]:AVERAge:TCONtrol[:ENUM]`

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<mode> MOVing | REPeat  
If you use `SYSTem:PRESet` instead of `*RST`, the RST value differs. See [Table 12-18](#).  
\*RST: REPeat

**[SENSe<Sensor>:]AVERAge:TYPE** <type>

Available for compatibility. Recommended sensor command:

`CALCulate<Measurement>[:CHANnel<Channel>]:AVERAge:TYPE`

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<type> POWer | VIDeo | LINear  
\*RST: POWer

**[SENSe<Sensor>:]AVERAge[:STATe]** <state>

Available for compatibility. Recommended sensor command:

CALCulate<Measurement>[:CHANnel<Channel>]:AVERage[:STATe]

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<state> ON | OFF  
\*RST: ON

[SENSe<Sensor>:]BWIDth:VIDeo <mode>

[SENSe<Sensor>:]BANDwidth:VIDeo <mode>

Available for compatibility. Recommended sensor command:

CALCulate<Measurement>[:CHANnel<Channel>][:POWer]:VBWidth:ENUM

CALCulate<Measurement>[:CHANnel<Channel>]:NRT:VBWidth[:VALue]

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<mode>

[SENSe<Sensor>:]BWIDth:VIDeo:LIST?

[SENSe<Sensor>:]BANDwidth:VIDeo:LIST?

Available for compatibility. Queries the parameters available for [SENSe<Sensor>:]BANDwidth:VIDeo and [SENSe<Sensor>:]BWIDth:VIDeo.

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Usage:**

Query only

[SENSe<Sensor>:]BURSt:MODE <mode>

Available for compatibility. Recommended sensor command:

CALCulate<Measurement>[:CHANnel<Channel>]:NRT:BURSt:MODE

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100



**Parameters:**

<mode> AUTO | USER  
 \*RST: AUTO

**[SENSe<Sensor>:]BURSt:PERiod <value>**

Available for compatibility. Recommended sensor command:

CALCulate<Measurement>[:CHANnel<Channel>]:NRT:BURSt:PERiod

**Suffix:**

<Sensor> 1 to 128  
 Configured sensor connected at: port A = 1, ... , port D = 4, R&S  
 NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<value> Range: 0.0 s to 1.0 s  
 \*RST: 0.1 s  
 Default unit: s

**[SENSe<Sensor>:]BURSt:WIDTh <width>**

Available for compatibility. Recommended sensor command:

CALCulate<Measurement>[:CHANnel<Channel>]:NRT:BURSt:WIDTh

**Suffix:**

<Sensor> 1 to 128  
 Configured sensor connected at: port A = 1, ... , port D = 4, R&S  
 NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<width> Range: 0.0 s to 1.0 s  
 \*RST: 0.01 s  
 Default unit: s

**[SENSe<Sensor>:]CORRection:DCYClE:STATe <state>**

Available for compatibility. Recommended sensor command:

CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:DCYClE:  
 STATe

**Suffix:**

<Sensor> 1 to 128  
 Configured sensor connected at: port A = 1, ... , port D = 4, R&S  
 NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<state> ON | OFF  
 \*RST: OFF

---

**[SENSe<Sensor>:]CORRection:DCYClE[:INPut][:MAGNitude]** <duty\_cycle>

Available for compatibility. Recommended sensor command:

```
CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:DCYClE[:VALue]
```

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<duty\_cycle>

---

**[SENSe<Sensor>:]CORRection:DCYClE[:VALue]** <duty\_cycle>

Available for compatibility. Recommended sensor command:

```
CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:DCYClE[:VALue]
```

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<duty\_cycle> Range: 0.001 pct to 100.00 pct  
\*RST: 50.0 pct  
Default unit: pct

---

**[SENSe<Sensor>:]CORRection:FDOFFset[:INPut][:MAGNitude]?**

Available for compatibility. Recommended sensor command:

```
CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:OFFSet[:MAGNitude]
```

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Usage:** Query only

---

**[SENSe<Sensor>:]CORRection:FDOTable:STATe** <state>

Available for compatibility. Recommended sensor command:

```
CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:OFFSet:TABLE[:STATe]
```

**Suffix:**

&lt;Sensor&gt;

1 to 128

Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

&lt;state&gt;

**[SENSe<Sensor>:]CORRection:FDOTable[:SElect] <table\_name>**

Available for compatibility. Recommended sensor command:

CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:OFFSet:  
TABLE:INDEX

**Suffix:**

&lt;Sensor&gt;

1 to 128

Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

&lt;table\_name&gt;

**[SENSe<Sensor>:]CORRection:OFFSet:STATe <state>**

Available for compatibility. Recommended sensor command:

CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:OFFSet:  
STATe

**Suffix:**

&lt;Sensor&gt;

1 to 128

Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

&lt;state&gt;

\*RST: OFF

**[SENSe<Sensor>:]CORRection:OFFSet[:VALue] <offset>**

Available for compatibility. Recommended sensor command:

CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:OFFSet[:  
MAGNitude]

**Suffix:**

&lt;Sensor&gt;

1 to 128

Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<offset>                    Range:        -200.00 dB to 200.00 dB  
                                  \*RST:        0.0 dB  
                                  Default unit: dB

**[SENSe<Sensor>:]DATA? [<function>]**

Available for compatibility. Recommended sensor command:

[CALCulate<Measurement>:DATA?](#)

**Suffix:**

<Sensor>                    1 to 128  
                                  Configured sensor connected at: port A = 1, ... , port D = 4, R&S  
                                  NRX-B9 = 101, USB and LAN port = 5 to 100

**Query parameters:**

<function>

**Usage:**                    Query only

**[SENSe<Sensor>:]DM:WCDMa:CRATe <value>**

Available for compatibility. Recommended sensor command:

[CALCulate<Measurement>\[:CHANnel<Channel>\]:NRT:DMODulation:WCDMa:CRATe](#)

**Suffix:**

<Sensor>                    1 to 128  
                                  Configured sensor connected at: port A = 1, ... , port D = 4, R&S  
                                  NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<value>                      Range:        0.0 Hz to 8.2e6 Hz  
                                  \*RST:        1.0e6 Hz  
                                  Default unit: Hz

**[SENSe<Sensor>:]FUNCTION[:ON] <function>**

Available for compatibility. Recommended sensor command:

[CALCulate<Measurement>\[:CHANnel<Channel>\]:FEED<Channel>](#)

**Suffix:**

<Sensor>                    1 to 128  
                                  Configured sensor connected at: port A = 1, ... , port D = 4, R&S  
                                  NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<function>                    \*RST:        POWER:AVG

---

**[SENSe<Sensor>:]INFormation? [<argument>]**

Available for compatibility. Recommended sensor command:

`SYSTem:SENSor<Sensor>:INFO?`

**Suffix:**

<Sensor> 1 to 128

Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Query parameters:**

<argument>

**Usage:** Query only

---

**[SENSe<Sensor>:]INPut:ATTenuation:AUTO <auto>**

Available for compatibility. Recommended sensor command:

`CALCulate<Measurement>[:CHANnel<Channel>]:INPut:ATTenuation:AUTO`

**Suffix:**

<Sensor> 1 to 128

Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<auto> OFF | ON | ONCE

\*RST: OFF

---

**[SENSe<Sensor>:]INPut:ATTenuation[:VALue] <value>**

Available for compatibility. Recommended sensor command:

`CALCulate<Measurement>[:CHANnel<Channel>]:INPut:ATTenuation[:VALue]`

**Suffix:**

<Sensor> 1 to 128

Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<value> Range: 0.0 dB to 30.0 dB

\*RST: 30.0 dB

Default unit: dB

---

**[SENSe<Sensor>:]INternal:TRIGger:JITTer:METHod <method>**

Available for compatibility. Recommended sensor command:

`TRIGger<Measurement>[:CHANnel<Channel>]:JITTer:METHod`

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<method> COMPensate | MEASure | NONE  
\*RST: COMPensate

**[SENSe<Sensor>:][POWER:][AVG:]APERTure[:VALue] <integration\_time>**

Available for compatibility. Recommended sensor command:

CALCulate<Measurement>[:CHANnel<Channel>][:POWER][:AVG]:  
APERTure[:VALue]

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<integration\_time> Range: 8.3e-9 s to 30.0 s  
\*RST: 0.005 s  
Default unit: s

**[SENSe<Sensor>:][POWER:][AVG:]SMOothing:STATe <state>**

Available for compatibility. Recommended sensor command:

CALCulate<Measurement>[:CHANnel<Channel>][:POWER][:AVG]:  
SMOothing[:STATe]

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<state> ON | OFF  
\*RST: OFF

**[SENSe<Sensor>:][POWER:]BURSt:DTOLerance <tolerance>**

Available for compatibility. Recommended sensor command:

CALCulate<Measurement>[:CHANnel<Channel>][:POWER]:BURSt:  
DTOLerance

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<tolerance> Range: 0.00 s to 0.30 s  
\*RST: 1.000e-6 s  
Default unit: s

**[SENSe<Sensor>:][POWER:][NCORrection[:STATe] <state>**

Available for compatibility. Recommended sensor command:

`CALCulate<Measurement>[:CHANnel<Channel>][:POWER]:NCORrection[:STATe]`

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<state> \*RST: OFF

**[SENSe<Sensor>:][POWER:]TGATe:SElect <gate>**

Available for compatibility. Recommended sensor command:

`CALCulate<Measurement>[:POWER]:TGATe[:AVG]:SElection`

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<gate>

**[SENSe<Sensor>:][POWER:]TGATe<Gate>:OFFSet:TIME <time>**

Available for compatibility. Recommended sensor command:

`CALCulate<Measurement>[:POWER]:TGATe<Gate>[:AVG]:OFFSet[:TIME]`

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

<Gate>

1 to 4  
Time gate

**Parameters:**

<time> Default unit: s

---

**[SENSe<Sensor>:][POWER:]TGATe<Gate>:TIME <time>**

Available for compatibility. Recommended sensor command:

[CALCulate<Measurement>\[:POWER\]:TGATe<Gate>\[:AVG\]:TIME](#)

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

<Gate> 1 to 4  
Time gate

**Parameters:**

<time> Default unit: s

---

**[SENSe<Sensor>:][POWER:]TGATe<Gate>:EXCLude]:MID:OFFSet[:TIME]  
<time\_interval>**

Available for compatibility. Recommended sensor command:

[CALCulate<Measurement>\[:POWER\]:TGATe<Gate>\[:AVG\]\[:EXCLude\]:MID:OFFSet\[:TIME\]](#)

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

<Gate> 1 to 4  
Time gate

**Parameters:**

<time\_interval> Default unit: s

---

**[SENSe<Sensor>:][POWER:]TGATe<Gate>:EXCLude]:MID:TIME <time\_interval>**

Available for compatibility. Recommended sensor command:

[CALCulate<Measurement>\[:POWER\]:TGATe<Gate>\[:AVG\]\[:EXCLude\]:MID:TIME](#)

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

<Gate> 1 to 4  
Time gate



**Parameters:**

<time\_interval>      Default unit: s

---

**[SENSe<Sensor>:][POWER:]TGATe[:EXCLude]:MID[:STATe] <state>**

Available for compatibility. Recommended sensor command:

CALCulate<Measurement>[:POWER]:TGATe<Gate>[:AVG][:EXCLude]:MID[:STATe]

**Suffix:**

<Sensor>              1 to 128  
 Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<state>

---

**[SENSe<Sensor>:][POWER:]TSLot[:AVG]:COUNT <count>**

Available for compatibility. Recommended sensor command:

CALCulate<Measurement>[:POWER]:TSLot[:AVG]:COUNT

**Suffix:**

<Sensor>              1 to 128  
 Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<count>              Range:      1 to 128  
                          \*RST:      8

---

**[SENSe<Sensor>:][POWER:]TSLot[:AVG]:WIDTH <width>**

Available for compatibility. Recommended sensor command:

CALCulate<Measurement>[:POWER]:TSLot[:AVG]:WIDTH

**Suffix:**

<Sensor>              1 to 128  
 Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<width>              Range:      50.0e-9 s to 0.10 s  
                          \*RST:      1.000e-3 s  
                          Default unit: s

---

**[SENSe<Sensor>:][POWER:]TSLot[:AVG][:EXCLude]:MID:OFFSet[:TIME] <time>**

Available for compatibility. Recommended sensor command:

CALCulate<Measurement>[:POWER]:TSLot[:AVG][:EXCLude]:MID:OFFSet[:TIME]

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<time> Range: 0.00 s to 0.10 s  
\*RST: 0.00 s  
Default unit: s

[SENSe<Sensor>][:POWER]:TSLot[:AVG][:EXCLude]:MID:TIME <time>

Available for compatibility. Recommended sensor command:

CALCulate<Measurement>[:POWER]:TSLot[:AVG][:EXCLude]:MID:TIME

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<time> Range: 0.00 s to 0.10 s  
\*RST: 0.00 s  
Default unit: s

[SENSe<Sensor>][:POWER]:TSLot[:AVG][:EXCLude]:MID:STATe <state>

Available for compatibility. Recommended sensor command:

CALCulate<Measurement>[:POWER]:TSLot[:AVG][:EXCLude]:MID[:STATe]

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<state> \*RST: OFF

[SENSe<Sensor>:]POWER:CCDFunction:REFerence <ref>

Available for compatibility. Recommended sensor command:

CALCulate<Measurement>[:CHANnel<Channel>]:NRT:CCDF:THReshold  
on page 385

If you enter a value without unit, the unit is defined by UNIT<Measurement>:  
POWER[:VALue] on page 231. For further information, see Chapter 12.6.1.3, "Units",  
on page 229.

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<ref> Range: -290.0 dBm to +110.0 dBm  
\*RST: +0.0 dBm  
Default unit: dBm

**[SENSe<Sensor>:]POWer:PEP:HOLD <time>**

Available for compatibility. Recommended sensor command:

`CALCulate<Measurement>[:CHANnel<Channel>]:NRT:PEP:HOLD:TIME`

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<time> Range: 1.0e-3 s to 1.0e-1 s  
\*RST: 6.0e-2 s  
Default unit: s

**[SENSe<Sensor>:]RANGe:AUTO <state>**

Available for compatibility. Recommended sensor command:

`CALCulate<Measurement>[:CHANnel<Channel>][:POWer][:AVG]:RANGe:AUTO`

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<state> \*RST: ON

**[SENSe<Sensor>:]RANGe:CLEVel <level>**

Available for compatibility. Recommended sensor command:

`CALCulate<Measurement>[:CHANnel<Channel>][:POWer][:AVG]:RANGe:CLEVel[:VALue]`

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<level>                   Range:     -20.00 dB to 0.00 dB  
                               \*RST:       0.00 dB  
                               Default unit: dB

**[SENSe<Sensor>:]RANGe[:VALue] <range>**

Available for compatibility. Recommended sensor command:

`CALCulate<Measurement>[:CHANnel<Channel>][:POWer][:AVG]:RANGe[:VALue]`

**Suffix:**

<Sensor>                   1 to 128  
 Configured sensor connected at: port A = 1, ... , port D = 4, R&S  
 NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<range>                   Range:     0 to 2  
                               \*RST:       1

**[SENSe<Sensor>:]ROSCillator:REFio:FREQuency <value>**

Available for compatibility. Recommended sensor command:

`CALCulate<Measurement>[:CHANnel<Channel>]:ROSCillator:REFio:FREQuency`

**Suffix:**

<Sensor>                   1 to 128  
 Configured sensor connected at: port A = 1, ... , port D = 4, R&S  
 NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<value>                   Range:     1.0e+7 Hz to 1.2e+8 Hz  
                               \*RST:       1.0e+7 Hz  
                               Default unit: Hz

**[SENSe<Sensor>:]ROSCillator:REFio:OUTPut[:STATe] <value>**

Available for compatibility. Recommended sensor command:

`CALCulate<Measurement>[:CHANnel<Channel>]:ROSCillator:REFio:OUTPut[:STATe]`

**Suffix:**

<Sensor>                   1 to 128  
 Configured sensor connected at: port A = 1, ... , port D = 4, R&S  
 NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<value>                   \*RST:       OFF

---

**[SENSe<Sensor>:]ROSCillator:SOURce <value>**

Available for compatibility. Recommended sensor command:

`CALCulate<Measurement>[:CHANnel<Channel>]:ROSCillator:SOURce`

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S  
NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<value> HOST | INTernal | REFio  
\*RST: INTernal

---

**[SENSe<Sensor>:]SAMPLing <sampling\_rate>**

Available for compatibility. Recommended sensor command:

`CALCulate<Measurement>[:CHANnel<Channel>]:SAMPLing`

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S  
NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<sampling\_rate> FREQ1 | FREQ2  
\*RST: FREQ1

---

**[SENSe<Sensor>:]SGAMma:CORRection:STATe <state>**

Available for compatibility. Recommended sensor command:

`CALCulate<Measurement>[:CHANnel<Channel>]:SGAMma:CORRection:STATe`

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S  
NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<state> ON | OFF  
\*RST: OFF

---

**[SENSe<Sensor>:]SGAMma:PHASe <phase>**

Available for compatibility. Recommended sensor command:

`CALCulate<Measurement>[:CHANnel<Channel>]:SGAMma:PHASe`

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<phase> Range: -360.0 to 360.0  
\*RST: 0.0  
Default unit: degree

**[SENSe<Sensor>:]SGAMma[:MAGNitude]** <magnitude>

Available for compatibility. Recommended sensor command:

`CALCulate<Measurement>[:CHANnel<Channel>]:SGAMma[:MAGNitude]`

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<magnitude> Range: 0.0 to 1.0  
\*RST: 0.0

**[SENSe<Sensor>:]STATistics:SAMPles[:MINimum]** <value>

Available for compatibility. Recommended sensor command:

`CALCulate<Measurement>:STATistics:SAMPles[:MINimum]`

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<value>

**[SENSe<Sensor>:]STATistics:SCALE:X:POINTS** <points>

Available for compatibility. Recommended sensor command:

`CALCulate<Measurement>:STATistics[:SCALE]:X:POINTS`

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<points> Range: 3 to 8191  
\*RST: 200

**[SENSe<Sensor>:]STATistics:SCALE:X:RANGe** <range>

Available for compatibility. Recommended sensor command:

`CALCulate<Measurement>:STATistics[:SCALE]:X:RANGe`

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<range> Range: 0.01 dB to 100.0 dB  
\*RST: 50.0 dB  
Default unit: dB

**[SENSe<Sensor>:]STATistics:SCALE:X:RLEVel** <rlev>

Available for compatibility. Recommended sensor command:

`CALCulate<Measurement>:STATistics[:SCALE]:X:RLEVel:RELative`

`CALCulate<Measurement>:STATistics[:SCALE]:X:RLEVel[:ABSolute]`

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<rlev> Range: -280.0 dBm to 220.0 dBm  
\*RST: -30.0 dBm  
Default unit: dBm

**[SENSe<Sensor>:]STATistics:TIME** <time>

Available for compatibility. Recommended sensor command:

`CALCulate<Measurement>[:POWER]:TGATe<Gate>[:AVG]:TIME` if a gate is set.

`CALCulate<Measurement>:STATistics:APERture` if no gate is set.

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<time> Range: 10.0e-6 s to 0.3 s  
\*RST: 0.01 s  
Default unit: s

---

**[SENSe<Sensor>]:STATistics[:EXCLude]:MID:OFFSet[:TIME]** <time>

Available for compatibility. Recommended sensor command:

CALCulate<Measurement>[:POWER]:TGATe<Gate>[:AVG][:EXCLude]:MID:OFFSet[:TIME]

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<time> Range: 0.0 s to 0.3 s  
\*RST: 0.0 s  
Default unit: s

---

**[SENSe<Sensor>]:STATistics[:EXCLude]:MID:TIME** <time>

Available for compatibility. Recommended sensor command:

CALCulate<Measurement>[:POWER]:TGATe<Gate>[:AVG][:EXCLude]:MID:TIME

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<time> Range: 0.0 s to 0.3 s  
\*RST: 0.0 s  
Default unit: s

---

**[SENSe<Sensor>]:TIMing:EXCLude:START** <exclude\_start>

Available for compatibility. Recommended sensor command:

CALCulate<Measurement>:TSLot:TIMing:EXCLude:START

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<exclude\_start> Range: 0.0 s to 15.0 s  
\*RST: 0.0 s  
Default unit: s

---

**[SENSe<Sensor>]:TIMing:EXCLude:STOP** <exclude\_stop>

Available for compatibility. Recommended sensor command:



CALCulate<Measurement>:TSLot:TIMing:EXCLude:STOP

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<exclude\_stop> Range: 0.0 s to 15.0 s  
\*RST: 0.0 s  
Default unit: s

**[SENSe<Sensor>:]TRACe:AVERage:COUNT <filter length>**

Available for compatibility. Recommended sensor command:

CALCulate<Measurement>[:CHANnel<Channel>]:TRACe:AVERage:COUNT[:VALue]

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<count> Range: 1 to 65536  
\*RST: 4

**[SENSe<Sensor>:]TRACe:AVERage:TCONtrol <mode>**

Available for compatibility. Recommended sensor command:

CALCulate<Measurement>[:CHANnel<Channel>]:TRACe:AVERage:TCONtrol[:ENUM]

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<mode> MOVing | REPeat  
\*RST: REPeat

**[SENSe<Sensor>:]TRACe:AVERage[:STATe] <state>**

Available for compatibility. Recommended sensor command:

CALCulate<Measurement>[:CHANnel<Channel>]:TRACe:AVERage[:STATe]

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<state> ON | OFF  
\*RST: ON

**[SENSe<Sensor>:]TRACe:ESAMpling:AUTO <auto>**

Available for compatibility. Recommended sensor command:

[CALCulate<Measurement>\[:CHANnel<Channel>\]:TRACe:ESAMpling](#)

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<auto> \*RST: ON

**[SENSe<Sensor>:]TRACe:MEASurement:ALGORITHM <value>**

Available for compatibility. Recommended sensor command:

[CALCulate<Measurement>:TRACe:MEASurement:ALGORITHM](#)

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<value> HISTogram | INTegration | PEAK  
\*RST: HISTogram

**[SENSe<Sensor>:]TRACe:MEASurement:DEFine:DURATION:REFERENCE <value>**

Available for compatibility. Recommended sensor command:

[CALCulate<Measurement>:TRACe:MEASurement:DEFine:DURATION:REFERENCE](#)

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<value>                    Range:        Depends on sensor.  
                               \*RST:        Depends on sensor.  
                               Default unit: pct

**[SENSe<Sensor>:]TRACe:MEASurement:DEFine:TRANSition:HREFerence**  
 <value>

Available for compatibility. Recommended sensor command:

[CALCulate<Measurement>:TRACe:MEASurement:DEFine:TRANSition:HREFerence](#)

**Suffix:**

<Sensor>                    1 to 128  
 Configured sensor connected at: port A = 1, ... , port D = 4, R&S  
 NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<value>                    Range:        Depends on the sensor.  
                               \*RST:        Depends on the sensor.  
                               Default unit: pct

**[SENSe<Sensor>:]TRACe:MEASurement:DEFine:TRANSition:LREFerence**  
 <value>

Available for compatibility. Recommended sensor command:

[CALCulate<Measurement>:TRACe:MEASurement:DEFine:TRANSition:LREFerence](#)

**Suffix:**

<Sensor>                    1 to 128  
 Configured sensor connected at: port A = 1, ... , port D = 4, R&S  
 NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<value>                    float\_value  
                               Range:        depending on the sensor  
                               \*RST:        depending on the sensor  
                               Default unit: PCT

**[SENSe<Sensor>:]TRACe:MEASurement:POWer:AVG?**

Available for compatibility. Recommended sensor command:

[CALCulate<Measurement>:TRACe:MEASurement:POWer:AVG?](#)

If you enter a value without unit, the unit is defined by [SENSe<Sensor>:UNIT:POWer\[:VALue\]](#). For further information, see [Chapter 12.6.1.3, "Units"](#), on page 229.

**Suffix:**

&lt;Sensor&gt;

1 to 128

Configured sensor connected at: port A = 1, ... , port D = 4, R&amp;S NRX-B9 = 101, USB and LAN port = 5 to 100

**Usage:**

Query only

**[SENSe<Sensor>:]TRACe:MEASurement:POWer:HREFerence?**

Available for compatibility. Recommended sensor command:

`CALCulate<Measurement>:TRACe:MEASurement:POWer:HREFerence?`If you enter a value without unit, the unit is defined by `SENSe<Sensor>:UNIT:POWer[:VALue]`. For further information, see [Chapter 12.6.1.3, "Units"](#), on page 229.**Suffix:**

&lt;Sensor&gt;

1 to 128

Configured sensor connected at: port A = 1, ... , port D = 4, R&amp;S NRX-B9 = 101, USB and LAN port = 5 to 100

**Usage:**

Query only

**[SENSe<Sensor>:]TRACe:MEASurement:POWer:LREFerence?**

Available for compatibility. Recommended sensor command:

`CALCulate<Measurement>:TRACe:MEASurement:POWer:LREFerence?`If you enter a value without unit, the unit is defined by `SENSe<Sensor>:UNIT:POWer[:VALue]`. For further information, see [Chapter 12.6.1.3, "Units"](#), on page 229.**Suffix:**

&lt;Sensor&gt;

1 to 128

Configured sensor connected at: port A = 1, ... , port D = 4, R&amp;S NRX-B9 = 101, USB and LAN port = 5 to 100

**Usage:**

Query only

**[SENSe<Sensor>:]TRACe:MEASurement:POWer:MAX?**

Available for compatibility. Recommended sensor command:

`CALCulate<Measurement>:TRACe:MEASurement:POWer:MAX?`If you enter a value without unit, the unit is defined by `SENSe<Sensor>:UNIT:POWer[:VALue]`. For further information, see [Chapter 12.6.1.3, "Units"](#), on page 229.**Suffix:**

&lt;Sensor&gt;

1 to 128

Configured sensor connected at: port A = 1, ... , port D = 4, R&amp;S NRX-B9 = 101, USB and LAN port = 5 to 100

**Usage:**

Query only

**[SENSe<Sensor>:]TRACe:MEASurement:POWer:MIN?**

Available for compatibility. Recommended sensor command:

`CALCulate<Measurement>:TRACe:MEASurement:POWer:MIN?`

If you enter a value without unit, the unit is defined by `SENSe<Sensor>:UNIT:POWer[:VALue]`. For further information, see [Chapter 12.6.1.3, "Units"](#), on page 229.

**Suffix:**

<Sensor>                    1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S  
NRX-B9 = 101, USB and LAN port = 5 to 100

**Usage:**                    Query only

**[SENSe<Sensor>:]TRACe:MEASurement:POWer:PULSe:BASE?**

Available for compatibility. Recommended sensor command:

`CALCulate<Measurement>:TRACe:MEASurement:POWer:PULSe:BASE?`

If you enter a value without unit, the unit is defined by `SENSe<Sensor>:UNIT:POWer[:VALue]`. For further information, see [Chapter 12.6.1.3, "Units"](#), on page 229.

**Suffix:**

<Sensor>                    1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S  
NRX-B9 = 101, USB and LAN port = 5 to 100

**Usage:**                    Query only

**[SENSe<Sensor>:]TRACe:MEASurement:POWer:PULSe:DROop?**

Available for compatibility. Recommended sensor command:

`CALCulate<Measurement>:TRACe:MEASurement:POWer:PULSe:DROop?`

If you enter a value without unit, the unit is defined by `SENSe<Sensor>:UNIT:POWer[:VALue]`. For further information, see [Chapter 12.6.1.3, "Units"](#), on page 229.

**Suffix:**

<Sensor>                    1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S  
NRX-B9 = 101, USB and LAN port = 5 to 100

**Usage:**                    Query only

**[SENSe<Sensor>:]TRACe:MEASurement:POWer:PULSe:TOP?**

Available for compatibility. Recommended sensor command:

`CALCulate<Measurement>:TRACe:MEASurement:POWer:PULSe:TOP?`

If you enter a value without unit, the unit is defined by `SENSe<Sensor>:UNIT:POWER[:VALue]`. For further information, see [Chapter 12.6.1.3, "Units"](#), on page 229.

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Usage:** Query only

**[SENSe<Sensor>:]TRACe:MEASurement:POWer:REFerence?**

Available for compatibility. Recommended sensor command:

`CALCulate<Measurement>:TRACe:MEASurement:POWer:REFerence?`

If you enter a value without unit, the unit is defined by `SENSe<Sensor>:UNIT:POWER[:VALue]`. For further information, see [Chapter 12.6.1.3, "Units"](#), on page 229.

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Usage:** Query only

**[SENSe<Sensor>:]TRACe:MEASurement:PULSe:DCYClE?**

Available for compatibility. Recommended sensor command:

`CALCulate<Measurement>:TRACe:MEASurement:PULSe:DCYClE?`

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Usage:** Query only

**[SENSe<Sensor>:]TRACe:MEASurement:PULSe:DURation?**

Available for compatibility. Recommended sensor command:

`CALCulate<Measurement>:TRACe:MEASurement:PULSe:DURation?`

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Usage:** Query only

**[SENSe<Sensor>:]TRACe:MEASurement:PULSe:PERiod?**

Available for compatibility. Recommended sensor command:

`CALCulate<Measurement>:TRACe:MEASurement:PULSe:PERiod?`

**Suffix:**

<Sensor> 1 to 128

Configured sensor connected at: port A = 1, ... , port D = 4, R&S  
NRX-B9 = 101, USB and LAN port = 5 to 100

**Usage:** Query only

**[SENSe<Sensor>:]TRACe:MEASurement:PULSe:SEParation?**

Available for compatibility. Recommended sensor command:

`CALCulate<Measurement>:TRACe:MEASurement:PULSe:SEParation?`

**Suffix:**

<Sensor> 1 to 128

Configured sensor connected at: port A = 1, ... , port D = 4, R&S  
NRX-B9 = 101, USB and LAN port = 5 to 100

**Usage:** Query only

**[SENSe<Sensor>:]TRACe:MEASurement:TRANSition:ESAMpling:AUTO[:STATe]  
<value>**

Available for compatibility. Recommended sensor command:

`CALCulate<Measurement>:TRACe:MEASurement:TRANSition:ESAMpling:  
AUTO[:STATe]` on page 351

**Suffix:**

<Sensor> 1 to 128

Configured sensor connected at: port A = 1, ... , port D = 4, R&S  
NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<value> \*RST: ON

**[SENSe<Sensor>:]TRACe:MEASurement:TRANSition:NEGative:DURation?**

Available for compatibility. Recommended sensor command:

`CALCulate<Measurement>:TRACe:MEASurement:TRANSition:NEGative:  
DURation?`

**Suffix:**

<Sensor> 1 to 128

Configured sensor connected at: port A = 1, ... , port D = 4, R&S  
NRX-B9 = 101, USB and LAN port = 5 to 100

**Usage:** Query only

---

**[SENSe<Sensor>:]TRACe:MEASurement:TRANSition:NEGative:OCCurrence?**

Available for compatibility. Recommended sensor command:

`CALCulate<Measurement>:TRACe:MEASurement:TRANSition:NEGative:OCCurrence?`

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Usage:** Query only

---

**[SENSe<Sensor>:]TRACe:MEASurement:TRANSition:NEGative:OVERshoot?**

Available for compatibility. Recommended sensor command:

`CALCulate<Measurement>:TRACe:MEASurement:TRANSition:NEGative:OVERshoot?`

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Usage:** Query only

---

**[SENSe<Sensor>:]TRACe:MEASurement:TRANSition:POSitive:DURation?**

Available for compatibility. Recommended sensor command:

`CALCulate<Measurement>:TRACe:MEASurement:TRANSition:POSitive:DURation?`

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Usage:** Query only

---

**[SENSe<Sensor>:]TRACe:MEASurement:TRANSition:POSitive:OCCurrence?**

Available for compatibility. Recommended sensor command:

`CALCulate<Measurement>:TRACe:MEASurement:TRANSition:POSitive:OCCurrence?`



**Suffix:**

&lt;Sensor&gt;

1 to 128

Configured sensor connected at: port A = 1, ... , port D = 4, R&amp;S NRX-B9 = 101, USB and LAN port = 5 to 100

**Usage:**

Query only

**[SENSe<Sensor>:]TRACe:MEASurement:TRANSition:POSitive:OVERshoot?**

Available for compatibility. Recommended sensor command:

[CALCulate<Measurement>:TRACe:MEASurement:TRANSition:POSitive:OVERshoot?](#)**Suffix:**

&lt;Sensor&gt;

1 to 128

Configured sensor connected at: port A = 1, ... , port D = 4, R&amp;S NRX-B9 = 101, USB and LAN port = 5 to 100

**Usage:**

Query only

**[SENSe<Sensor>:]TRACe:MEASurement:TRANSition:SPERiod?**

Available for compatibility. Recommended sensor command:

[CALCulate<Measurement>:TRACe:MEASurement:TRANSition:SPERiod?](#)**Suffix:**

&lt;Sensor&gt;

1 to 128

Configured sensor connected at: port A = 1, ... , port D = 4, R&amp;S NRX-B9 = 101, USB and LAN port = 5 to 100

**Usage:**

Query only

**[SENSe<Sensor>:]TRACe:POINts <points>**

Available for compatibility. Recommended sensor command:

[CALCulate<Measurement>:TRACe:X:POINts](#)**Suffix:**

&lt;Sensor&gt;

1 to 128

Configured sensor connected at: port A = 1, ... , port D = 4, R&amp;S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

&lt;points&gt;

Range: 1 to 8192

\*RST: 260

## 13 Remote control basics

For general information on remote control of Rohde & Schwarz products via SCPI, refer to [www.rohde-schwarz.com/rc-via-scpi](http://www.rohde-schwarz.com/rc-via-scpi).

### 13.1 Remote control interfaces and protocols

For remote control, communication between the R&S NRX and the controlling host is established based on the following interfaces and protocols.

**Table 13-1: Supported interfaces and protocols**

Interface	Protocol	VISA <sup>*)</sup> address string	Library
USB	USBTMC	USB::<vendor ID>::<product ID>::<serial number>[:INSTR]	VISA
Ethernet	VXI-11	TCPIP::host address[:LAN device name][:INSTR]	VISA
	HiSLIP High-speed LAN instrument protocol (IVI-6.1)	TCPIP::host address::hislip0[:INSTR]	VISA
	Socket communication (SCPI raw)	TCPIP::host address[:LAN device name]::<port>::SOCKET	
GPIB/ IEEE-488 interface (R&S NRX-B8)	GPIB/IEEE 488	GPIB::<primary address>::INSTR	
<p>*) VISA is a standardized software interface library providing input and output functions to communicate with instruments. A VISA installation on the controller is a prerequisite for remote control over LAN (when using VXI-11 or HiSLIP protocol) and USBTMC interfaces. See also <a href="#">Chapter 13.1.2.1, "VISA resource strings"</a>, on page 484.</p>			

#### 13.1.1 USB interface

##### Computer requirements

- VISA library  
A USB connection requires the VISA library to be installed. VISA detects and configures the R&S NRX automatically when the USB connection is established.
- USBTMC driver  
Apart from the USBTMC driver, which comes with the installation of the R&S NRP-Toolkit, you do not have to install a separate driver.

## Setup

- ▶ Connect the host interface of the R&S NRX and the USB interface of the computer.

## USBTMC protocol

USB Test & Measurement Class Specification (USBTMC) is a protocol that is built on top of USB for communication with USB devices from the test & measurement category. It defines a dedicated class code that identifies a device's functionality. R&S NRX also uses this class code to identify itself as a member of the test & measurement class. Using a VISA library, such devices support service request, trigger and other operations that are commonly found in GPIB devices.

## USB resource string

The VISA resource string for USBTMC device communication represents an addressing scheme that is used to establish a communication session with the sensor. It is based on the sensor address and some sensor- and vendor-specific information. The syntax of the used USB resource string is:

USB::*<vendor ID>*::*<product ID>*::*<serial number>*::[INSTR]

- *<vendor ID>* is the vendor ID for Rohde & Schwarz.
- *<product ID>* is the product ID for the R&S NRX.
- *<serial number>* is the individual serial number of the R&S NRX, printed on the casing.

### Example:

```
USB::0x0AAD::0x0180::100001
```

0x0AAD is the vendor ID for Rohde & Schwarz.

0x0180 is the product ID for the R&S NRX.

100001 is the serial number of the particular R&S NRX.

## 13.1.2 Ethernet interface

The Ethernet interface of the R&S NRX allows you to integrate it in a local area network (LAN).

### Requirements

- TCP/IP network protocol  
The local area network must support the TCP/IP network protocol.  
The TCP/IP network protocol and the associated network services are preconfigured on the R&S NRX.
- VISA library  
Installed on the computer.
- Software for device control  
Installed on the computer.

## Setup

- ▶ Using the Ethernet interface, connect the computer and the R&S NRX to a local area network.

### 13.1.2.1 VISA resource strings

The VISA resource string is required to establish a communication session between the controller and the sensor in a LAN. The resource string is a unique identifier, composed of the specific IP address of the sensor and some network and VISA-specific keywords.

TCPIP::*<IP address or hostname>*[:*<LAN device name>*][:INSTR]

- *TCPIP* designates the network protocol used.
- *<IP address or hostname>* is the IP address or host name of the device.
- [*<LAN device name>*] defines the protocol and the instance number of a sub-instrument.
- [*INSTR*] indicates the sensor resource class (optional).

The IP address or host name is used by the programs to identify and control the sensor. While the host name is determined by settings in the sensor, the IP address is assigned by a DHCP server when the sensor requests one. Alternatively the IP address is determined with a procedure called zeroconf.

You can also assign a *LAN device name* which defines the protocol characteristics of the connection. See the description of the VISA resource string below for the corresponding interface protocols. The string of the *LAN device name* is emphasized in italics.

#### HiSLIP

TCPIP::*<IP address or hostname>*::*hislip0*[:INSTR]

- *hislip0* is the HiSLIP device name, designates that the interface protocol HiSLIP is used (mandatory)

*hislip0* is composed of [*HiSLIP device name*[,*HiSLIP port*]] and must be assigned.

#### VXI-11

TCPIP::*<IP address or hostname>*[:*inst0*][:INSTR]

- *inst0* is the LAN device name, indicating that the VXI-11 protocol is used (optional)

*inst0* currently selects the VXI-11 protocol by default and can be omitted.

#### Socket communication

TCPIP::*<IP address or hostname>*::*port*::*SOCKET*

- *Port* determines the used port number
- *SOCKET* indicates the raw network socket resource class

Socket communication requires the specification of the port (commonly referred to as port number) and of "SOCKET" to complete the VISA resource string with the associated protocol used.

The default port for socket communication is port 5025.

**Example:**

A sensor has the IP address *10.111.11.20*; the valid resource string using the VXI-11 protocol is:

```
TCPIP::10.111.11.20::INSTR
```

The DNS host name is *nrx-100001*; the valid resource string is:

```
TCPIP::nrx-100001::hislip0 (HiSLIP)
```

```
TCPIP::nrx-100001::inst0 (VXI-11)
```

A raw socket connection can be established using:

```
TCPIP::10.111.11.20::5025::SOCKET
```

```
TCPIP::nrx-100001::5025::SOCKET
```

### 13.1.3 GPIB interface

Connect the R&S NRX and the controller using a GPIB bus cable. Address the R&S NRX by its GPIB address.

Controller prerequisites

- GPIB bus card
- Card drivers
- Program libraries for the programming language

## 13.2 Status reporting system

The status reporting system stores all information on the current operating state of the instrument, and on errors which have occurred. This information is stored in the status registers and in the error queue. You can query both with the commands of the `STATus` subsystem.

### 13.2.1 Overview

[Figure 13-1](#) shows the hierarchical structure of information in the status registers.

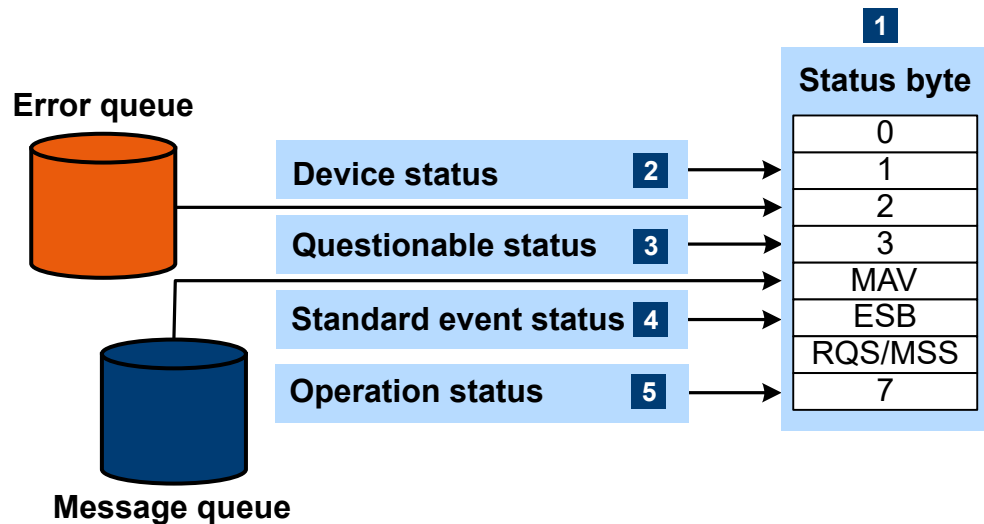


Figure 13-1: Status registers overview

1 = Status byte, see [Table 13-2](#)

2 = [Chapter 13.2.2, "Device status register"](#), on page 487

3 = [Chapter 13.2.3, "Questionable status register"](#), on page 489

4 = [Chapter 13.2.4, "Standard event status and enable register \(ESR, ESE\)"](#), on page 493

5 = [Chapter 13.2.5, "Operation status register"](#), on page 493

The highest level is formed by the status byte register (STB) and the associated service request enable (SRE) register.

The status byte register (STB) receives its information from:

- Standard event status register (ESR)
- Associated standard event status enable register (ESE)
- SCPI-defined operation status register
- Questionable status register, which contains detailed information on the device.

The R&S NRX works with several status register levels to support a high number of measurements. 8 measurements are grouped on one status register. The first status register groups the measurements 1 to 8. The next lower status register groups the measurements 9 to 16, and so on. Thus, the suffixes (m+1), (m+2), ... read as follows:

Status register	SCPI suffix	Value of suffix m	Measurement covered (m+1) to (m+8)
First hierarchy	1	0	1 to 8
Second hierarchy	2	8	9 to 16
Third hierarchy	3	16	17 to 24
...	...	...	...
8th hierarchy	8	56	57 to 64

The SCPI suffix of the status register is always (m+1). The suffix of the `CALC` command corresponds to the measurement channel, (m+x). Bit 0 summarizes the status of the next lower status register.

**Table 13-2: Used status byte bits and their meaning**

Bit no.	Short description	Bit is set if
1	Device status register summary	An instrument is connected or disconnected or when an error has occurred in an instrument, depending on the configuration of the instrument status register. <a href="#">Chapter 13.2.2, "Device status register"</a> , on page 487
2	Error queue not empty	The error queue has an entry. If this bit is enabled by the service request enable register, each entry of the error queue generates a service request. An error can thus be recognized and specified in detail by querying the error queue. The query yields a conclusive error message. This procedure is recommended since it considerably reduces the problems of IEC/IEEE bus control.
3	Questionable status register summary	An <code>EVENT</code> bit is set in the <code>QUESTIONABLE</code> status register and the associated <code>ENABLE</code> bit is set to 1. A set bit denotes a questionable device status which can be specified in greater detail by querying the questionable status register. <a href="#">Chapter 13.2.3, "Questionable status register"</a> , on page 489
4	MAV Message available	A readable message is in the message queue. This bit can be used to read data automatically from the instrument into the controller.
5	ESB Standard event status register summary	One of the bits in the standard event status register is set and enabled in the event status enable register. Setting this bit denotes a serious error which can be specified in greater detail by querying the standard event status register. <a href="#">Chapter 13.2.4, "Standard event status and enable register (ESR, ESE)"</a> , on page 493.
6	RQS/MSS Primary status summary	The instrument triggers a service request. The service request happens if one of the other bits of this register is set together with its enable bit in the service request enable register (SRE).
7	Operation status register summary	An <code>EVENT</code> bit is set in the operation status register and the associated <code>ENABLE</code> bit is set to 1. A set bit denotes that an action is being performed by the instrument. Information on the type of action can be obtained by querying the operation status register. <a href="#">Chapter 13.2.5, "Operation status register"</a> , on page 493

Further information:

- See [Figure 13-1](#).
- Set and read the service request enable register using `*SRE`.

### 13.2.2 Device status register

Contains information on current instrument states in the `CONDition` register. Or states that occurred since the last query in the `EVENT` register.

0	0	+
Sensor A connected	1	
Sensor B connected	2	
Sensor A error	3	
Sensor B error	4	
Sensor A Front/Rear	5	
Sensor B Front/Rear	6	
Sensor C connected	7	
Sensor D connected	8	
Sensor C error	9	
Sensor D error	10	
Sensor C Front/Rear	11	
Sensor D Front/Rear	12	
NRT Sensor connected	13	
Key pressed	14	
not used	15	

**Figure 13-2: Device status register**

Querying the register:

- `STATUS:DEVICE:CONDITION?`
- `STATUS:DEVICE[:EVENT]?`

**Table 13-3: Used device status bits and their meaning**

Bit no.	Short description	Bit is set if
1	Sensor A connected	
2	Sensor B connected	
3	Sensor A error	
4	Sensor B error	
5	Sensor A front/rear	Sensor A is connected at the rear.
6	Sensor B front/rear	Sensor B is connected at the rear.
7	Sensor C connected	
8	Sensor D connected	
9	Sensor C error	
10	Sensor D error	
11	Sensor C front/rear	Sensor C is connected at the rear.
12	Sensor D front/rear	Sensor D is connected at the rear.



Bit no.	Short description	Bit is set if
13	NRT sensor connected	
14	Key pressed	Front panel key is pressed.

### 13.2.3 Questionable status register

Contains information on questionable instrument states that occur if the instrument is not operated in compliance with its specifications.

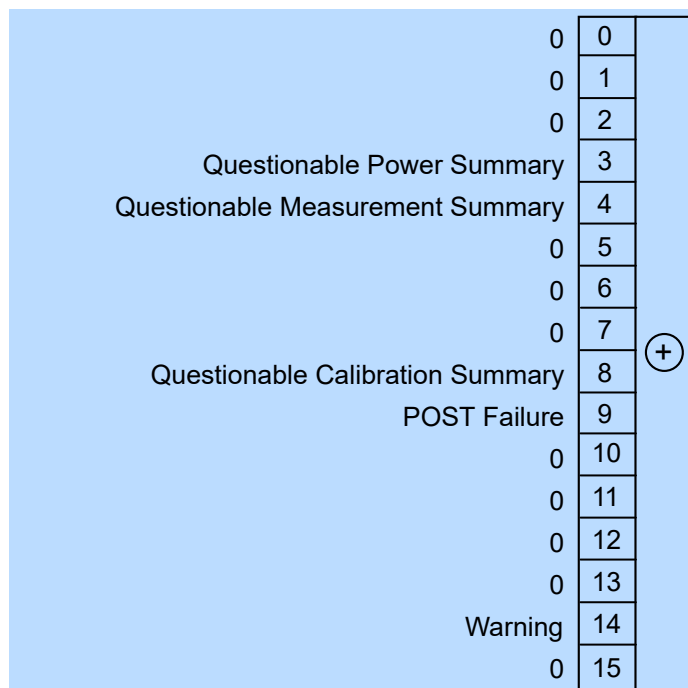


Figure 13-3: Questionable status register

Querying the register:

- `STATUS:QUESTIONable:CONDition?`
- `STATUS:QUESTIONable[:EVENT]?`

Table 13-4: Used questionable status bits and their meaning

Bit no.	Short description	Bit is set if
3	Questionable power summary	Summary of <a href="#">Questionable power status register</a> exists.
4	Questionable measurement summary	Summary of <a href="#">Questionable measurement status registers</a> exists.
8	Questionable calibration summary	Summary of <a href="#">Questionable calibration status register</a> exists.

Bit no.	Short description	Bit is set if
9	POST failure	Built-in test of the R&S NRX that is carried out automatically upon power-up has generated an error.
14	Warning	

### 13.2.3.1 Questionable power status register

Contains information on whether the measured power values are questionable.

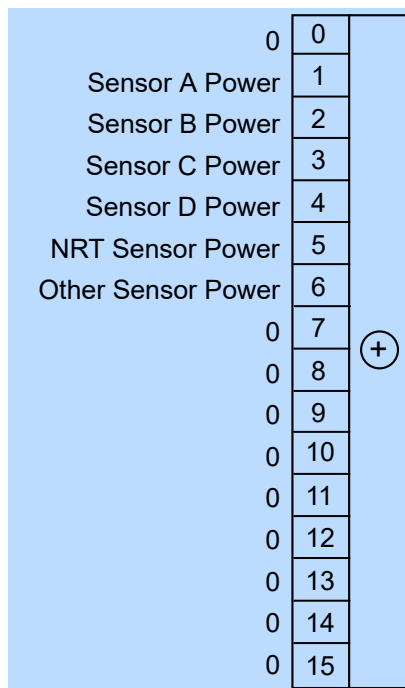


Figure 13-4: Questionable power status register

Querying the register:

- `STATUS:QUESTIONABLE:POWER[:SUMMARY]:CONDITION?`
- `STATUS:QUESTIONABLE:POWER[:SUMMARY][:EVENT]?`

Table 13-5: Used questionable power status bits and their meaning

Bit no.	Short description	Bit is set if measurement data of a sensor is corrupt.
1	Sensor A power	Sensor A
2	Sensor B power	Sensor B
3	Sensor C power	Sensor C
4	Sensor D power	Sensor D
5	NRT sensor power	R&S NRT-Zxx sensor
6	Other sensor power	USB or LAN sensor

### 13.2.3.2 Questionable measurement status registers

Contain information whether the displayed data or the calculated power is questionable.

For information on index *m*, see [Chapter 13.2.1, "Overview"](#), on page 485.

Extension Summary	0	+
Measurement m+1 Power	1	
Measurement m+2 Power	2	
Measurement m+3 Power	3	
Measurement m+4 Power	4	
Measurement m+5 Power	5	
Measurement m+6 Power	6	
Measurement m+7 Power	7	
Measurement m+8 Power	8	
0	9	
0	10	
0	11	
0	12	
0	13	
0	14	
0	15	

**Figure 13-5: Questionable measurement status registers**

Querying the register:

- `STATUS:QUESTionable:MEASure<RegisterIndex>:CONDition?`
- `STATUS:QUESTionable:MEASure<RegisterIndex>[:SUMMARY][:EVENT]?`
- `STATUS:QUESTionable:WINDow<RegisterIndex>:CONDition?`
- `STATUS:QUESTionable:WINDow<RegisterIndex>[:SUMMARY][:EVENT]?`

**Table 13-6: Used questionable measurement status bits and their meaning**

Bit no.	Short description	Bit is set if measured values of a measurement channel are corrupt or for the extension summary.
0	Extension summary	Sum bit of the next lower status register.
1	Measurement m+1 power	Channel 1
2	Measurement m+2 power	Channel 2
3	Measurement m+3 power	Channel 3
4	Measurement m+4 power	Channel 4
5	Measurement m+5 power	Channel 5
6	Measurement m+6 power	Channel 6

Bit no.	Short description	Bit is set if measured values of a measurement channel are corrupt or for the extension summary.
7	Measurement m+7 power	Channel 7
8	Measurement m+8 power	Channel 8

### 13.2.3.3 Questionable calibration status register

Contains information whether the zeroing of a sensor was successful.

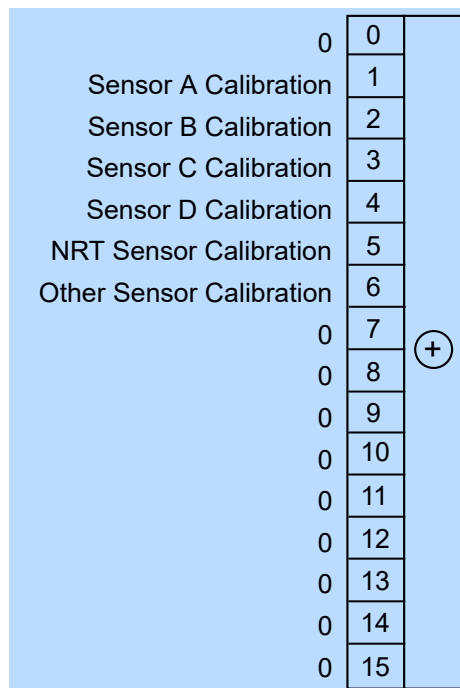


Figure 13-6: Questionable calibration status register

Querying the register:

- `STATUS:QUESTIONABLE:CALIBRATION[:SUMMARY]:CONDITION?`
- `STATUS:QUESTIONABLE:CALIBRATION[:SUMMARY][:EVENT]?`

Table 13-7: Used questionable calibration status bits and their meaning

Bit no.	Short description	Bit is set if zeroing of a sensor is not successful.
1	Sensor A calibration	Sensor A
2	Sensor B calibration	Sensor B
3	Sensor C calibration	Sensor C
4	Sensor D calibration	Sensor D
5	NRT sensor calibration	R&S NRT-Zxx sensor
6	Other sensor calibration	USB or LAN sensor

### 13.2.4 Standard event status and enable register (ESR, ESE)

The `ESR` is already defined in the IEEE 488.2 standard. It is comparable to the `EVENT` register of a SCPI register. The standard event status register can be read out by `*ESR?`.

The `ESE` forms the associated `ENABLE` register. It can be set and read by `*ESE`.

Operation Complete	0	+
0	1	
Query Error	2	
Device-Dependent Error	3	
Execution Error	4	
Command Error	5	
User Request	6	
Power On	7	

Figure 13-7: Standard event status register (ESR)

Table 13-8: Used standard event status bits and their meaning

Bit no.	Short description	Bit is set if
0	Operation complete	All previous commands have been executed and <code>*OPC</code> is received.
2	Query error	The controller wants to read data from the instrument but has not sent a query, or it sends new commands to the instrument before it retrieves existing requested data. A frequent cause is a faulty query which cannot be executed.
3	Device-dependent error	An instrument-dependent error occurs. An error message with a number between -300 and -399 or a positive error number denoting the error in greater detail is entered in the error queue.
4	Execution error	The syntax of a received command is correct but the command cannot be executed due to various marginal conditions. An error message with a number between -200 and -300 denoting the error in greater detail is entered in the error queue.
5	Command error	An undefined command or a command with incorrect syntax is received. An error message with a number between -100 and -200 denoting the error in greater detail is entered in the error queue.
6	User request	The instrument is switched over to manual control.
7	Power on	The instrument is switched on.

### 13.2.5 Operation status register

Contains information on current operations in the `CONDition` register. Or operations performed since the last query in the `EVENT` register.

Operation CAL Summary	0	+
0	1	
0	2	
0	3	
Operation Measurement Summary	4	
Operation Trigger Summary	5	
0	6	
0	7	
0	8	
0	9	
Operation Sense Summary	10	
Lower Limit Fail	11	
Upper Limit Fail	12	
0	13	
0	14	
0	15	

Figure 13-8: Operation status register

Querying the register:

- `STATUS:OPERation:CONDition?`
- `STATUS:OPERation[:EVENT]?`

Table 13-9: Used operation status bits and their meaning

Bit no.	Short description	Bit is set if
0	Operation CAL summary	Summary of <a href="#">Operation calibrating status register</a> exists.
4	Operation measurement summary	Summary of <a href="#">Operation measuring status register</a> exists.
5	Operation trigger summary	Summary of <a href="#">Operation trigger status register</a> exists.
10	Operation sense summary	Summary of <a href="#">Operation sense status register</a> exists.
11	Lower limit fail	Summary of <a href="#">Operation lower limit fail status registers</a> exists.
12	Upper limit fail	Summary of <a href="#">Operation upper limit fail status registers</a> exists.

### 13.2.5.1 Operation calibrating status register

The `CONDition` register contains information on whether a sensor is being calibrated. The `EVENT` register contains information on whether a calibration was started or completed since the last query.

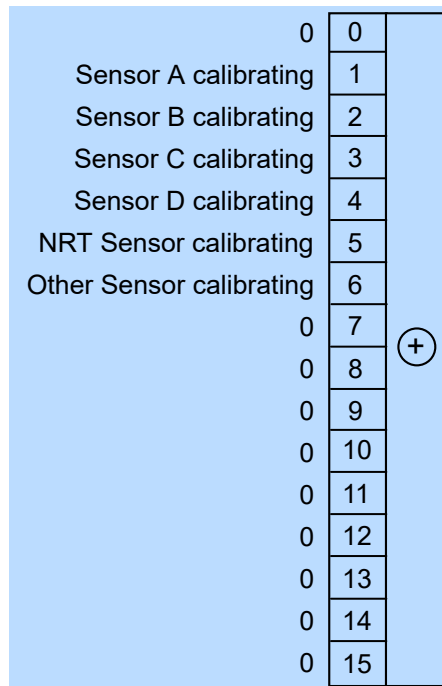


Figure 13-9: Operation calibrating status register

Querying the register:

- `STATUS:OPERation:CALibrating[:SUMMARY]:CONDition?`
- `STATUS:OPERation:CALibrating[:SUMMARY][:EVENT]?`

Table 13-10: Used operation calibrating status bits and their meaning

Bit no.	Short description	Bit is set if a sensor is zeroing.
1	Sensor A calibrating	Sensor A
2	Sensor B calibrating	Sensor B
3	Sensor C calibrating	Sensor C
4	Sensor D calibrating	Sensor D
5	NRT sensor calibrating	R&S NRT-Zxx sensor
6	Other sensor calibrating	USB or LAN sensor

### 13.2.5.2 Operation measuring status register

The `CONDition` register contains information on whether a sensor is measuring. The `EVENT` register contains information on whether a measurement was started or completed since the last query.

Extension Summary	0	+
Sensor A measuring	1	
Sensor B measuring	2	
Sensor C measuring	3	
Sensor D measuring	4	
NRT Sensor measuring	5	
Other Sensor measuring	6	
0	7	
0	8	
0	9	
0	10	
0	11	
0	12	
0	13	
0	14	
0	15	

Figure 13-10: Operation measuring status register

Querying the register:

- `STATUS:OPERation:MEASuring[:SUMMARY]:CONDition?`
- `STATUS:OPERation:MEASuring[:SUMMARY][:EVENT]?`

Table 13-11: Used operation measuring status bits and their meaning

Bit no.	Short description	Bit is set if a sensor is measuring or for the extension summary.
0	Extension summary	Summary of <a href="#">Operation measuring extended status registers</a> exists.
1	Sensor A measuring	Sensor A
2	Sensor B measuring	Sensor B
3	Sensor C measuring	Sensor C
4	Sensor D measuring	Sensor D
5	NRT sensor measuring	R&S NRT-Zxx sensor
6	Other sensor measuring	USB or LAN sensor

### 13.2.5.3 Operation measuring extended status registers

The `CONDition` registers contain information on whether a measurement channel is used. The `EVENT` registers contain information on whether a measurement channel was used since the last query.

For information on index `m`, see [Chapter 13.2.1, "Overview"](#), on page 485.



Extension Summary	0	+
Measurement m+1 measuring	1	
Measurement m+2 measuring	2	
Measurement m+3 measuring	3	
Measurement m+4 measuring	4	
Measurement m+5 measuring	5	
Measurement m+6 measuring	6	
Measurement m+7 measuring	7	
Measurement m+8 measuring	8	
0	9	
0	10	
0	11	
0	12	
0	13	
0	14	
0	15	

Figure 13-11: Operation measuring extended status registers

Querying the register:

- `STATUS:OPERation:MEASuring:EXTension<RegisterIndex>:CONDition?`
- `STATUS:OPERation:MEASuring:EXTension<RegisterIndex>[:SUMMARY] [:EVENT]?`

Table 13-12: Used operation measuring extended status bits and their meaning

Bit no.	Short description	Bit is set if a measurement channel is active or for the extension summary.
0	Extension summary	Sum bit of the next lower status register.
1	Measurement m+1 measuring	Channel 1
2	Measurement m+2 measuring	Channel 2
3	Measurement m+3 measuring	Channel 3
4	Measurement m+4 measuring	Channel 4
5	Measurement m+5 measuring	Channel 5
6	Measurement m+6 measuring	Channel 6
7	Measurement m+7 measuring	Channel 7
8	Measurement m+8 measuring	Channel 8

### 13.2.5.4 Operation trigger status register

The `CONDition` register contains information whether a sensor is waiting for a trigger event. The `EVENT` register contains information on whether the sensor has been waiting for a trigger event since the last query.

Extension Summary	0	+
Sensor A wait for trigger	1	
Sensor B wait for trigger	2	
Sensor C wait for trigger	3	
Sensor D wait for trigger	4	
NRT Sensor wait for trigger	5	
Other Sensor wait for trigger	6	
0	7	
0	8	
0	9	
0	10	
0	11	
0	12	
0	13	
0	14	
0	15	

Figure 13-12: Operation trigger status register

Querying the register:

- `STATUS:OPERation:TRIGger[:SUMMary]:CONDition?`
- `STATUS:OPERation:TRIGger[:SUMMary][:EVENT]?`

Table 13-13: Used operation trigger status bits and their meaning

Bit no.	Short description	Bit is set if a sensor is waiting for the trigger event or for the extension summary.
0	Extension summary	Summary of <a href="#">Operation trigger extended status registers</a> exists.
1	Sensor A wait for trigger	Sensor A
2	Sensor B wait for trigger	Sensor B
3	Sensor C wait for trigger	Sensor C
4	Sensor D wait for trigger	Sensor D
5	NRT sensor wait for trigger	R&S NRT-Zxx sensor
6	Other sensor wait for trigger	USB or LAN sensor

### 13.2.5.5 Operation trigger extended status registers

The `CONDition` registers contain information whether a measurement channel is waiting for a trigger event. The `EVENT` registers contain information on whether a measurement channel has been waiting for a trigger event since the last query.

For information on index `m`, see [Chapter 13.2.1, "Overview"](#), on page 485.

Extension Summary	0	+
Measurement m+1 wait for trigger	1	
Measurement m+2 wait for trigger	2	
Measurement m+3 wait for trigger	3	
Measurement m+4 wait for trigger	4	
Measurement m+5 wait for trigger	5	
Measurement m+6 wait for trigger	6	
Measurement m+7 wait for trigger	7	
Measurement m+8 wait for trigger	8	
0	9	
0	10	
0	11	
0	12	
0	13	
0	14	
0	15	

**Figure 13-13: Operation trigger extended status registers**

Querying the register:

- `STATUS:OPERation:TRIGger:EXTension<RegisterIndex>:CONDition?`
- `STATUS:OPERation:TRIGger:EXTension<RegisterIndex>[:SUMMARY][:EVENT]?`

**Table 13-14: Used operation trigger extended status bits and their meaning**

Bit no.	Short description	Bit is set if a measurement channel is waiting for the trigger event or for the extension summary.
0	Extension summary	Sum bit of the next lower status register.
1	Measurement m+1 wait for trigger	Channel 1
2	Measurement m+2 wait for trigger	Channel 2
3	Measurement m+3 wait for trigger	Channel 3
4	Measurement m+4 wait for trigger	Channel 4
5	Measurement m+5 wait for trigger	Channel 5
6	Measurement m+6 wait for trigger	Channel 6

Bit no.	Short description	Bit is set if a measurement channel is waiting for the trigger event or for the extension summary.
7	Measurement m+7 wait for trigger	Channel 7
8	Measurement m+8 wait for trigger	Channel 8

### 13.2.5.6 Operation sense status register

The `CONDition` register contains information whether a sensor is being initialized. The `EVENT` register contains information whether an initialization was started or completed since the last query.

A sensor is initialized if:

- Supply voltage is switched on (power-up).
- Sensor was connected.
- Reset was performed, `*RST` or `SYSTem:PRESet`.

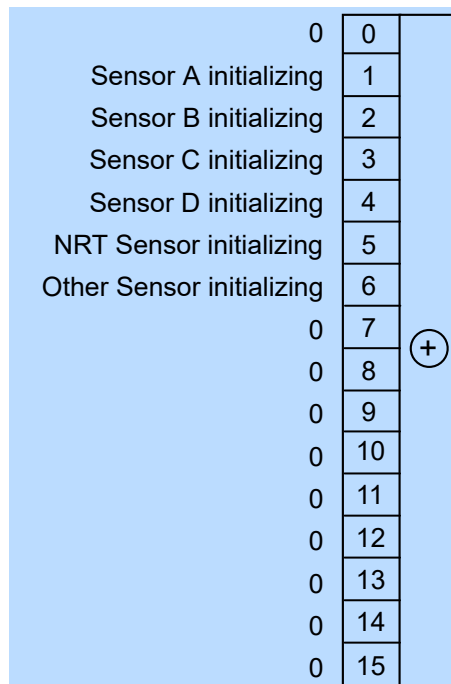


Figure 13-14: Operation sense status register

Querying the register:

- `STATus:OPERation:SENSe[:SUMMARY]:CONDition?`
- `STATus:OPERation:SENSe[:SUMMARY][:EVENT]?`

Table 13-15: Used operation sense status bits and their meaning

Bit no.	Short description	Bit is set if a sensor is initializing.
1	Sensor A initializing	Sensor A
2	Sensor B initializing	Sensor B

Bit no.	Short description	Bit is set if a sensor is initializing.
3	Sensor C initializing	Sensor C
4	Sensor D initializing	Sensor D
5	NRT sensor initializing	R&S NRT-Zxx sensor
6	Other sensor initializing	USB or LAN sensor

### 13.2.5.7 Operation lower limit fail status registers

The `CONDition` registers contain information whether a measured value is below a configured lower limit. The `EVENT` registers contain information on whether a measured value dropped below a limit value since the last query.

For information on index *m*, see [Chapter 13.2.1, "Overview"](#), on page 485.

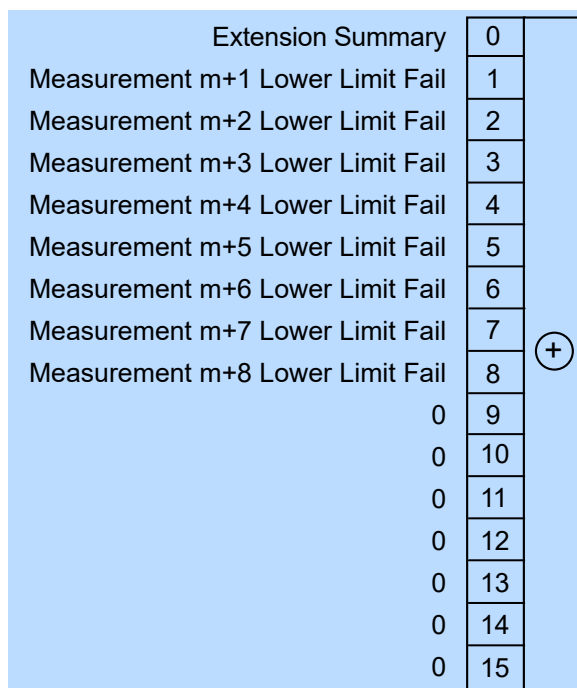


Figure 13-15: Operation lower limit fail status registers

Querying the register:

- `STATUS:OPERation:LLFail<RegisterIndex>[:SUMMARY]:CONDition?`
- `STATUS:OPERation:LLFail<RegisterIndex>[:SUMMARY][:EVENT]?`

Table 13-16: Used operation lower limit fail status bits and their meaning

Bit no.	Short description	Bit is set if measured values of a measurement channel are below the lower limit value or for the summary.
0	Extension summary	Sum bit of the next lower status register.
1	Measurement m+1 lower limit fail	Channel 1

Bit no.	Short description	Bit is set if measured values of a measurement channel are below the lower limit value or for the summary.
2	Measurement m+2 lower limit fail	Channel 2
3	Measurement m+3 lower limit fail	Channel 3
4	Measurement m+4 lower limit fail	Channel 4
5	Measurement m+5 lower limit fail	Channel 5
6	Measurement m+6 lower limit fail	Channel 6
7	Measurement m+7 lower limit fail	Channel 7
8	Measurement m+8 lower limit fail	Channel 8

### 13.2.5.8 Operation upper limit fail status registers

The `CONDition` registers contain information on whether a measured value currently exceeds a configured upper limit. The `EVENT` registers contain information on whether a measured value exceeded an upper limit value since the last query.

For information on index `m`, see [Chapter 13.2.1, "Overview"](#), on page 485.

Extension Summary		0
Measurement m+1 Upper Limit Fail		1
Measurement m+2 Upper Limit Fail		2
Measurement m+3 Upper Limit Fail		3
Measurement m+4 Upper Limit Fail		4
Measurement m+5 Upper Limit Fail		5
Measurement m+6 Upper Limit Fail		6
Measurement m+7 Upper Limit Fail		7
Measurement m+8 Upper Limit Fail		8
		+
	0	9
	0	10
	0	11
	0	12
	0	13
	0	14
	0	15

**Figure 13-16: Operation upper limit fail status registers**

Querying the register:

- `STATUS:OPERation:ULFail<RegisterIndex>[:SUMMARY]:CONDition?`
- `STATUS:OPERation:ULFail<RegisterIndex>[:SUMMARY][:EVENT]?`

**Table 13-17: Used operation upper limit fail status bits and their meaning**

Bit no.	Short description	Bit is set if measured values of a measurement channel exceed the upper limit value or for the summary.
0	Extension summary	Sum bit of the next lower status register.
1	Measurement m+1 upper limit fail	Channel 1
2	Measurement m+2 upper limit fail	Channel 2
3	Measurement m+3 upper limit fail	Channel 3
4	Measurement m+4 upper limit fail	Channel 4
5	Measurement m+5 upper limit fail	Channel 5
6	Measurement m+6 upper limit fail	Channel 6
7	Measurement m+7 upper limit fail	Channel 7
8	Measurement m+8 upper limit fail	Channel 8

# 14 Troubleshooting

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• <a href="#">Notifications</a> .....	504
• <a href="#">Performing tests</a> .....	508
• <a href="#">Collecting information for technical support</a> .....	509
• <a href="#">Contacting customer support</a> .....	509

## 14.1 Displaying information

### Status information

Status information is displayed in the title bar of the graphical user interface. See [Chapter 4, "Operating concepts"](#), on page 35.

In remote control, the status reporting system stores all information on the current operating state and occurred errors. See:

- [Chapter 12.15, "Using the status register"](#), on page 438
- [Chapter 13.2, "Status reporting system"](#), on page 485

### Instrument information

Instrument information, including the installed hardware and software options, is described in [Chapter 10.2, "Instrument information"](#), on page 162.

In remote control, use the commands described in [Chapter 12.14.9, "Instrument information"](#), on page 429.

### Sensor information

You can display information about one of the connected sensors. See ["Sensor Info"](#) on page 160.

In remote control, use the commands described in [Chapter 12.14.9, "Instrument information"](#), on page 429.

## 14.2 Notifications

The graphical user interface has a notification center where all information, warning and error messages are collected. See [Chapter 4.1.4, "Notification center"](#), on page 39.

In remote control, use the commands described in [Chapter 12.14.11, "Notifications and errors"](#), on page 434.



## 14.2.1 Interpreting notifications and their number

In the following, important notifications and their meaning are explained. For all other notifications, perform tests to find out whether it is a hardware or software problem, and report the problem to the R&S customer support. See [Chapter 14.3, "Performing tests"](#), on page 508.

In remote control, notifications and errors are associated with a unique number. Positive numbers are instrument-dependent. Negative numbers are reserved by the SCPI standard.

The notification types are grouped in number ranges. In the following description, both the number used in remote control and the description is given to help identify the problem.

### 14.2.1.1 System notifications

Number range: 1000 to 1999. Described notifications:

<a href="#">1004 - firmware update error</a> .....	505
<a href="#">1005 - settings conflict</a> .....	505
<a href="#">1007 - target descriptor error</a> .....	505
<a href="#">1008 - temperature alert</a> .....	505
<a href="#">1009 - fan failure alert</a> .....	506

#### **1004 - firmware update error**

Firmware update failed.

Possible reasons:

- You have used a \*.rsu file that is not designated for the R&S NRX. The name of a suitable \*.rsu file starts with "NRX".
- The firmware update was interrupted or otherwise faulty.

Solution: Perform the firmware update again. See [Chapter 11, "Firmware update"](#), on page 184.

#### **1005 - settings conflict**

Settings conflict of the R&S NRX occurred.

Reason: Contradictory settings are allowed so that you are not hampered in your workflow.

Solution: See [Chapter 5.5, "Settings conflict"](#), on page 52.

#### **1007 - target descriptor error**

Servicing required. You cannot resolve the problem yourself.

Solution: Contact customer support. See [Chapter 14.5, "Contacting customer support"](#), on page 509.

#### **1008 - temperature alert**

R&S NRX is overheated. Overheating can damage the R&S NRX.

Possible reasons:

- Insufficient airflow. Follow the instructions in [Chapter 3.1.4, "Setting up the product"](#), on page 20.
- The environmental temperature exceeds the suitable temperature range given in the specifications document under environmental conditions.
- The fan does not work properly. See [Chapter 14.5, "Contacting customer support"](#), on page 509.

#### **1009 - fan failure alert**

The fan does not work. Overheating can damage the R&S NRX.

Solution: Switch off the R&S NRX, and contact customer support. See [Chapter 14.5, "Contacting customer support"](#), on page 509.

### **14.2.1.2 Sensor notifications**

Number range: 2000 to 2999.

The sensors report their error states to the R&S NRX. The error states depend on the sensor type. Described notifications:

<a href="#">2001 - sensor maximum allowed count</a> .....	506
<a href="#">2003 - sensor settings conflict</a> .....	506
<a href="#">2005 - sensor underrange</a> .....	506
<a href="#">2006 - sensor overrange</a> .....	507
<a href="#">2007 - sensor overload</a> .....	507
<a href="#">2008 - sensor protocol minor mismatch</a> .....	507
<a href="#">2009 - sensor protocol major mismatch</a> .....	507

#### **2001 - sensor maximum allowed count**

The maximum number of sensors that you can use simultaneously is reached.

Solution: Install the R&S NRX-K2 second measurement channel or the R&S NRX-K4 third and fourth measurement channel.

See also:

- [Chapter 5.1, "Parallel measurements"](#), on page 48
- [Chapter 10.4, "Option management"](#), on page 176

#### **2003 - sensor settings conflict**

The current settings of the R&S NRX do not comply with the operating range of the connected sensor.

Solution: Change the settings of the R&S NRX or use another sensor that is suitable for the selected settings.

#### **2005 - sensor underrange**

Possible reasons:

- The detected signal is below the minimum value that the sensor can correctly measure.
- The current settings of the R&S NRX undercut the specified operating range of the connected sensor.

Solution: Change the settings of the R&S NRX or use another sensor that is suitable for the selected settings.

#### 2006 - sensor overrange

Possible reasons:

- The detected signal is above the maximum value that the sensor can correctly measure.
- The current settings of the R&S NRX exceed the specified operating range of the connected sensor.

Solution: Change the settings of the R&S NRX or use another sensor that is suitable for the selected settings.

#### 2007 - sensor overload

The RF input power exceeds the measurement range by far.

Solution: Immediately disconnect the sensor from the RF source to avoid damage. Use an attenuator or another sensor that is suitable for the input level.

#### 2008 - sensor protocol minor mismatch

The firmware version of the connected sensor is out-of-date.

Solution: An update of the sensor firmware is recommended.

#### 2009 - sensor protocol major mismatch

The firmware version of the connected sensor is not supported anymore.

Solution: Update the firmware of the connected sensor.

### 14.2.1.3 R&S NRX-B1 sensor check source notifications

Number range: 3000 to 3999. Described notifications:

3002 - setting not supported.....	507
3003 - missing calibration data.....	507
3004 - version <no.> available for R&S NRX-B1 sensor check source.....	508

#### 3002 - setting not supported

The R&S NRX-B1 sensor check source does not support the set frequency or power level.

Solution: Change the frequency or power level setting. See "[Sensor Check Source tab](#)" on page 150.

#### 3003 - missing calibration data

The calibration data of the R&S NRX-B1 sensor check source are missing for the set power level.

Solution:

- Change the frequency or power level setting. See "[Sensor Check Source tab](#)" on page 150.
- If you cannot work with another power level, servicing is required. Contact customer support. See [Chapter 14.5, "Contacting customer support"](#), on page 509.

**3004 - version <no.> available for R&S NRX-B1 sensor check source**

A newer version of the R&S NRX-B1 sensor check source is available.

Solution: Update the R&S NRX-B1 sensor check source as described in "[Sensor Check Source Info](#)" on page 151.

**14.2.1.4 License key notifications**

Number range: 4000 to 4999.

For all notifications not described here, collect information for technical support. See [Chapter 14.4, "Collecting information for technical support"](#), on page 509. Described notifications:

<a href="#">4001 - license key management warning</a> .....	508
<a href="#">4002 - remote language not allowed, NRX-K301 option missing</a> .....	508

**4001 - license key management warning**

Usually caused by:

- Problems with the system time. See "[Date and Time Settings](#)" on page 164.
- Wrong license key for a software option.  
See [Chapter 10.4, "Option management"](#), on page 176.

**4002 - remote language not allowed, NRX-K301 option missing**

For the feature you want to use, the R&S NRX-K301 Keysight emulation mode is required. The option is not installed on your R&S NRX.

Solution: Purchase the R&S NRX-K301 Keysight emulation mode and install it. See also [Chapter 10.4, "Option management"](#), on page 176.

**14.2.1.5 Queue handling notifications**

Number range starts from 9000.

**9001 - static error queue overflow**

The queue of events has reached its maximum number of 1000 notices, warnings and errors. No more entries are created.

Solution: Solve the errors before continuing.

**14.3 Performing tests**

Using the graphical user interface, you can test the following:

- User interface of the R&S NRX. See [Chapter 10.5, "User interface tests"](#), on page 180.
- Connected sensors:
  - "[Sensor Test](#)" on page 160
  - "[Sensor Test at Check Source](#)" on page 161
  - "[... with Attenuator](#)" on page 161

In remote control, use the commands described in [Chapter 12.12, "Running self-tests"](#), on page 407.

## 14.4 Collecting information for technical support

If you encounter problems that you cannot solve yourself, contact your Rohde & Schwarz support center, see [Chapter 14.5, "Contacting customer support"](#), on page 509. Our support center staff is optimally trained to assist you in solving problems.

The support center finds solutions more quickly and efficiently if you provide them with information on the instrument and an error description.

### Obtaining information from the R&S NRX firmware

1. Select [System] > "Test".
2. Create and save the information for troubleshooting. See ["Creating information for troubleshooting"](#) on page 181.

Attach the archive file to an email in which you describe the problem.

If you need to transport or ship the product, see [Chapter 15, "Transporting"](#), on page 511.

## 14.5 Contacting customer support

### Technical support – where and when you need it

For quick, expert help with any Rohde & Schwarz product, contact our customer support center. A team of highly qualified engineers provides support and works with you to find a solution to your query on any aspect of the operation, programming or applications of Rohde & Schwarz products.

### Contact information

Contact our customer support center at [www.rohde-schwarz.com/support](http://www.rohde-schwarz.com/support), or follow this QR code:



*Figure 14-1: QR code to the Rohde & Schwarz support page*

# 15 Transporting

## Lifting and carrying

See:

- ["Lifting and carrying the product"](#) on page 12
- [Chapter 3.1.1, "Lifting and carrying"](#), on page 19

## Packing

Use the original packaging material. It consists of antistatic wrap for electrostatic protection and packing material designed for the product.

If you do not have the original packaging, use similar materials that provide the same level of protection. You can also contact your local Rohde & Schwarz service center for advice.

## Securing

When moving the product in a vehicle or using transporting equipment, make sure that the product is properly secured. Only use items intended for securing objects.

## Transport altitude

The maximum transport altitude without pressure compensation is specified in the specifications document.

# 16 Maintenance, storage and disposal

The product does not require regular maintenance. It only requires occasional cleaning. It is however advisable to check the nominal data from time to time.

## 16.1 Cleaning

How to clean the product is described in "[Cleaning the product](#)" on page 13.

Do not use any liquids for cleaning. Cleaning agents, solvents, acids and bases can damage the front panel labeling, plastic parts and display.

## 16.2 Storage

Protect the product against dust. Ensure that the environmental conditions, e.g. temperature range and climatic load, meet the values specified in the specifications document.

## 16.3 Disposal

Rohde & Schwarz is committed to making careful, ecologically sound use of natural resources and minimizing the environmental footprint of our products. Help us by disposing of waste in a way that causes minimum environmental impact.

### Disposing of electrical and electronic equipment

A product that is labeled as follows cannot be disposed of in normal household waste after it has come to the end of its life. Even disposal via the municipal collection points for waste electrical and electronic equipment is not permitted.



*Figure 16-1: Labeling in line with EU directive WEEE*

Rohde & Schwarz has developed a disposal concept for the eco-friendly disposal or recycling of waste material. As a manufacturer, Rohde & Schwarz completely fulfills its obligation to take back and dispose of electrical and electronic waste. Contact your local service representative to dispose of the product.



## Glossary: List of abbreviations

### A

**AVG:** Average

### C

**CCDF:** Complementary cumulative distribution function

**CDMA:** Code division multiple access

### D

**DHCP:** Dynamic host control protocol

**DNS:** Domain name system

### E

**EMC:** Electromagnetic compatibility

**EMI:** Electromagnetic interference

### F

**FTP:** File transfer protocol

### G

**GPIO:** General purpose interface bus

### H

**HiSLIP:** High-speed LAN instrument protocol

### I

**IDN:** Instrument identification string

**IP:** Internet protocol

### L

**LAN:** Local area network

### O

**OPT:** Option identification string

**OSA:** Open source acknowledgment

### P

**PEP:** Peak envelope power

**S**

**SCP:** System and communications protections

**SCPI:** Standard commands for programmable instruments

**SSH:** Secure shell

**SWR:** Standing wave ratio

**U**

**USB:** Universal serial bus

**V**

**VISA:** Virtual instrument software architecture

**VNC:** Virtual network computing

**W**

**WCDMA:** Wideband code division multiple access

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