

# R&S®NRX

## Power Meter

### User Manual



1178556602

This manual describes the R&S®NRX (1424.7005.02) with firmware version FW 02.20 and later.  
In addition to the base unit, the following options are described:

- R&S®NRX-B1 (1424.7805.02)
- R&S®NRX-B4 (1424.8901.02)
- R&S®NRX-B8 (1424.8301.02)
- R&S®NRX-B9 (1424.8601.02)
- R&S®NRX-K2 (1424.9208.02)
- R&S®NRX-K4 (1424.9308.02)

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1178.5566.02 | Version 05 | R&S®NRX

Throughout this manual, products from Rohde & Schwarz are indicated without the ® symbol , e.g. R&S®NRX is indicated as R&S NRX.

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# 1 Preface

This chapter provides safety related information and an introduction to the R&S NRX.

## 1.1 Documentation Overview

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

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

### 1.1.1 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.

### 1.1.2 User Manuals and Help

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 .

### 1.1.3 Tutorials

Tutorials offer guided examples and demonstrations on operating the R&S NRX. They are provided on the product page of the internet.

### 1.1.4 Basic Safety Instructions

Contains safety instructions, operating conditions and further important information. The printed document is delivered with the instrument.

### 1.1.5 Data Sheets and Brochures

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)

### 1.1.6 Release Notes and Open Source Acknowledgment (OSA)

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

The open source acknowledgment document provides verbatim license texts of the used open source software.

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

### 1.1.7 Application Notes, Application Cards, White Papers, etc.

These documents deal with special applications or background information on particular topics.

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

## 1.2 Key Features

The R&S NRX supports:

- Easy RF power measurements
- Multi-channel 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 power 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 directional power sensors

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

## 2 Safety Information

The product documentation helps you use the R&S NRX safely and efficiently. Follow the instructions provided here and in the printed "Basic Safety Instructions". Keep the product documentation nearby and offer it to other users.

### **Intended use**

The R&S NRX is intended for the development, production and verification of electronic components and devices in industrial, administrative, and laboratory environments. Use the R&S NRX only for its designated purpose. Observe the operating conditions and performance limits stated in the data sheet.

### **Where do I find safety information?**

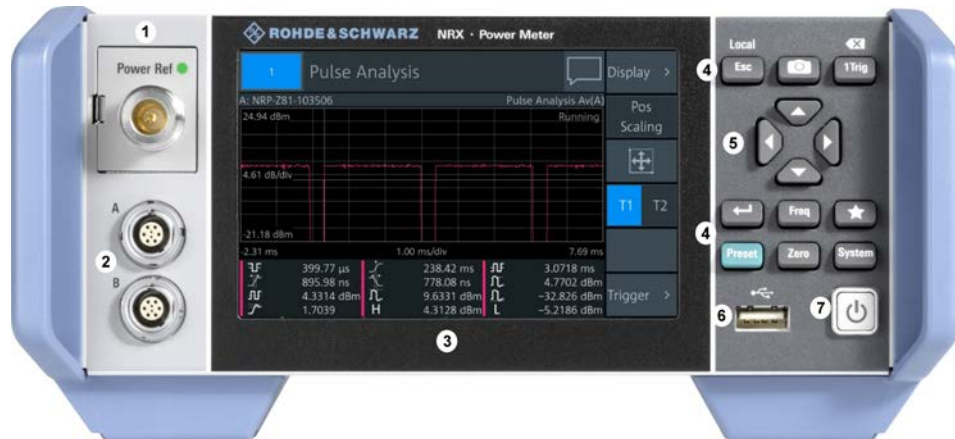
Safety information is part of the product documentation. It warns you about the potential dangers and gives instructions how to prevent personal injuries or damage caused by dangerous situations. Safety information is provided as follows:

- The printed "Basic Safety Instructions" provide safety information in many languages and are delivered with the R&S NRX.
- Throughout the documentation, safety instructions are provided when you need to take care during setup or operation.

## 3 Instrument Tour

- [Front Panel Tour](#).....14
- [Rear Panel Tour](#).....19

### 3.1 Front Panel Tour



**Figure 3-1: Front panel of the R&S NRX**

- 1 = Module bay for optional connectors, see [Chapter 3.1.2, "Module Bay"](#), on page 14.
- 2 = Sensor connectors A and B, see [Chapter 3.1.1, "Sensor Connector A and B"](#), on page 14.
- 3 = Touchscreen, see [Chapter 3.1.3, "Touchscreen"](#), on page 16.
- 4 = Keys, see [Chapter 3.1.4, "Keys"](#), on page 16.
- 5 = Cursor keys, see ["Cursor keys"](#) on page 18.
- 6 = USB host interface, see [Chapter 3.1.5, "USB Host Interface"](#), on page 18.
- 7 = On/standby key, see [Chapter 3.1.6, "On/Standby Key"](#), on page 18.

#### 3.1.1 Sensor Connector A and B

See (2) in [Figure 3-1](#).

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 data sheet.

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

Further information:

- [Chapter 4.8, "Connecting Power Sensors"](#), on page 26

#### 3.1.2 Module Bay

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

Two options fit in this bay. If you have both options, you can exchange them, see ["To exchange the option"](#) on page 15.

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

### Sensor check source (R&S NRX-B1)

Used as a power reference for testing the connected power sensors and the cabling. The LED of the sensor check source (R&S NRX-B1) shows the state, see [Table 3-1](#).

You can remove the option and send it to Rohde & Schwarz for calibration. Contact the Rohde & Schwarz customer service.

**Table 3-1: 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"

### Sensor interface for R&S NRT (R&S NRX-B9)

Provides an optional power sensor connector to connect an R&S NRT-Zxx power sensor. For supported power sensors, see the data sheet.

### To exchange the option

1. Press the latch to the right, using your thumb nail 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 4.8, "Connecting Power Sensors"](#), on page 26
- ["Sensor Check Source tab"](#) on page 134
- [Chapter 14.7, "Configuring the Test Generator"](#), on page 334

### 3.1.3 Touchscreen

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

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



#### False triggers of the touch panel in the presence of static electricity

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 29

### 3.1.4 Keys

See (4) in [Figure 3-1](#).

#### [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 5.1.1, "Start Dialog"](#), on page 29.

Further information:

- ["Going back to a higher hierarchy level"](#) on page 29
- [Chapter 5.3.2, "Returning to Manual Operation \(LOCAL\)"](#), on page 40

#### Screenshot



Creates a screenshot of the current display.

See [Chapter 5.1.8, "Creating and Saving Screenshots"](#), on page 38.

Remote command:

[SYSTem:HCOPY](#) on page 206

#### [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 57.
- Resets the auxiliary values that provide additional information about the measured values.  
See also ["Auxiliary Values"](#) on page 48.
- 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 302

**Favorites**

Reserved for future use.

**[Preset]**

Opens the "Save / Recall / Preset" dialog.

See [Chapter 10, "Saving and Recalling Settings"](#), on page 123.

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

See ["Preset"](#) on page 124.

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.

- Starts the zero calibration.
- Displays zeroing status.
- Displays sensor status.

**[System]**

Opens the "System Overview" dialog.

See [Chapter 12, "System Settings"](#), on page 127.

**Cursor keys**

See (5) in [Figure 3-1](#).

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.

### 3.1.5 USB Host Interface

See (6) in [Figure 3-1](#).

USB 2.0 (universal serial bus) interface of the type A (host USB). Used to connect USB power sensors and external devices like a keyboard, mouse, or memory stick.

Further information:

- [Chapter 4.8.4, "USB 2.0 Host Interfaces"](#), on page 27
- [Chapter 4.9, "Connecting USB and External Devices"](#), on page 28

### 3.1.6 On/Standby Key

See (7) in [Figure 3-1](#).

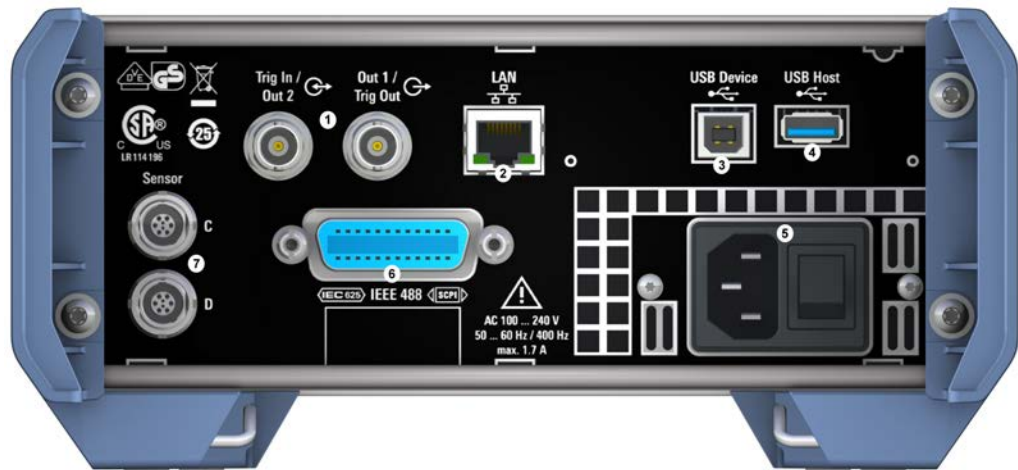
The on/standby key toggles the R&S NRX between standby and ready state.

The following states are possible:

- Off (key is not illuminated)  
The AC power switch on the back of the R&S NRX is switched off. The R&S NRX is disconnected from the AC power supply.
- Ready (green)  
The R&S NRX is ready for operation.
- Standby (red)  
The power supply has the operating voltage supplied to it. Thus, the R&S NRX is still power-supplied.

For operating details, see [Chapter 4.7, "Switching On or Off"](#), on page 25.

## 3.2 Rear Panel Tour



**Figure 3-2: Rear panel of the R&S NRX**

- 1 = Trig In / Out 2 and Out 1 / Trig Out connectors, see [Chapter 3.2.1, "Trig In / Out 2 and Out 1 / Trig Out Connectors"](#), on page 19.
- 2 = Ethernet interface, see [Chapter 3.2.2, "Ethernet Interface"](#), on page 20.
- 3 = USB device interface, see [Chapter 3.2.3, "USB Device Interface"](#), on page 20.
- 4 = USB host interface, see [Chapter 3.2.4, "USB Host Interface"](#), on page 20.
- 5 = AC supply and power switch, see [Chapter 3.2.5, "AC Supply and Power Switch"](#), on page 20.
- 6 = IEC 625/IEEE 488 interface, optional, see [Chapter 3.2.6, "IEC 625/IEEE 488 Interface"](#), on page 20.
- 7 = Sensor connectors C and D (optional), used to connect R&S power sensors, see [Chapter 3.2.7, "Sensor Connectors C and D"](#), on page 21.

### 3.2.1 Trig In / Out 2 and Out 1 / Trig Out Connectors

See (1) in [Figure 3-2](#).

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 136

### 3.2.2 Ethernet Interface

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

The Ethernet connector is an RJ45 socket for remote controlling the R&S NRX via a network.

### 3.2.3 USB Device Interface

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

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.

### 3.2.4 USB Host Interface

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

See [Chapter 3.1.5, "USB Host Interface"](#), on page 18.

### 3.2.5 AC Supply and Power Switch

See (5) in [Figure 3-2](#).

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 type label. There is no need to set the voltage manually.

For more details, see [Chapter 4.6, "Connecting to the AC Power Supply"](#), on page 25.

### 3.2.6 IEC 625/IEEE 488 Interface

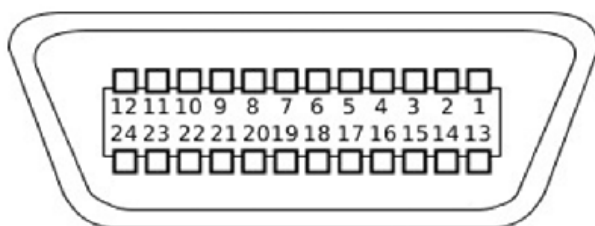
See (6) in [Figure 3-2](#).

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

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



### 3.2.7 Sensor Connectors C and D

See (7) [Figure 3-2](#).

Requires 3rd and 4th R&S NRP sensor connector (R&S NRX-B4).

For more details, see [Chapter 3.1.1, "Sensor Connector A and B"](#), on page 14.

## 4 Preparing for Use

• Unpacking and Checking.....	22
• Operating Conditions.....	22
• Important Aspects for Test Setup.....	23
• Placing on a Bench Top.....	23
• Mounting in a Rack.....	25
• Connecting to the AC Power Supply.....	25
• Switching On or Off.....	25
• Connecting Power Sensors.....	26
• Connecting USB and External Devices.....	28

### 4.1 Unpacking and Checking

Check the equipment for completeness using the delivery note and the accessory lists for the various items. Check the R&S NRX for any damage. If there is damage, immediately contact the carrier who delivered the R&S NRX. Make sure not to discard the box and packing material.



#### Packing material

Retain the original packing material. If the instrument needs to be transported or shipped later, you can use the material to protect the control elements and connectors.

#### 4.1.1 Accessory List

The R&S NRX comes with the following accessories:

- Printed getting started manual
- Multilingual safety brochure
- Additive data sheet ref. China ROHS
- Country-specific power cable

### 4.2 Operating Conditions

Specific operating conditions are required to ensure accurate measurements and to avoid damage to the R&S NRX and connected devices. Before switching on the R&S NRX, observe the information on appropriate operating conditions provided in the basic safety instructions and the data sheet of the R&S NRX.

In particular, ensure the following:

- The R&S NRX is dry and shows no sign of condensation.
- The ambient temperature does not exceed the range specified in the data sheet.
- Signal levels at the input connectors are all within the specified ranges.

- Signal outputs are connected correctly and are not overloaded.

## 4.3 Important Aspects for Test Setup

### Preventing electrostatic discharge (ESD)

Electrostatic discharge is most likely to occur when you connect or disconnect a DUT or test fixture to the instrument's test ports.

- **NOTICE!** Risk of electrostatic discharge (ESD). Electrostatic discharge (ESD) can damage the electronic components of the R&S NRX and the device under test (DUT).

Ground yourself to avoid electrostatic discharge (ESD) damage:

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

### EMI impact on measurement results

Electromagnetic interference (EMI) may affect the measurement results.

To suppress generated electromagnetic interference (EMI):

- Use suitable shielded cables of high quality. For example, use double-shielded RF and LAN cables.
- Always terminate open cable ends.
- Note the EMC classification in the data sheet.
- Do not use USB connecting cables exceeding 5 m.

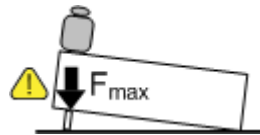
## 4.4 Placing on a Bench Top

Place the R&S NRX on a stable and level surface. The R&S NRX can be used in horizontal position, standing on its feet, or with the support feet on the bottom extended. Do not place anything on top of the R&S NRX, if the R&S NRX is not in a level position.

**⚠ WARNING****Risk of injury if feet are folded out**

The feet can fold in if they are not folded out completely or if the instrument is shifted. Collapsing feet can cause injury or damage the instrument.

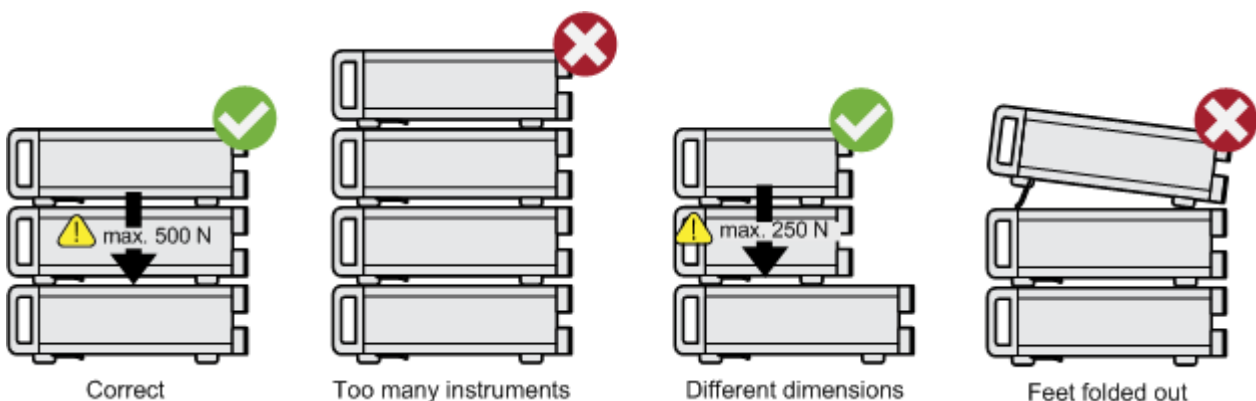
- Fold the feet completely in or out to ensure stability of the instrument. Never shift the instrument when the feet are folded out.
- When the feet are folded out, do not work under the instrument or place anything underneath.
- The feet can break if they are overloaded. The overall load on the folded-out feet must not exceed 500 N.

**⚠ WARNING****Risk of injury when stacking instruments**

A stack of instruments can tilt over and cause injury if not stacked correctly. Furthermore, the instruments at the bottom of the stack can be damaged due to the load imposed by the instruments on top.

Observe the following instructions when stacking instruments:

- Never stack more than three instruments. If you need to stack more than three instruments, install them in a rack.
- The overall load imposed on the lowest instrument must not exceed 500 N.
- It is best if all instruments have the same dimensions (width and length). If you need to stack smaller instruments on the top, the overall load imposed on the lowest instrument must not exceed 250 N.
- If the instruments have foldable feet, fold them in completely.





## 4.5 Mounting in a Rack

1. Order one of the rack adapter kits designed for the R&S NRX. For the order number, see data sheet.
2. Follow the installation instructions provided with the adapter kit.
3. **NOTICE!** Insufficient airflow can cause overheating and damage the R&S NRX. Develop and implement an efficient ventilation concept.

## 4.6 Connecting to the AC Power Supply

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 data sheet for the requirements of voltage and frequency.

The power switch can be set to two positions:

- [0]: The instrument is disconnected from the mains.
  - [I]: The instrument is power-supplied. It is either ready for operation (STANDBY) or in operating mode.
1. Plug the AC power cable into the AC power connector on the rear panel of the R&S NRX. Only use the power cable delivered with the R&S NRX.
  2. Plug the AC power cable into a power outlet with ground contact. The R&S NRX complies with safety class EN61010-1.

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

Further information:

- [Chapter 3.2.5, "AC Supply and Power Switch"](#), on page 20

## 4.7 Switching On or Off

The possible instrument states are described in [Chapter 3.1.6, "On/Standby Key"](#), on page 18.

### To switch on the R&S NRX

1. To turn on the power, press the AC power switch at the rear to position [I] (On). After power-up, the R&S NRX is in standby or ready state, depending on the position of the on/standby key.
2. If the R&S NRX is in standby state, press the on/standby key. The R&S NRX initiates its startup procedure. It boots the operating system and starts the instrument firmware.

See [Chapter 5.1.1, "Start Dialog"](#), on page 29.

If the previous session ended regularly, the R&S NRX 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 124.

#### To switch off the R&S NRX

1. Press the on/standby key.

The R&S NRX saves its current settings for reuse in the next session and changes into the standby state.

2. To power down the R&S NRX completely, set the AC power switch to position [0] (Off).

Further information:

- [Chapter 10, "Saving and Recalling Settings"](#), on page 123
- [Chapter 3.1.6, "On/Standby Key"](#), on page 18

## 4.8 Connecting Power Sensors

The R&S NRX supports a wide range of R&S power sensors. See the data sheet for detailed information.

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

### 4.8.1 Sensor Connectors A to D

See [Chapter 3.1.1, "Sensor Connector A and B"](#), on page 14 and [Chapter 3.2.7, "Sensor Connectors C and D"](#), on page 21.

Suitable for:

- USB and LAN power sensors
- R&S NRQ6
- R&S NRP-Zxx power sensors

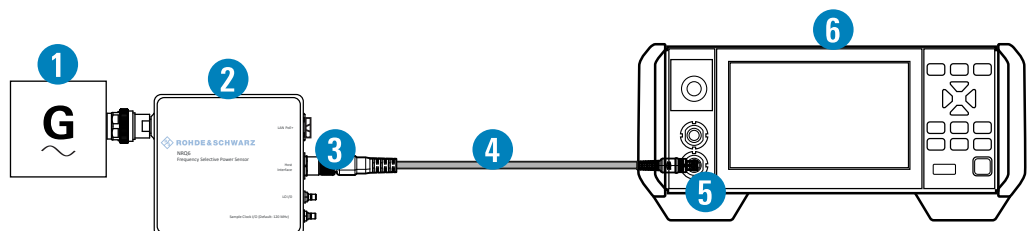


Figure 4-1: Setup with an R&S power sensor (example)

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

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

1. 8-pin female connector of R&S NRP-ZK8:
  - a) Insert the screw-lock cable connector into the host interface of the R&S power sensor.
  - b) Tighten the union nut manually.
2. 8-pin male connector of R&S NRP-ZK8:
  - a) Insert this connector into one of the sensor ports of the R&S NRX.
3. Connect the RF connector of the R&S power sensor to the signal source. For details, see the user manual of the R&S power sensor.

**Note:** Incorrectly connecting/disconnecting an R&S power sensor can damage the power sensor or lead to erroneous results.

#### 4.8.2 Optional Sensor Interface for R&S NRT (R&S NRX-B9)

See [Chapter 3.1.2, "Module Bay"](#), on page 14.

Suitable for R&S NRT directional power sensors.

- Connect the R&S NRT-Zxx power sensor between source and load.

#### 4.8.3 LAN Interface

See [Chapter 3.2.2, "Ethernet Interface"](#), on page 20.

Suitable for LAN power sensors.

R&S power sensors that are connected to the LAN interface are not recognized automatically. You need to add them, see ["To add a LAN power sensor"](#) on page 140.

#### 4.8.4 USB 2.0 Host Interfaces

See [Chapter 3.1.5, "USB Host Interface"](#), on page 18 and [Chapter 3.2.4, "USB Host Interface"](#), on page 20.

Suitable for USB power sensors.

## 4.9 Connecting USB and External Devices

Apart from connecting USB power sensors, you can 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.

## 5 Operating Concepts

• <a href="#">Manual Operation</a> .....	29
• <a href="#">Remote Operation</a> .....	38
• <a href="#">Remote Control</a> .....	39

### 5.1 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.



*Tap* = touch the screen quickly, usually on a specific element. You can tap 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.

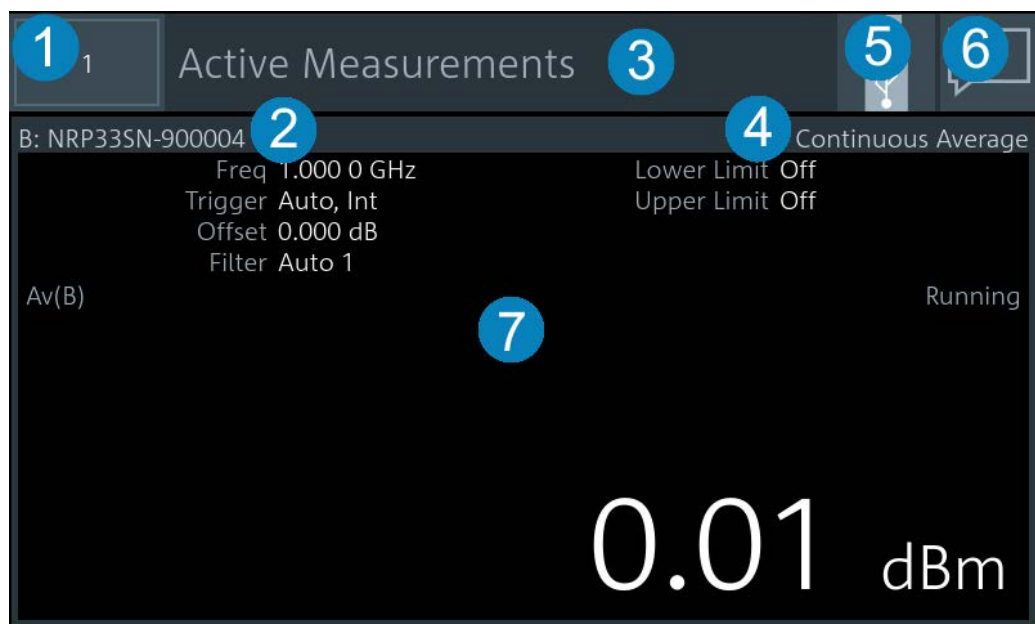
#### Going back to a higher hierarchy level

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

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

#### 5.1.1 Start Dialog

1. Connect a power sensor to the R&S NRX as described in [Chapter 4.8, "Connecting Power Sensors"](#), on page 26.
2. Boot the R&S NRX.  
After successful booting, the R&S NRX displays the start dialog.



**Figure 5-1: Start dialog (example for setup with one power sensor)**

- 1 = Miniature display layout. See [Chapter 5.1.5, "Selecting the Display Layout"](#), on page 34.
- 2 = Connected sensors
- 3 = Title
- 4 = Measurement mode
- 5 = Status information. See [Chapter 5.1.3, "Status Information"](#), on page 32.
- 6 = Notification center status, see [Chapter 5.1.4, "Notification Center"](#), on page 33.
- 7 = Measurement pane

In the measurement pane, the settings, results and status of the active measurements are displayed. The layout depends on the selected display layout. See [Chapter 5.1.5, "Selecting the Display Layout"](#), on page 34.

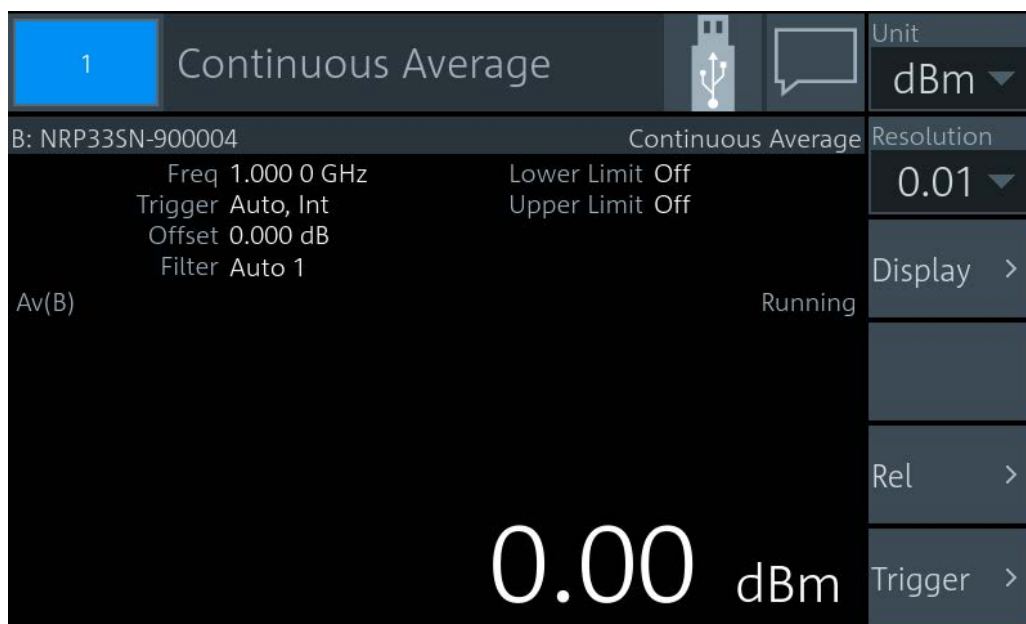
## 5.1.2 Main Measurement Dialog

From the start dialog, you can access the measurements.

### To access a measurement

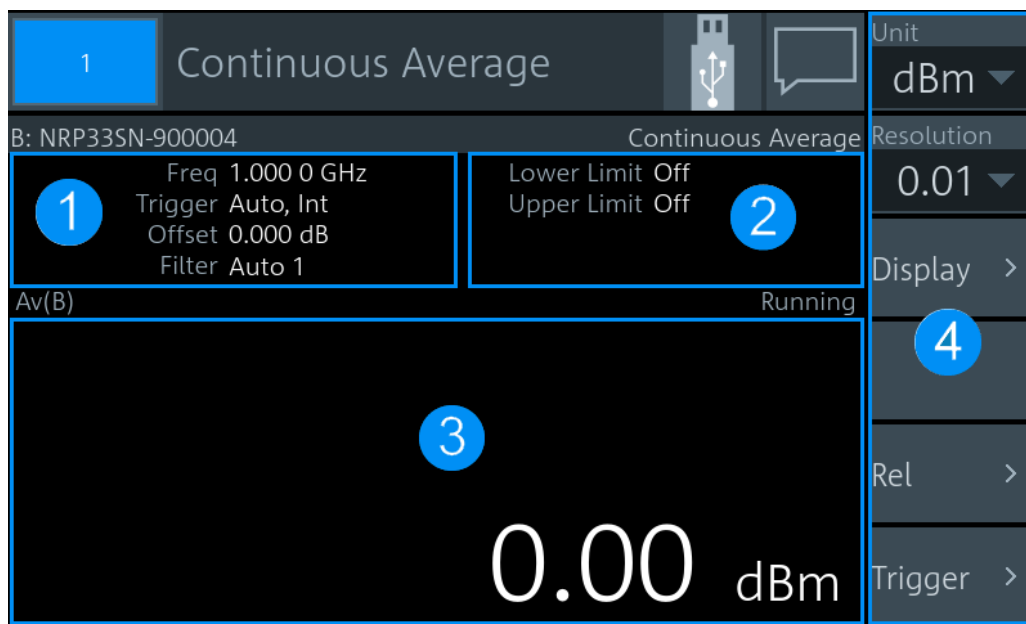
- In the start dialog, tap the pane of the measurement you want to access. In this example, tap (7) in [Figure 5-1](#).

The selected measurement is displayed in full screen. Its number is highlighted in the miniature display layout in the upper left corner.



#### Layout of the main measurement dialog

The operating philosophy in the main measurement dialog is independent of the measurement type. The dialog is divided into touch areas that lead to different settings.



**Figure 5-2: Layout of the main measurement dialog (example)**

- 1 = Settings displayed in the measurement pane
- 2 = Limit values displayed in the measurement pane
- 3 = Measurement value displayed in the measurement pane
- 4 = Navigation pane

► Tap the *displayed settings*, (1) in [Figure 5-2](#), to access the sensor settings.

The "Primary Sensor" dialog is displayed.

See [Chapter 9, "Sensor Configuration"](#), on page 104.

- ▶ Tap the *displayed limit values*, (2) in [Figure 5-2](#), to change the measurement type, assign a sensor, access the sensor settings, ...

The "Limit Monitor" dialog is displayed.

See ["Limit Monitor"](#) on page 51.

- ▶ Tap the *displayed measurement value or graph*, (3) in [Figure 5-2](#), to change the measurement type, assign a sensor, access the sensor settings, ...

The "Measurement Settings" dialog is displayed.

See [Chapter 7.4, "Measurement Settings Dialog"](#), on page 60.

- ▶ Tap an *element in the navigation pane*, (4) in [Figure 5-2](#), to configure the trigger, the presentation of the measurement result and further measurement-specific settings.




See [Chapter 7, "Configuration for All Measurement Types"](#), on page 46.

Tapping 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.



### 5.1.3 Status Information

The status information is displayed in the upper right corner, left from the notification center. See [Figure 5-1](#).

**Table 5-1: Status symbols**

Symbol	Description	Further information
	Memory stick is connected and ready for use.	<a href="#">Chapter 4.9, "Connecting USB and External Devices"</a> , on page 28
	Memory stick is connected and initialization is in progress. When the moving green dot vanishes, the memory stick is ready for use.	
	R&S NRX is in remote control.	<a href="#">Chapter 5.3.2, "Returning to Manual Operation (LOCAL)"</a> , on page 40



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 power sensor is in progress.	





### 5.1.4 Notification Center

The notification center collects all information, warning and error messages during the operation of the R&S NRX. Its status is displayed in the upper right corner:

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

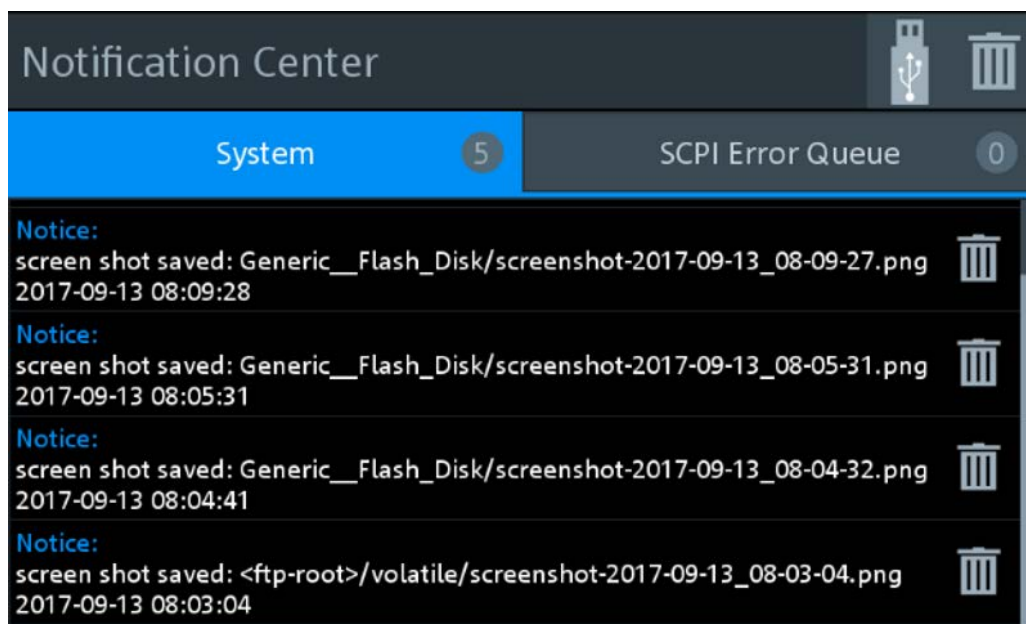
See (6) in [Figure 5-1](#).

**Table 5-2: 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

- Tap 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 no longer needed

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

### 5.1.5 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. Tap the miniature display layout in the upper left corner.



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



Figure 5-3: Two measurement panes

Remote command:

`DISPlay:LAYout` on page 180

### 5.1.6 Swapping Measurement Panes

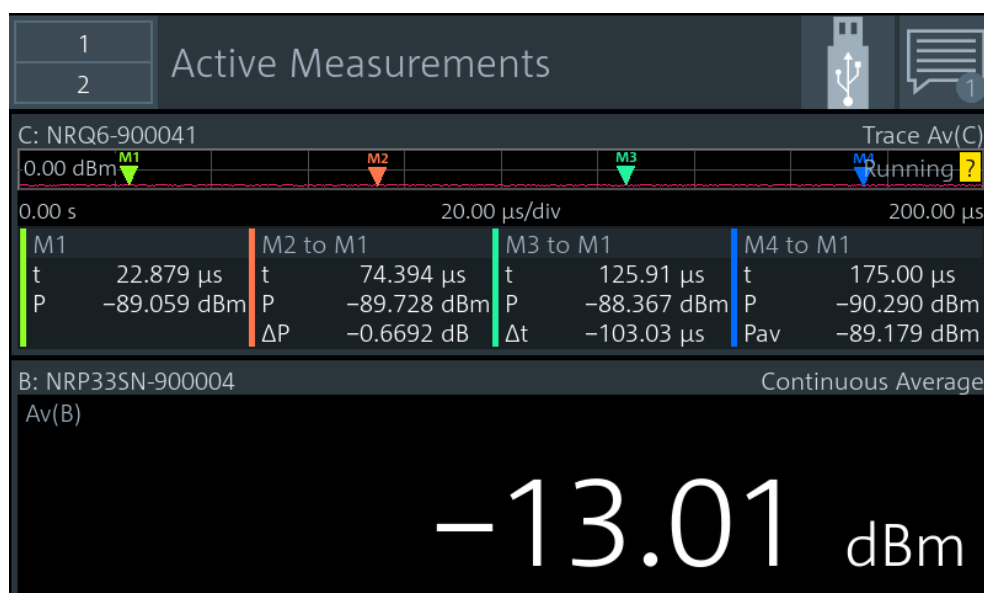
You can swap the position of measurement panes using drag and drop. The numbering of the panes is not changed.

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

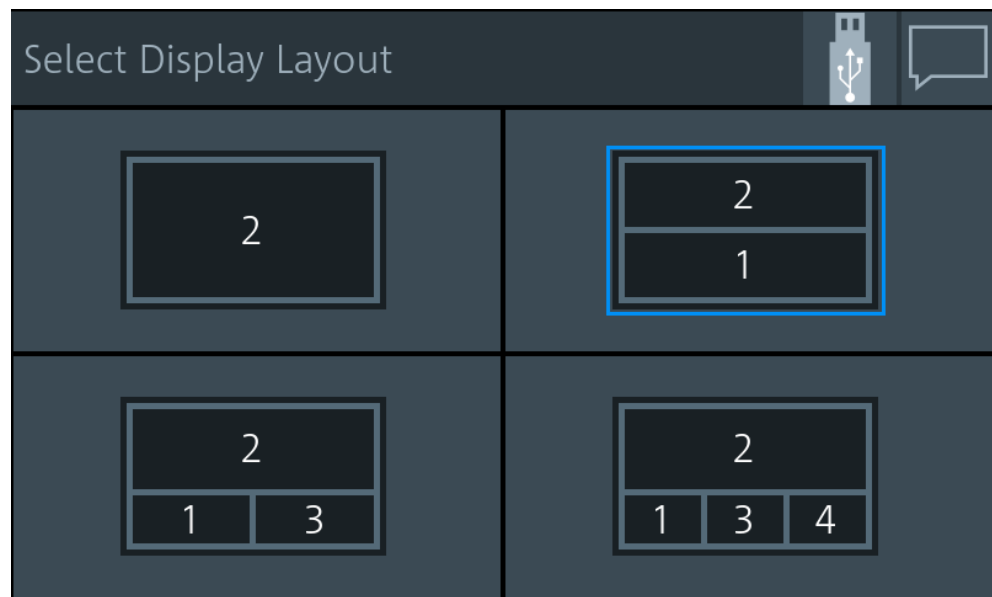
- Touch & hold a measurement pane and drag it into the new position.



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 182

### 5.1.7 Editing Parameters

- ▶ Tap a parameter to change its value.

Depending on the selected parameter, a numeric or an alphanumeric editor is displayed.

The numeric editor shows for each parameter the specific value range (min, max).

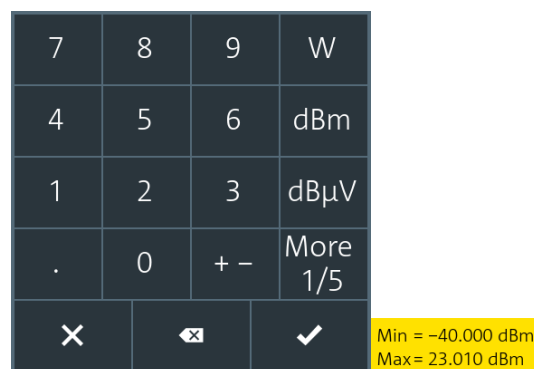


Figure 5-4: Numeric editor

Use the alphanumeric editor as a standard keyboard.

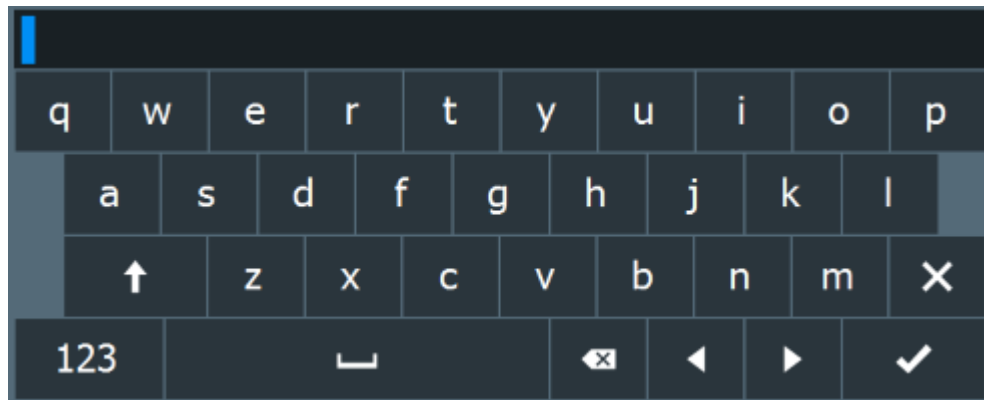


Figure 5-5: Alphanumeric editor

### 5.1.8 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. Default user identification and password are *instrument*.

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

Remote control:

[SYSTem:HCOPY](#) on page 206

Further information:

- [Chapter 4.9, "Connecting USB and External Devices"](#), on page 28
- [Chapter 3.1.5, "USB Host Interface"](#), on page 18

## 5.2 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 5.1, "Manual Operation"](#), on page 29) 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 password and IP address of the R&S NRX can access the R&S NRX. To prevent access, disable the VNC server service under "VNC" on page 148.

#### 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 129.
4. Click "Connect".
5. Enter the session password. The preconfigured password is *instrument*.

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

1. Open the web browser.
2. Enter as web address: *http://<hostname>* or *http://<IP address>*. For example, *http://nrx-104711*.  
See also "Overview tab" on page 129.
3. Enter the password. The preconfigured password is *instrument*.

## 5.3 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, "Instrument Tour"](#), on page 14.

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 test instruments with functions beyond the scope of the IEEE 488.2 standard.

For a detailed description of the remote commands, see [Chapter 14, "Remote Control Commands"](#), on page 163.

### 5.3.1 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.

### 5.3.2 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 16.  
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).
- ▶ Tap the symbol on the touchscreen.  
See [Chapter 5.1.3, "Status Information"](#), on page 32.



## 6 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.

• <a href="#">Parallel Measurements</a> .....	41
• <a href="#">Sensor Assignment and Memory</a> .....	41
• <a href="#">Performing a Measurement</a> .....	43
• <a href="#">Limit Violation</a> .....	44
• <a href="#">Settings Conflict</a> .....	44

### 6.1 Parallel Measurements

An R&S NRX without enhancements supports the configuration of one power sensor for one measurement type. If you want to configure more than one power sensor simultaneously or run different measurement types in parallel, you can extend both to a maximum of 4 with the following options:

- second measurement channel (R&S NRX-K2)
- 3rd and 4th measurement channel (R&S NRX-K4)

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 5.1.5, "Selecting the Display Layout"](#), on page 34.

If you connect more than 4 power sensors simultaneously, the R&S NRX notifies you. Use the sensor manager to handle more than 4 power sensors, see [Chapter 12.1.4, "Sensor Manager"](#), on page 139.

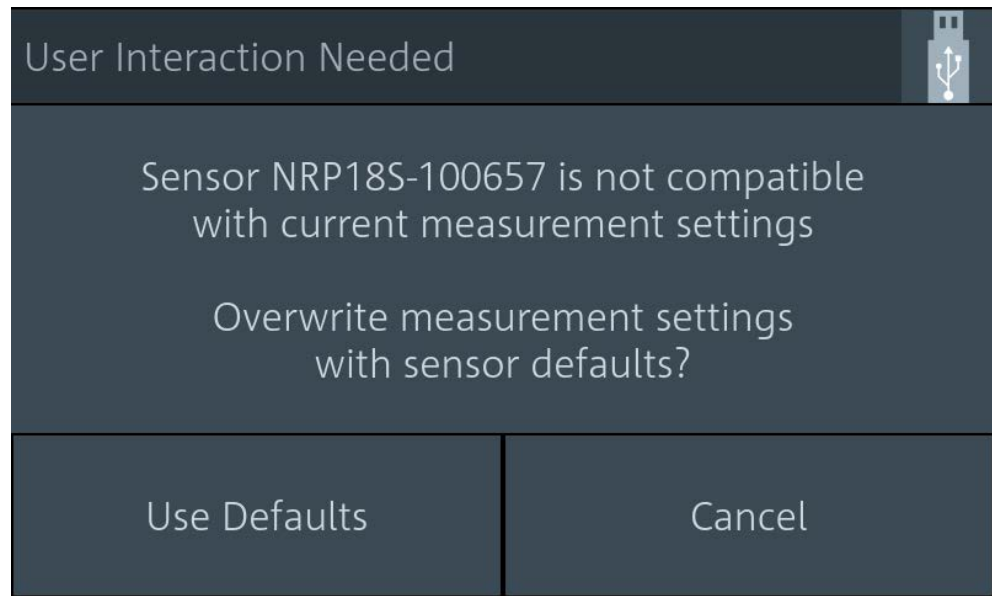
### 6.2 Sensor Assignment and Memory

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 power 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 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 42.

- 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 6.5, "Settings Conflict"](#), on page 44.

**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.

## 6.3 Performing a Measurement

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 7, "Configuration for All Measurement Types"](#), on page 46
- [Chapter 8, "Measurement Types and Result Displays"](#), on page 63
- [Chapter 9, "Sensor Configuration"](#), on page 104

### Setup

1. Connect one or more R&S power sensors to the R&S NRX. See [Chapter 4.8, "Connecting Power Sensors"](#), on page 26.  
How many R&S power sensors you can connect depends on the options of your R&S NRX. See [Chapter 6.1, "Parallel Measurements"](#), on page 41.
2. Connect each R&S power sensor to a DUT (signal source). See the user manual of the R&S power sensor for information on topics that need your special attention.

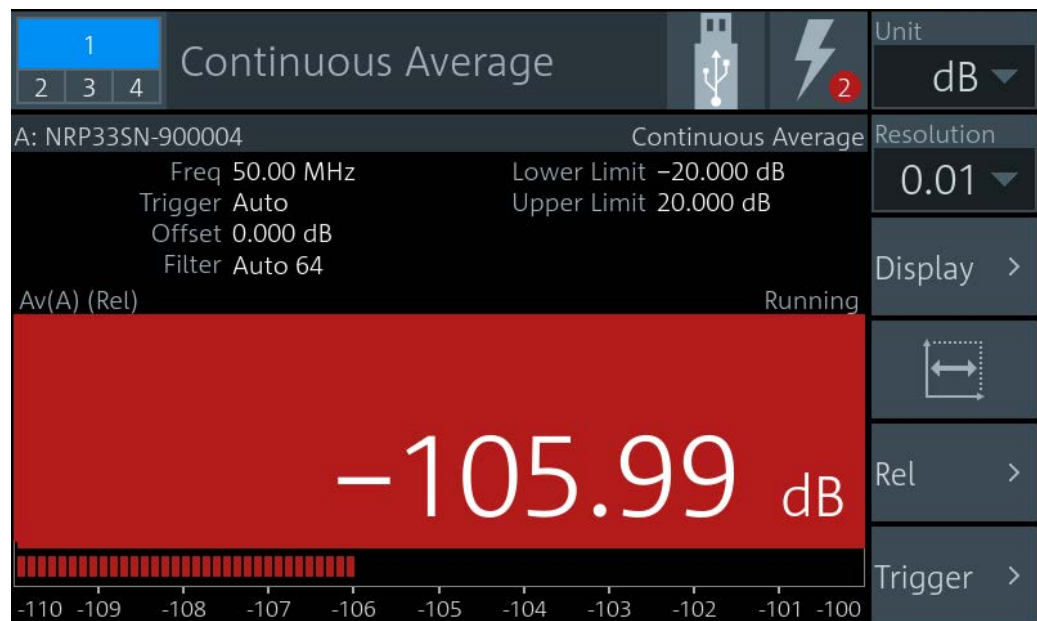
### Starting a measurement

1. Preset the R&S NRX and the connected R&S power sensors.
  - a) Press the [Preset] key.
  - b) Tap "Preset".See also [Chapter 10, "Saving and Recalling Settings"](#), on page 123.
2. Depending on the power sensor and the measurement conditions, consider to zero the power 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) Tap "Zero All Sensors".See also [Chapter 11, "Zeroing Sensors"](#), on page 125.
3. Configure the measurement.
  - a) Open the "Measurement Settings" dialog, as described in [Chapter 5.1.2, "Main Measurement Dialog"](#), on page 30.
  - b) Select the "Measurement Type", for example "Continuous Average".
  - c) Tap "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.

## 6.4 Limit Violation

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

- To change the limit settings, tap the displayed limit values. See also (2) in [Figure 5-2](#).



## 6.5 Settings Conflict

A settings 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 settings 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 6.4, "Limit Violation"](#), on page 44.

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

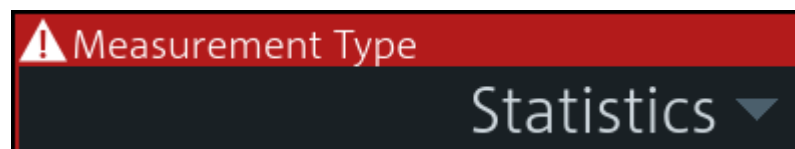
The notification center indicates an error, but the no control element is highlighted.  
The error message reports a settings conflict.

**Solving the error**

1. Tap the *displayed measurement value or graphic*. See also [Figure 5-2](#).

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 155.



7 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 5.1.2, "Main Measurement Dialog"](#), on page 30.

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 in [Chapter 8, "Measurement Types and Result Displays"](#), on page 63.

7.1 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.

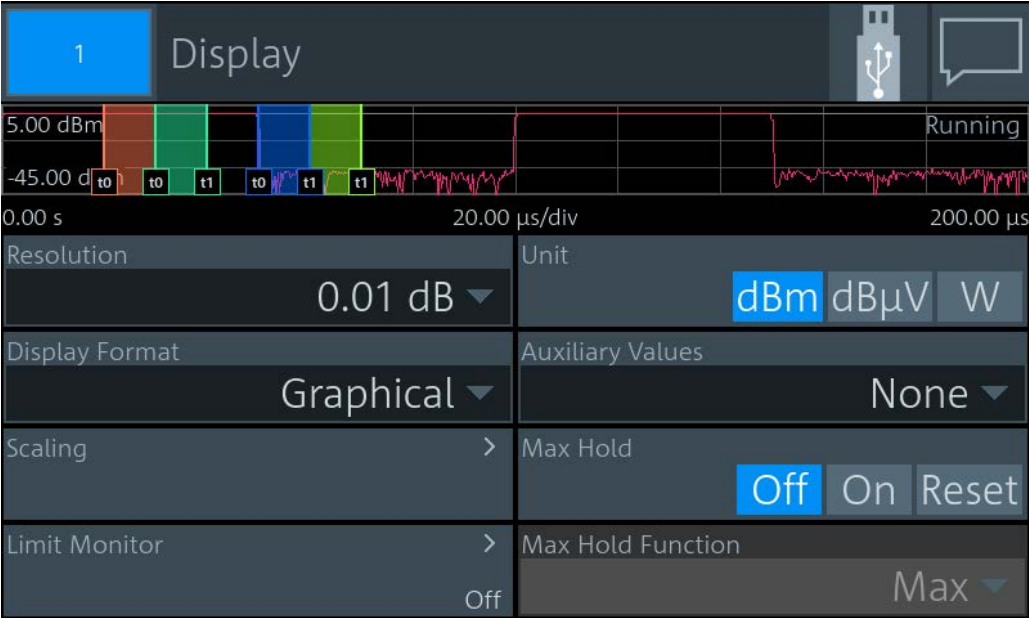


Figure 7-1: Display dialog, example for time gate measurement

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Display Format.....	48
Auxiliary Values.....	48
Scaling.....	48
L Scale Lower Limit.....	49
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L Start Time.....	49
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L Forward Upper Limit, Reflection Upper Limit.....	53

### Resolution

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

"1 dB | 0.1 dB |   Sets the resolution to a specific value.

0.01 dB |

0.001 dB "

Remote command:

[CALCulate<Measurement>:RESolution](#) on page 178

### Unit

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

"dBm"	Power in dBm
"dBμV"	Power in dBμV
"W"	Power in W
"dB"	Quotient of the power values as dB
"Δ%"	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 190

[UNIT<Measurement>:POWer:RATio](#) on page 189

### Forward Unit

Available for NRT measurements.

Specifies the unit of measurement in forward direction. See ["Unit"](#) on page 47.

Remote command:

[UNIT<Measurement>:POWer\[:VALue\]](#) on page 190

[UNIT<Measurement>:POWer:RATio](#) on page 189

### Display Format

Specifies the display format of the measured values.

"Scalar Digital" Available for continuous average, burst average, pulse analysis, time gate, timeslot, NRT measurements.  
Numeric format

"Scalar Analog" Marker on a scale

"Graphical" Available for time gate, timeslot measurements.  
Measured values are plotted over time.

Remote command:

[CALCulate<Measurement>:DMODE](#) on page 176

### Auxiliary Values

Available for the graphic displays 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 longterm 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 176

### Scaling

Specifies the scaling of the display. The available parameters depend on the following settings:

- [Measurement Type](#).
- [Display Format](#)



**Scale Lower Limit ← Scaling**

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

Specifies the lower limit of the display.

Remote command:

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

`CCDF` on page 199

`CALCulate<Measurement>:METer<DirectionalChannel>:LOWer[:DATA][:`  
`POWER]` on page 202

`CALCulate<Measurement>:METer<DirectionalChannel>:LOWer[:DATA]:`  
`RATio:RCOefficient` on page 200

`CALCulate<Measurement>:METer<DirectionalChannel>:LOWer[:DATA]:`  
`RATio:RFRatio` on page 200

`CALCulate<Measurement>:METer<DirectionalChannel>:LOWer[:DATA]:`  
`RATio:RLOSs` on page 200

`CALCulate<Measurement>:METer<DirectionalChannel>:LOWer[:DATA]:`  
`RATio:SWR` on page 201

`CALCulate<Measurement>:METer<DirectionalChannel>:LOWer[:DATA]:`  
`RATio[:VALue]` on page 201

**Scale Upper Limit ← Scaling**

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

Specifies the upper limit of the display.

Remote command:

`CALCulate<Measurement>:METer<DirectionalChannel>:UPPer[:DATA]:`  
`CCDF` on page 202

`CALCulate<Measurement>:METer<DirectionalChannel>:UPPer[:DATA][:`  
`POWER]` on page 204

`CALCulate<Measurement>:METer<DirectionalChannel>:UPPer[:DATA]:`  
`RATio:RCOefficient` on page 202

`CALCulate<Measurement>:METer<DirectionalChannel>:UPPer[:DATA]:`  
`RATio:RFRatio` on page 203

`CALCulate<Measurement>:METer<DirectionalChannel>:UPPer[:DATA]:`  
`RATio:RLOSs` on page 203

`CALCulate<Measurement>:METer<DirectionalChannel>:UPPer[:DATA]:`  
`RATio:SWR` on page 204

`CALCulate<Measurement>:METer<DirectionalChannel>:UPPer[:DATA]:`  
`RATio[:VALue]` on page 204

**Start Time ← Scaling**

Available for statistics measurements. If [Display Format](#) is set to "Graphical", available for trace, pulse analysis, 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 183

#### Time / Div ← Scaling

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

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

Sets the duration of the trace.

Remote command:

`CALCulate<Measurement>:TRACe:X[:SCALe]:LENGth` on page 183

`[SENSe<Sensor>:]TRACe:OFFSet:TIME` on page 188

#### Power Reference ← Scaling

Available for trace, pulse analysis, time gate, timeslot, statistics 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 185

`CALCulate<Measurement>:TRACe:Y[:SCALe]:TOP:DBM` on page 185

`CALCulate<Measurement>:TRACe:Y[:SCALe]:TOP:DBUV` on page 186

`CALCulate<Measurement>:TRACe:Y[:SCALe]:TOP:DPCT` on page 186

`CALCulate<Measurement>:TRACe:Y[:SCALe]:TOP:ONE` on page 186

`CALCulate<Measurement>:TRACe:Y[:SCALe]:TOP:WATT` on page 187

#### 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 188

#### 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 183

`CALCulate<Measurement>:TRACe:Y[:SCALe]:SPAN:DBM` on page 183

`CALCulate<Measurement>:TRACe:Y[:SCALe]:SPAN:DBUV` on page 184

`CALCulate<Measurement>:TRACe:Y[:SCALe]:SPAN:DPCT` on page 184

[CALCulate<Measurement>:TRACe:Y\[:SCALE\]:SPAN:ONE](#) on page 184

[CALCulate<Measurement>:TRACe:Y\[:SCALE\]:SPAN:WATT](#) on page 185

### Unit ← Scaling

Sets the unit of the power axis.

### Max Hold

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

Remote command:

[CALCulate<Measurement>:HOLD\[:STATe\]](#) on page 177

### 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 between maximum, minimum or difference display at any time.

"Max"                      Maximum value

"Min"                      Minimum value

"Max – Min"              Difference between maximum and minimum value

Remote command:

[CALCulate<Measurement>:HOLD:FUNctIon](#) on page 177

### Limit Monitor

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

Enables or disables a lower limit.

Remote command:

[CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer:STATe](#)  
on page 192

### Lower Limit ← Limit Monitor

Defines a lower limit.

Remote command:

[CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer\[:DATA\]:CCDF](#) on page 193

[CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer\[:DATA\]:RATio:RCoefficient](#) on page 193

[CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer\[:DATA\]:RATio:RFRatio](#) on page 194

[CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer\[:DATA\]:RATio:RLOSs](#) on page 194

`CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer[:DATA]:`  
`RATio:SWR` on page 195  
`CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer[:DATA]:`  
`RATio[:VALue]` on page 195  
`CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer[:DATA]:`  
`POWER` on page 195

#### **Upper Limit State ← Limit Monitor**

Enables or disables an upper limit.

Remote command:

`CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer:STATe`  
 on page 196

#### **Upper Limit ← Limit Monitor**

Defines an upper limit.

Remote command:

`CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer[:DATA]:`  
`CCDF` on page 196  
`CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer[:DATA]:`  
`RATio:RCOefficient` on page 197  
`CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer[:DATA]:`  
`RATio:RFRatio` on page 197  
`CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer[:DATA]:`  
`RATio:RLOSs` on page 198  
`CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer[:DATA]:`  
`RATio:SWR` on page 198  
`CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer[:DATA]:`  
`RATio[:VALue]` on page 198  
`CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer[:DATA]:`  
`POWER` on page 199

#### **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`  
 on page 192

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

Available for NRT measurements.

Defines the value for the lower limit.

Remote command:

`CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer[:DATA]`  
 on page 193

#### **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`

on page 196

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

Available for NRT measurements.

Defines the value for the upper limit.

Remote command:

`CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer[:DATA]`

on page 196

## **7.2 Controlling the Measurement**

The power 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 7.3, "Triggering"](#), on page 54
- See the power sensor user manual for examples on the interplay of the controlling mechanisms.

### **7.2.1 Controlling the Measurement Results**

The R&S NRX 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 very 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.

## 7.3 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.

### 7.3.1 Trigger States

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

### 7.3.2 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 power sensor for details.	<code>TRIGger&lt;Measurement&gt;[:IMMediate]</code>
"Immediate"	Measures immediately, does not wait for trigger condition.	-

Trigger source	Description	Remote commands to initiate the measurement
"Internal"	Uses the input signal as trigger signal.	TRIGger<Measurement>[:IMMediate]
"Internal A" , "Internal B" , "Internal C" , "Internal D"	Receives the trigger signal from the trigger master. The trigger master is the sensor connected to port A, B, C, or D. See <a href="#">"Trigger Master State"</a> on page 59.	-
"External"	Uses the external trigger signal that is supplied at the Trig In / Out 2 connector. See <a href="#">Chapter 3.2.1, "Trig In / Out 2 and Out 1 / Trig Out Connectors"</a> , on page 19.	TRIGger<Measurement>[:IMMediate]
"External 2"	Requires a power sensor with a trigger input/output. Uses the external trigger signal that is supplied at the trigger input/output of the power sensor.	TRIGger<Measurement>[:IMMediate]
"Sensor Check Source"	Requires the sensor check source (R&S NRX-B1) option. If enabled, the sensor check source (R&S NRX-B1) sends trigger signals using the internal trigger bus. See <a href="#">"Sensor Check Source tab"</a> on page 134.	*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 power sensor for details.	*TRG TRIGger<Measurement>[:IMMediate]

### 7.3.3 Dropout Time

The dropout time is useful when dealing with signals with several active slots, for example GSM signals, see [Figure 7-2](#). When measuring in sync with the signal, a trigger event is to be produced at A, but not at B or C.

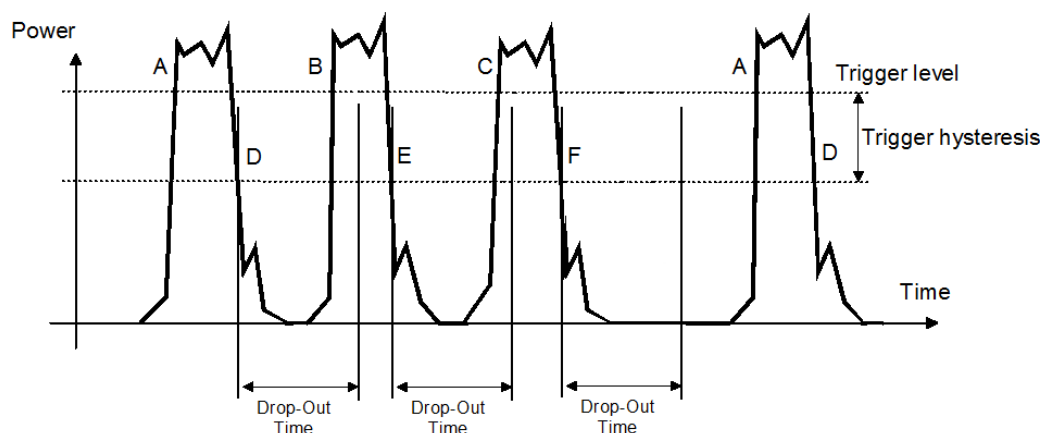


Figure 7-2: Significance of the dropout time

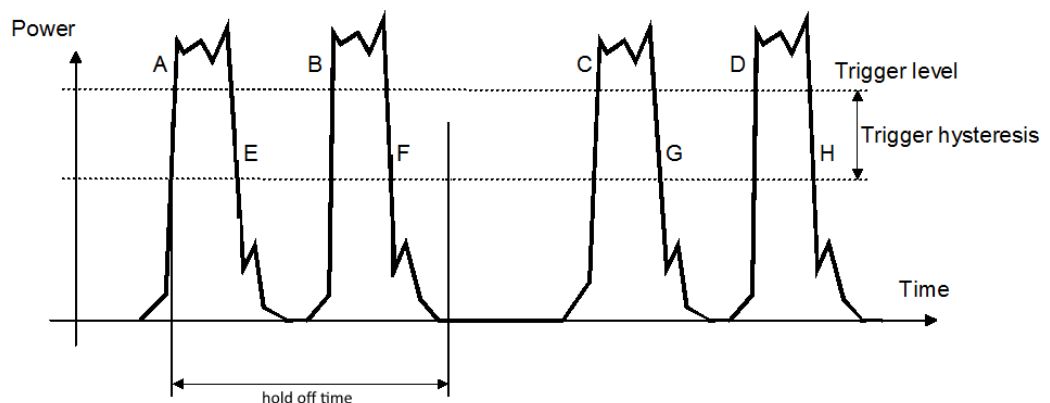
The RF power between the slots is below the threshold defined by the trigger level and the trigger hysteresis. Therefore, the trigger hysteresis alone cannot prevent triggering at B or at C. Therefore, set the dropout time greater than the time elapsed between points D and B and between E and C, but 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 obtain also unambiguous triggering for many complex signals.

If you use a hold-off 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.

### 7.3.4 Hold-Off Time

During the hold-off time, a period after a trigger event, all trigger events are ignored.



### 7.3.5 Trigger Settings

Access: Main measurement dialog > "Trigger"

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

Trigger Mode.....	57
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L Source.....	58
L Slope.....	58
L Level.....	58
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Specific Trigger.....	59
L Jitter Suppression.....	59
L Trigger Master State.....	59
L Trigger Master Port.....	59
L Trigger Synchronize State.....	59
L Trigger Synchronize Port.....	59
L Trigger 2 Input Impedance.....	60

### Trigger Mode

Controls the trigger execution depending on the settings under ["Trigger Source"](#) on page 57.

"Normal"	Continuous triggering with regular trigger events.
"Freerun"	Enables a continuous measurement. The power sensor executes one measurement cycle after the other.
"Single"	Available for trace, statistics measurements. Disables continuous triggering so that only one trigger event at a time is executed. To enable triggering again, press [1Trig].
"Auto"	Available for trace, statistics measurements. Automatically starts a measurement if no trigger event has occurred after 300 ms.

Remote command:

[TRIGger<undef>:ALL:MODE](#) on page 212

[TRIGger<Measurement>:MODE](#) on page 212

### Trigger Source

"Primary Sensor Trigger Source", "Secondary Sensor Trigger Source"

Sets the source for the trigger event. See [Chapter 7.3.2, "Trigger Sources"](#), on page 54.

Remote command:

[TRIGger<undef>:ALL:SOURce](#) on page 214

[TRIGger<Measurement>\[:CHANnel<Channel>\]:SOURce](#) on page 214

### Trigger Level

"Primary Sensor Trigger Level", "Secondary Sensor Trigger Level"

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

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

Remote command:

[TRIGger<undef>:ALL:LEVel](#) on page 211

[TRIGger<Measurement>\[:CHANnel<Channel>\]:LEVel](#) on page 211

### Trigger Advanced

"Primary Sensor Trigger Advanced", "Secondary Sensor Trigger Advanced"

Groups further trigger settings.

**Source ← Trigger Advanced**

See ["Trigger Source"](#) on page 57.

**Slope ← Trigger Advanced**

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

"Positive"            Rising edge

"Negative"           Falling edge

Remote command:

`TRIGger<undef>:ALL:SLOPe` on page 213

`TRIGger<Measurement>[:CHANnel<Channel>]:SLOPe` on page 213

**Level ← Trigger Advanced**

See ["Trigger Level"](#) on page 57-

**Delay ← Trigger Advanced**

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

Remote command:

`TRIGger<undef>:ALL:DELaY[:VALue]` on page 208

`TRIGger<Measurement>[:CHANnel<Channel>]:DELaY[:VALue]` on page 208

**Dropout ← Trigger Advanced**

If the trigger level has been underrun with internal triggering, it is sometimes useful to wait some time (drop-out time) before retriggering. The measurement of unwanted signal components can thus be suppressed. See [Chapter 7.3.3, "Dropout Time"](#), on page 55.

Remote command:

`TRIGger<undef>:ALL:DTIME` on page 209

`TRIGger<Measurement>[:CHANnel<Channel>]:DTIME` on page 209

**Holdoff ← Trigger Advanced**

Sets the hold-off time, see [Chapter 7.3.4, "Hold-Off Time"](#), on page 56.

Remote command:

`TRIGger<undef>:ALL:HOLDoff` on page 210

`TRIGger<Measurement>[:CHANnel<Channel>]:HOLDoff` on page 210

**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` on page 210

`TRIGger<Measurement>[:CHANnel<Channel>]:HYSTeresis` on page 210

**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 resampling of trace result.

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

Remote command:

`TRIGger<Measurement>[:CHANnel<Channel>]:JITTer:METhod` on page 211

**Trigger Master State ← Specific Trigger**

Enables or disables the trigger master mode of the sensor. If enabled, the power sensor outputs a digital trigger signal in sync with its own trigger event. The trigger signal is output at the port selected under "[Trigger Master Port](#)" on page 59.

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

Remote command:

`TRIGger<Measurement>[:CHANnel<Channel>]:MASter[:STATe]` on page 213

**Trigger Master Port ← Specific Trigger**

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

Remote command:

`TRIGger<Measurement>[:CHANnel<Channel>]:MASter:PORT` on page 212

**Trigger Synchronize State ← Specific Trigger**

Usually used if "On" is set under "[Trigger Master State](#)" on page 59.

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<Measurement>[:CHANnel<Channel>]:SYNChronize[:STATe]`  
on page 215

**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 59.

Remote command:

`TRIGger<Measurement>[:CHANnel<Channel>]:SYNChronize:PORT`  
on page 214

**Trigger 2 Input Impedance ← Specific Trigger**

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 power 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`  
on page 209

## 7.4 Measurement Settings Dialog

Access: In the main measurement dialog, tap the *displayed measurement value or graphic*. See also ["Layout of the main measurement dialog"](#) on page 31.

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 8.7.3, "Measurement Settings Dialog"](#), on page 93
- NRT: [Chapter 8.8.3, "Measurement Main Configuration Dialog"](#), on page 103

For configuring the assigned power sensors, see:

- [Quick Setup](#)
- [Chapter 9, "Sensor Configuration"](#), on page 104

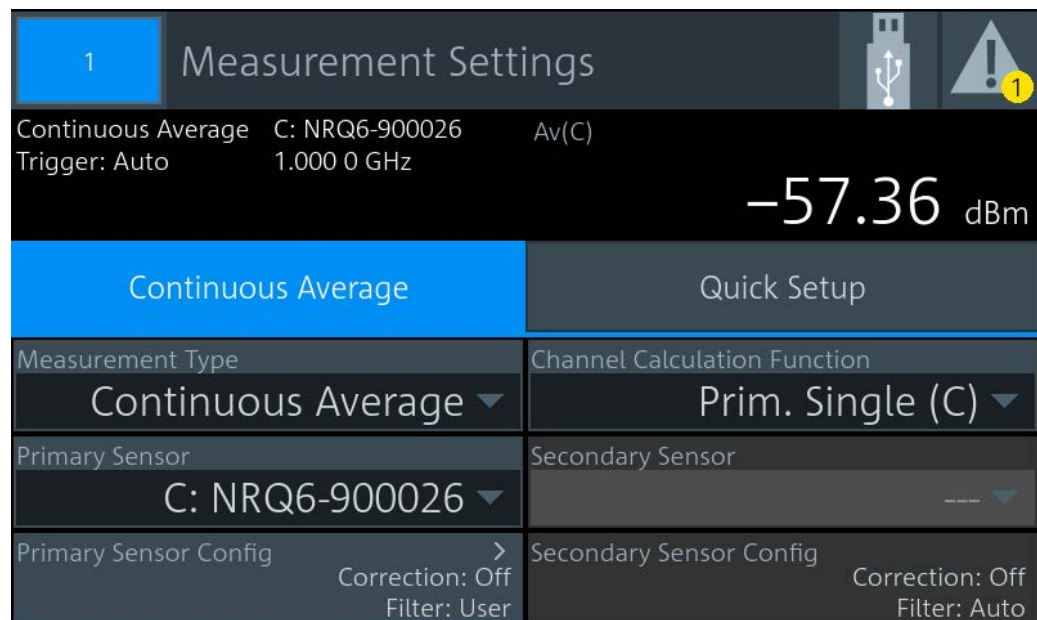


Figure 7-3: Example: continuous average

Measurement Type.....	61
Primary Sensor, Secondary Sensor.....	61
Primary Sensor Config, Secondary Sensor Config.....	61
Channel Calculation Function.....	61
Quick Setup.....	62
L Parameter Set.....	62
L Auto Set.....	62

### Measurement Type

Sets the measurement type.

Remote command:

`CALCulate<Measurement>:TYPE` on page 217

### 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 power sensor does not support the selected [Measurement Type](#), a settings conflict is displayed. See also [Chapter 6.5, "Settings Conflict"](#), on page 44.

Remote command:

`CALCulate<Measurement>[:CHANnel<Channel>]:SENSe:INDeX` on page 218  
`[SENSe<Sensor>:]CATalog?` on page 218

### 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 9, "Sensor Configuration"](#), on page 104.

### 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)
✓ 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 270

[CALCulate<Measurement>:MATH\[:EXPRession\]:CATalog?](#) on page 272

### Quick Setup

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

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

### Parameter Set ← Quick Setup

Sets an existing parameter set to configure the sensor.

### Auto Set ← Quick Setup

Configures the sensor automatically.

## 8 Measurement Types and Result Displays

The different measurement types and their specific configuration settings are described in the following. For settings available for all measurements, refer to [Chapter 7, "Configuration for All Measurement Types"](#), on page 46.

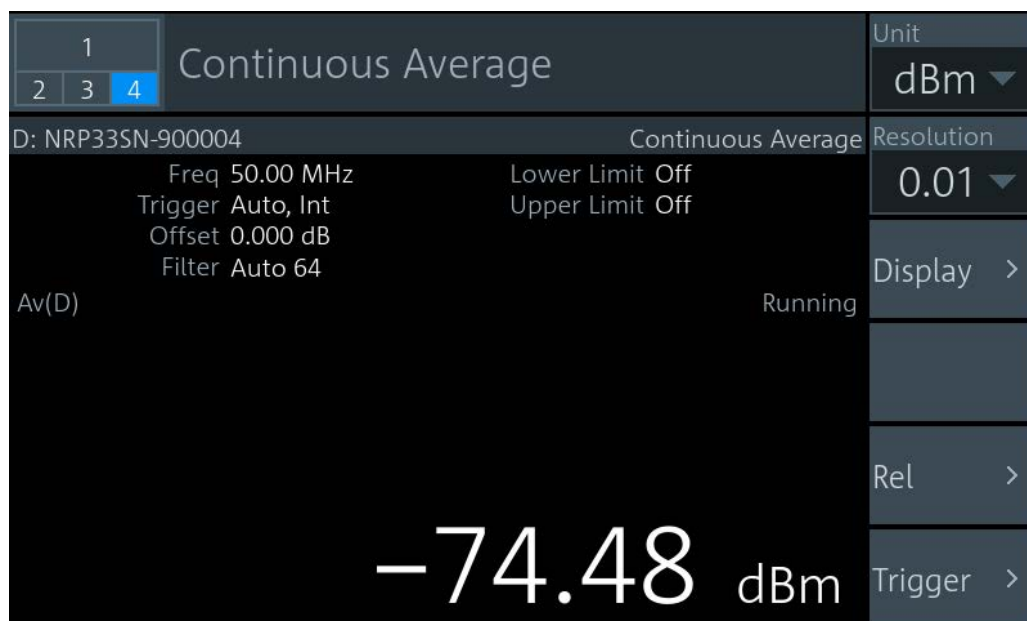
• <a href="#">Continuous Average</a> .....	63
• <a href="#">Burst Average</a> .....	65
• <a href="#">Trace</a> .....	67
• <a href="#">Pulse Analysis</a> .....	72
• <a href="#">Time Gate</a> .....	80
• <a href="#">Timeslot</a> .....	85
• <a href="#">Statistics</a> .....	91
• <a href="#">NRT</a> .....	98

### 8.1 Continuous Average

The power sensor 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.

#### 8.1.1 Continuous Average Result Display



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

### 8.1.2 Continuous Average Settings

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

Unit.....	64
Resolution.....	64
Display.....	64
Rel.....	64
L Reference Value.....	64
L Relative Measurements.....	64
Trigger.....	65

#### Unit

See "Unit" on page 47.

#### Resolution

See "Resolution" on page 47.

#### Display

See Chapter 7.1, "Display Settings", on page 46.

#### 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:

[SENSe<Sensor>:] POWer:REfERENCE on page 220

CALCulate<Measurement>:RELative<DirectionalChannel>:POWer[:  
MAGNitude] on page 260

CALCulate<Measurement>:RELative<DirectionalChannel>:RATio[:  
MAGNitude] on page 262

#### Relative Measurements ← Rel

Allows you to relate measured power to a reference value. Whether the power is measured by one power sensor or whether it is a combined value measured by two power sensors is set by "[Channel Calculation Function](#)" on page 61.

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



Remote command:

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

on page 263

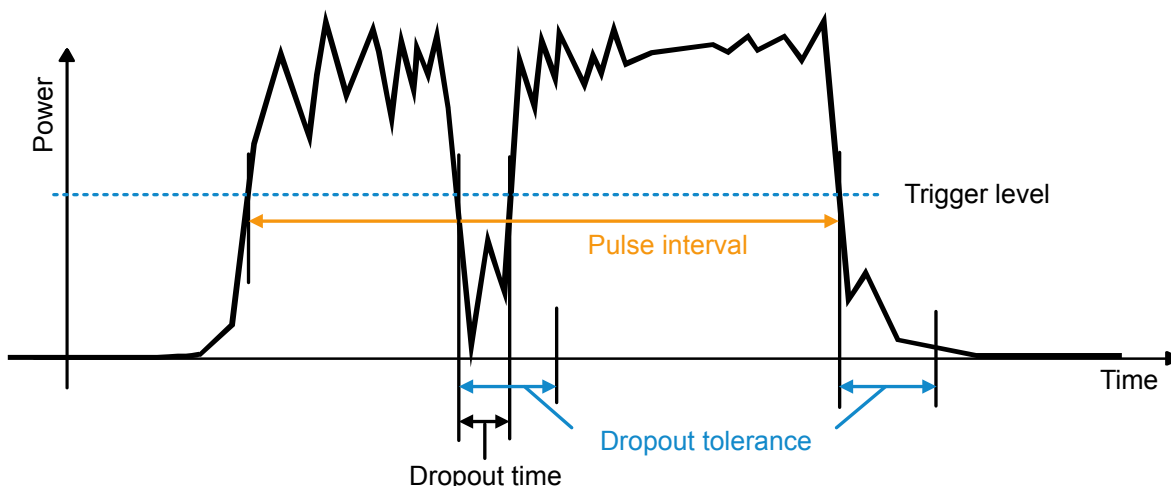
### Trigger

See [Chapter 7.3, "Triggering"](#), on page 54.

## 8.2 Burst Average

The power sensor measures the average burst power of pulsed signals. The burst average measurement is available with multipath and wideband power sensors.

No external trigger signal is required, because the power sensor 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.



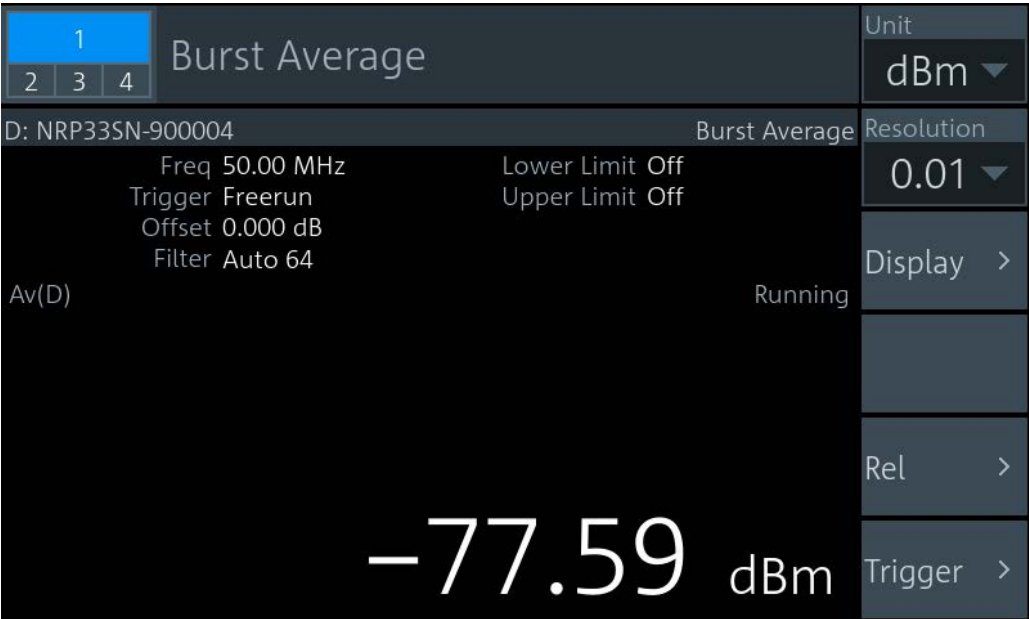
**Figure 8-1: Burst average measurement parameters**

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 57
- ["Dropout"](#) on page 58
- ["Dropout Tolerance"](#) on page 107
- ["Exclude from Start, Exclude from End"](#) on page 107

8.2.1 Burst Average Result Display



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

8.2.2 Burst Average Settings

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

Unit.....	66
Resolution.....	66
Display.....	66
Rel.....	66
Trigger.....	66

**Unit**  
See "Unit" on page 47.

**Resolution**  
See "Resolution" on page 47.

**Display**  
See Chapter 7.1, "Display Settings", on page 46.

**Rel**  
See "Rel" on page 64.

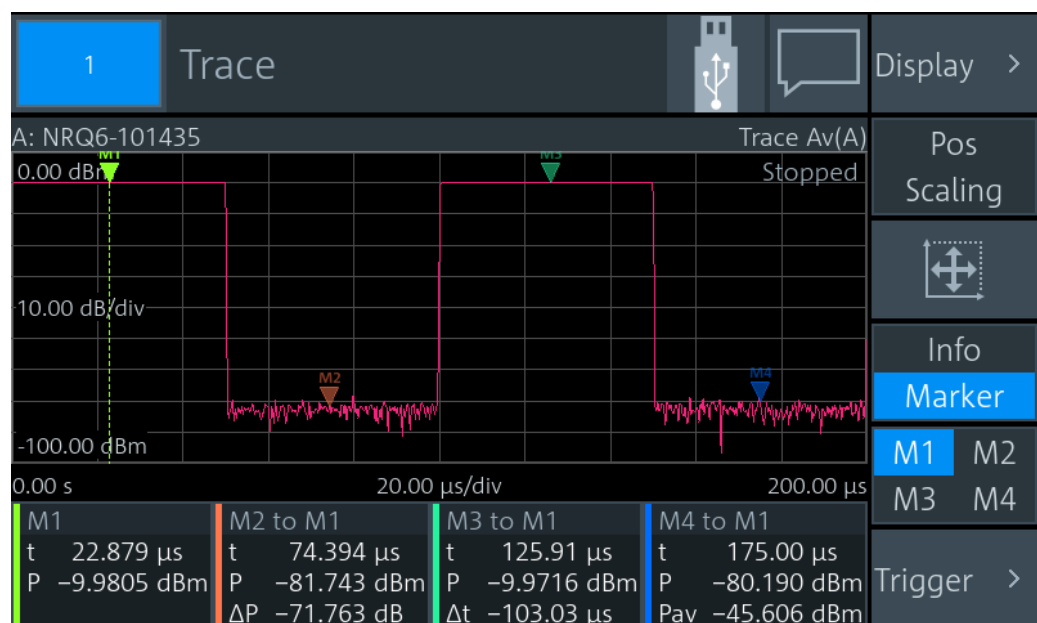
**Trigger**  
See Chapter 7.3, "Triggering", on page 54.

## 8.3 Trace

The power 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 must be triggered separately.

- [Trace Result Display](#).....67
- [Trace Settings](#).....67
- [Trace Marker Dialog](#).....69

### 8.3.1 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 68.

### 8.3.2 Trace Settings

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

- [Display](#).....68
- [Pos / Scaling](#).....68
- [Autoscale](#).....68
- [Info / Marker](#).....68
- [M1 / M2 / M3 / M4](#).....68
- [Trigger](#).....68
  - [Display](#).....69
  - [Trig Mode](#).....69
  - [Trig Source](#).....69

L Trig Slope.....	69
L Level.....	69
L Sensor Trigger.....	69

### Display

See [Chapter 7.1, "Display Settings"](#), on page 46.

### 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 power 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 <a href="#">"Measurement Mode"</a> on page 72. If you tap here, the "Trace Marker" dialog opens, see <a href="#">Chapter 8.3.3, "Trace Marker Dialog"</a> , on page 69. Shows buttons to select a marker, see <a href="#">"M1 / M2 / M3 / M4"</a> on page 68.

### M1 / M2 / M3 / M4

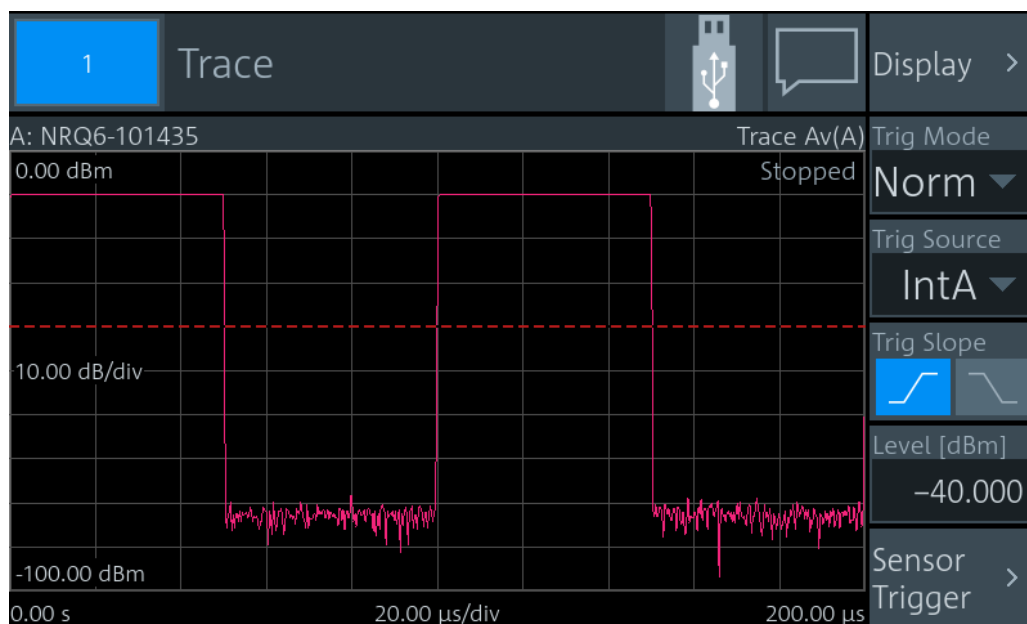
Shows the selected marker in the trace.

Remote command:

`DISPlay[:WINDow<Window>]:TRACe:MARKer<Undef>:SElection` on page 231

### Trigger

Gives quick access to selected trigger settings.



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

#### Display ← Trigger

See [Chapter 7.1, "Display Settings"](#), on page 46.

#### Trig Mode ← Trigger

See ["Trigger Mode"](#) on page 57.

#### Trig Source ← Trigger

See ["Trigger Source"](#) on page 57.

#### Trig Slope ← Trigger

See ["Slope"](#) on page 58.

#### Level ← Trigger

See ["Trigger Level"](#) on page 57.

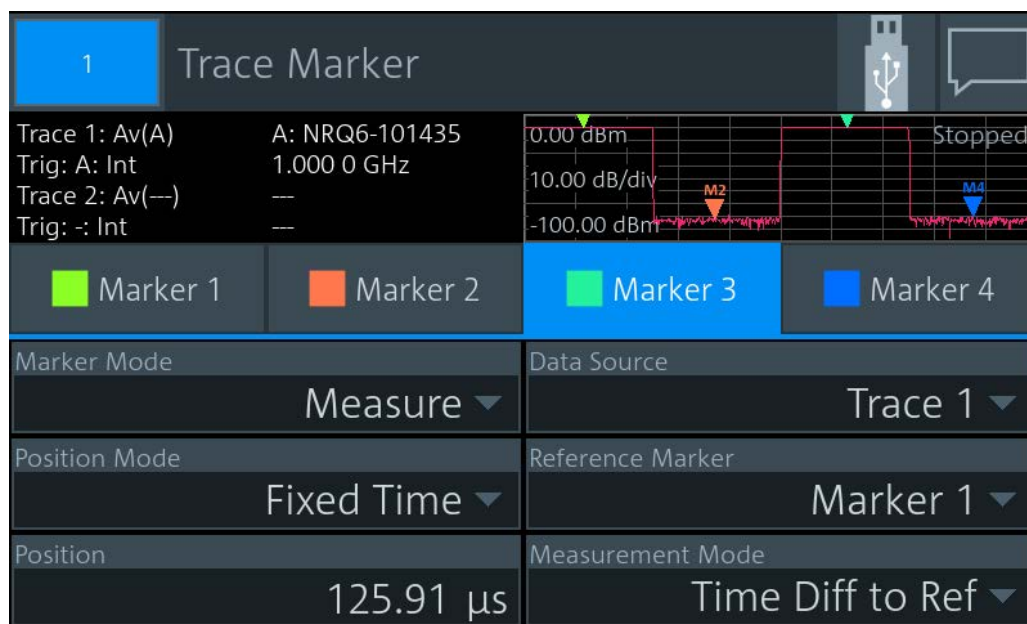
#### Sensor Trigger ← Trigger

See [Chapter 7.3, "Triggering"](#), on page 54.

### 8.3.3 Trace Marker Dialog

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

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



Marker Mode.....	70
Position Mode.....	70
Position.....	71
Data Source.....	72
Reference Marker.....	72
Measurement Mode.....	72

### 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 227

### 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 [Reference Marker](#).

"Peak Search from Ref ->", "Min Search from Ref ->"

Maximum or minimum power measured right from [Reference Marker](#).

Remote command:

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

on page 227

### 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 230

`DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:RELative:TIME` on page 230

`DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:POWer:DBM` on page 228

`DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:POWer:DBUV` on page 228

`DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:POWer:WATT` on page 230

`DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:RELative:POWer:DB` on page 229

`DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:RELative:POWer:DPCT` on page 229

`DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:RELative:POWer:O` on page 230

`DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:RELative:POWer:WATT` on page 230

`DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:POWer:RATio:DB` on page 229

`DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:POWer:RATio:DPCT` on page 229

`DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:POWer:RATio:O` on page 230

**Data Source**

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

Selects the trace.

**Reference Marker**

Defines a marker as reference marker.

Remote command:

`DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:REFerence`  
on page 231

**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 "Δp".

"Time Diff to Ref"  
                         Measures the time difference in relation to the reference marker.  
                         Marker result is "Δt".

"Average Power to Ref"  
                         Measures the average power between time positions of the marker  
                         and its reference marker.  
                         Marker result is "Pav".

Remote command:

`DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:FUNCTion` on page 226

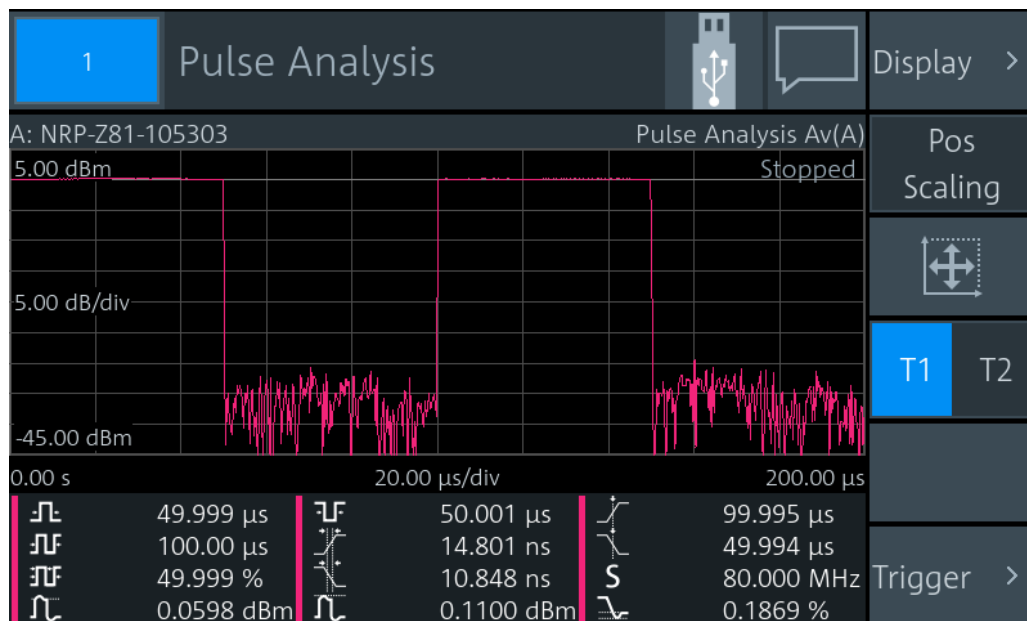
## 8.4 Pulse Analysis

Supported by wideband 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.

- [Pulse Analysis Result Display](#).....73
- [Pulse Analysis Settings](#).....73
- [Pulse Analysis Dialog](#).....74



### 8.4.1 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 8.4.3, "Pulse Analysis Dialog"](#), on page 74.

### 8.4.2 Pulse Analysis Settings

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

Display.....	73
Pos / Scaling.....	73
Autoscale.....	73
T1 / T2.....	73
Trigger.....	74

#### Display

See [Chapter 7.1, "Display Settings"](#), on page 46.

#### Pos / Scaling

See ["Pos / Scaling"](#) on page 68.



#### Autoscale

See ["Autoscale"](#) on page 68.

#### T1 / T2

Selects the displayed trace.

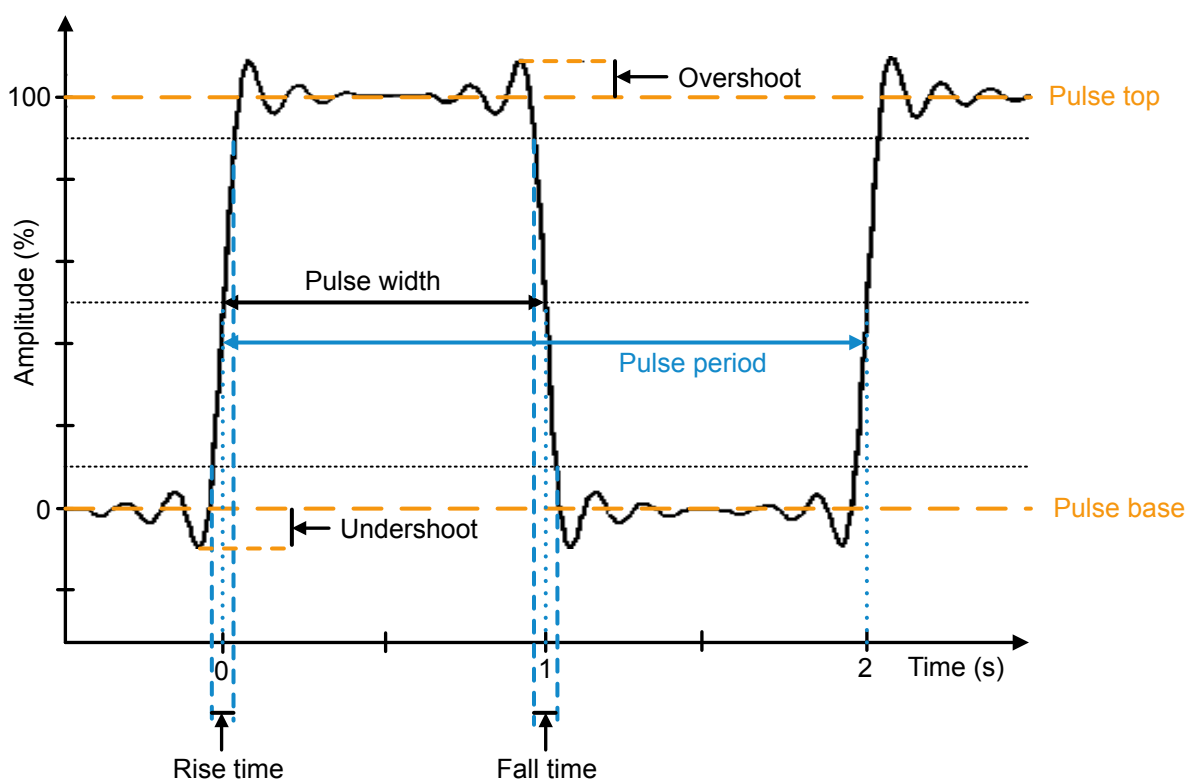
**Trigger**

Gives quick access to selected trigger settings. See ["Trigger"](#) on page 68.

**8.4.3 Pulse Analysis Dialog**

Access: Tap 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.



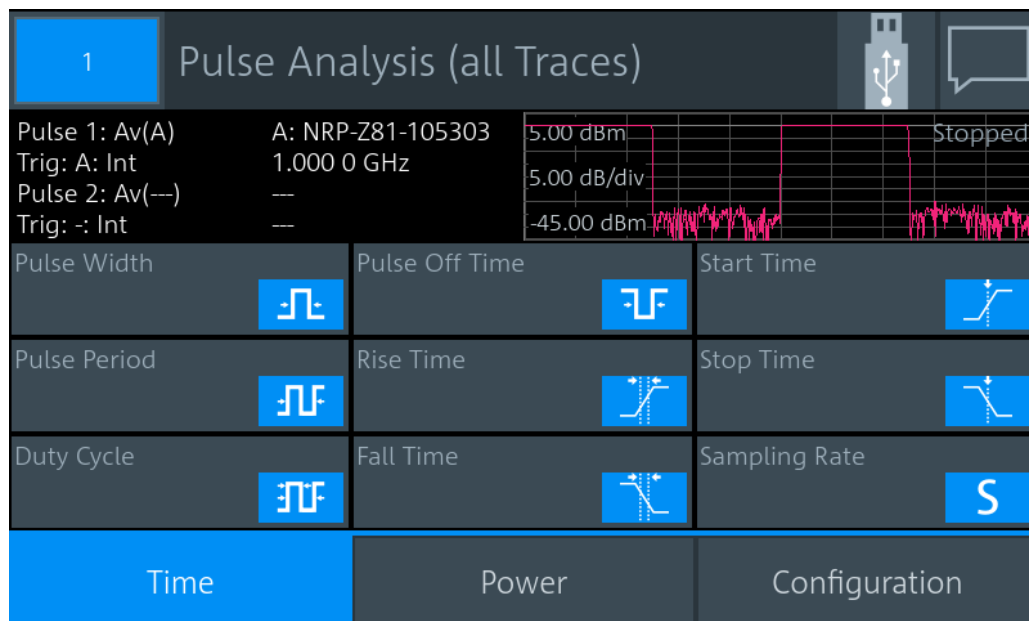
**Figure 8-2: Main pulse analysis parameters and characteristic values**

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L Pulse Width.....	75
L Pulse Period.....	75
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L Pulse Off Time.....	76
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### Time tab

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



#### 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 242



#### Pulse Period ← Time tab

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

Remote command:

`DISPlay[:WINDow<Window>]:TRACe:MEASurement:PULSe:PERiod[:STATe]`  
on page 242



#### 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 242



#### 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 243



#### 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 244



#### 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 243



#### 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 245



#### 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 244

S

### Sampling Rate ← Time tab

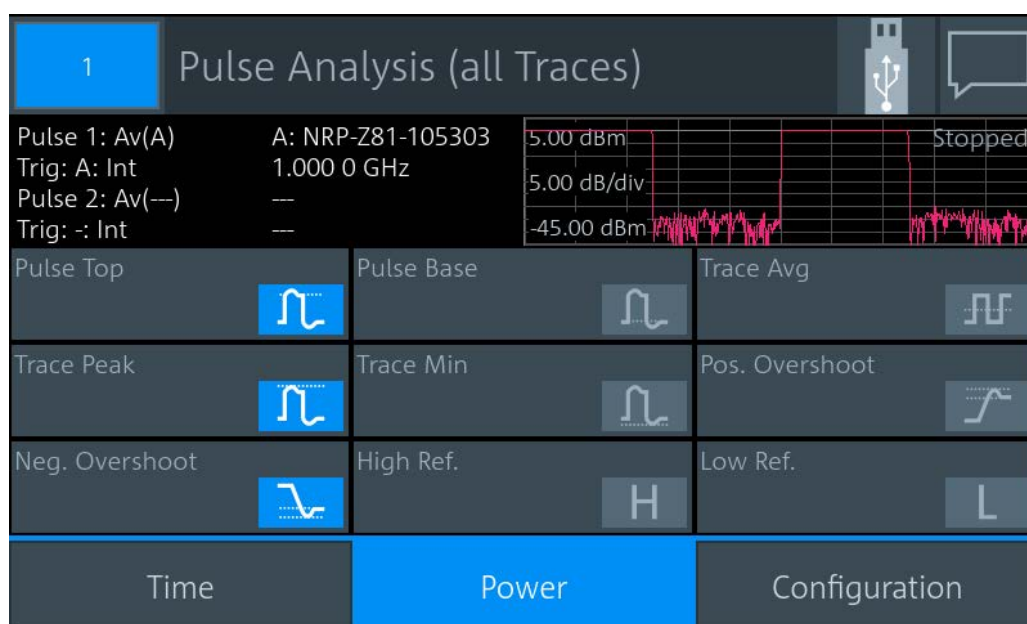
Number of samples per second.

Remote command:

`DISPlay[:WINDow<Window>]:TRACe:MEASurement:PULSe:RESolution[:STATe]` on page 242

### 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 241



### Trace Peak ← Power tab

Maximum power measured within the analysis window.

Remote command:

`DISPlay[:WINDow<Window>]:TRACe:MEASurement:POWer:MAXimum[:STATe]` on page 240

**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 244

**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 240

**Trace Min ← Power tab**

Minimum power measured within the analysis window.

Remote command:

`DISPlay[:WINDow<Window>]:TRACe:MEASurement:POWer:MINimum[:STATe]` on page 240

**High Ref. ← Power tab**

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

Remote command:

`DISPlay[:WINDow<Window>]:TRACe:MEASurement:POWer:PULSe:HREFerence[:STATe]` on page 241

**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 240

**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 245

**Low Ref. ← Power tab**

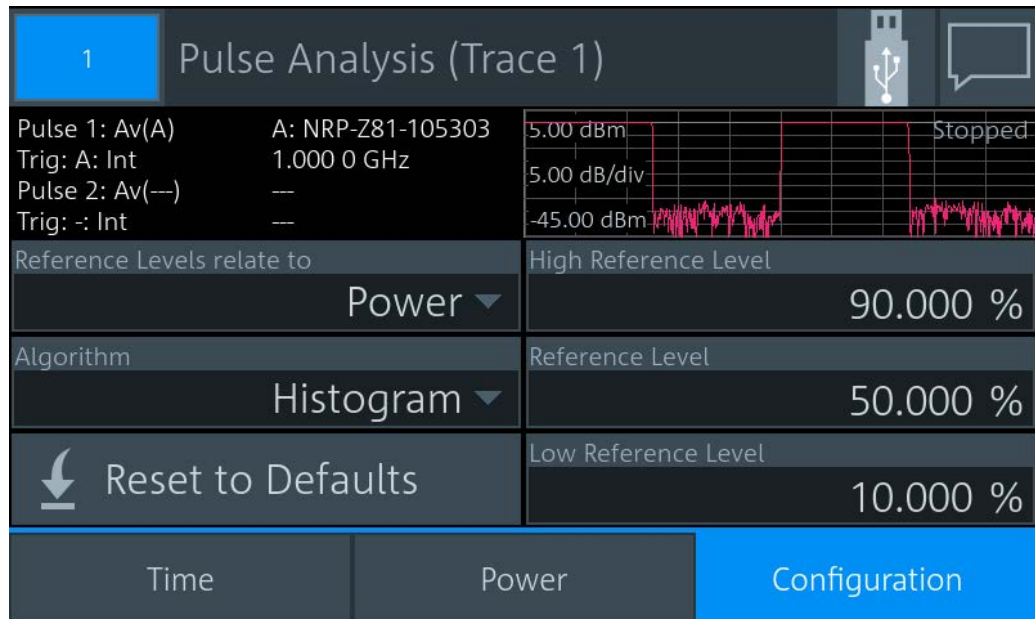
Power level at [Low Reference Level](#).

Remote command:

`DISPlay[:WINDow<Window>]:TRACe:MEASurement:POWer:PULSe:  
LREference[:STATe]` on page 241

**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.

**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 243

**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.<br>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.<br><br>This algorithm is recommended for: <ul style="list-style-type: none"> <li>• Pulse signals with modulation</li> <li>• If the pulse energy is considered</li> </ul> For example, if you compare the measurement result to a measurement result of a thermal power sensor. |

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

Remote command:

`CALCulate<Measurement>:TRACe:MEASurement:ALGorithm` on page 233

#### **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:

`DISPlay[:WINDow<Window>]:TRACe:MEASurement:POWer:PULSe:HREFerence[:STATe]` on page 241

#### **Reference Level ← Configuration tab**

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

Remote command:

`CALCulate<Measurement>:TRACe:MEASurement:POWer:REFerence?` on page 236

#### **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:

`DISPlay[:WINDow<Window>]:TRACe:MEASurement:POWer:PULSe:LREFerence[:STATe]` on page 241

#### **Reset to Defaults ← Configuration tab**

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

## 8.5 Time Gate

In combination with the R&S NRX, all power sensors that support the timeslot measurement, can use also this measurement type. The power 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 power sensor. An external trigger signal or internal signal triggering is required for synchronization.

- [Time Gate Result Display](#)..... 80
- [Time Gate Settings](#)..... 82
- [Gate Configuration Dialog](#)..... 84

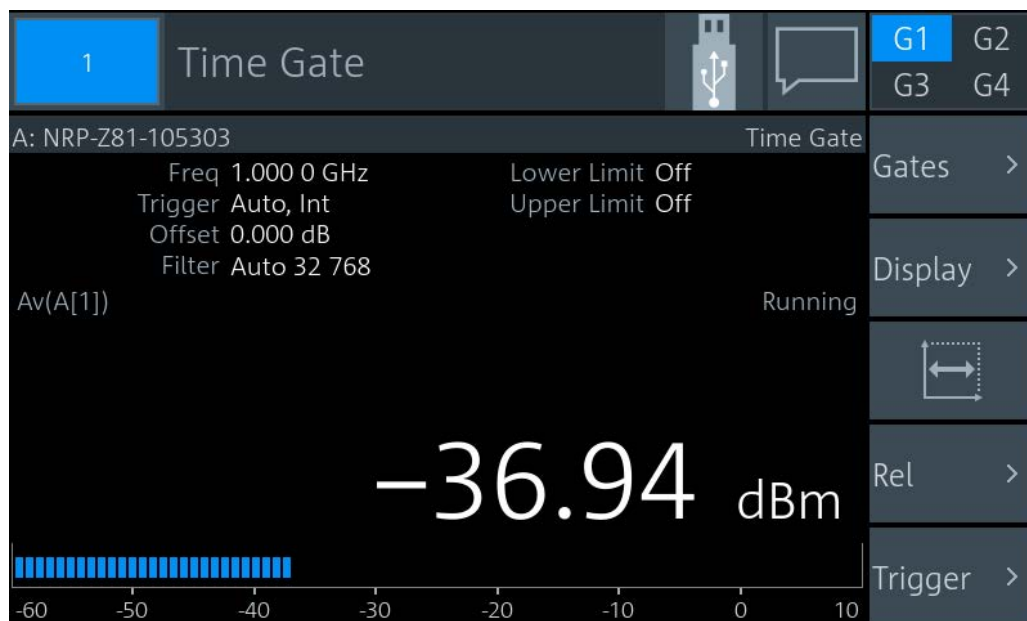
### 8.5.1 Time Gate Result Display

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 8-3: 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

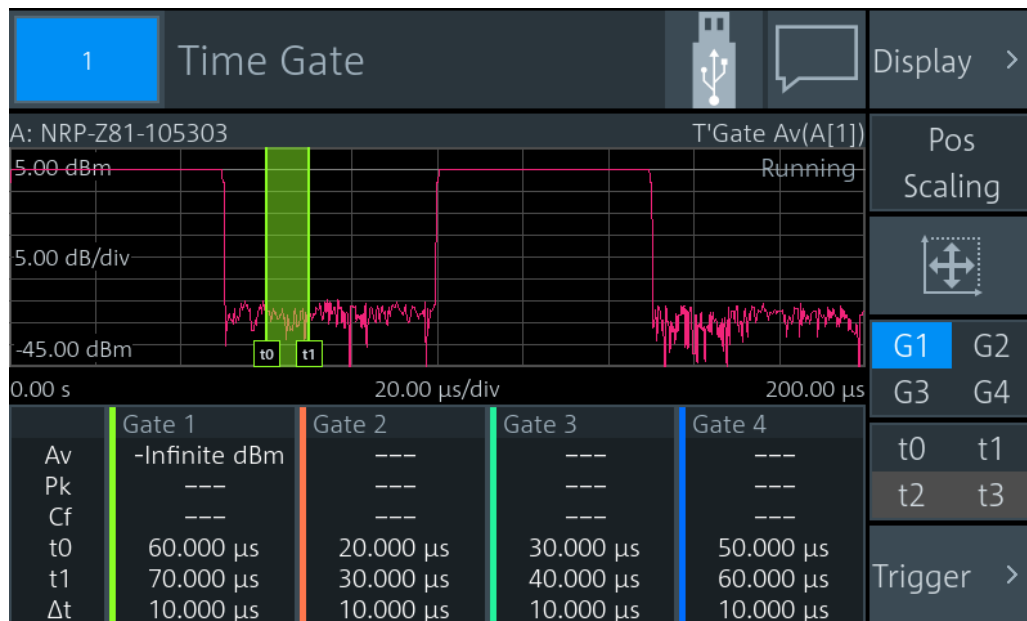


Figure 8-4: Time gate, graphical display

In the upper pane, the measurement result is shown as a single trace measurement of the primary sensor. The active gate is indicated as colored area. The color is matching the color assigned to the gate. You can change the gate configuration directly by using touch gestures. If you have a channel calculation function running that involves 2 power sensors, a legend in the upper right corner shows the assignment of curve to 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.

### 8.5.2 Time Gate Settings

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

The available settings depend on the selected result display.

G1 / G2 / G3 / G4.....	83
Gates.....	83
Display.....	83
Resolution.....	83
Pos / Scaling.....	83
Autoscale.....	83
t0 / t1 / t2 / t3.....	83
Rel.....	84
Trigger.....	84

### G1 / G2 / G3 / G4

Selects the active gate for the measurement.

Remote command:

`CALCulate<Measurement>[:POWER]:TGATe<Undef>[:AVG]:SElection`

on page 247

### Gates

Available for the scalar displays.

Opens the "Gate Configuration" dialog, see [Chapter 8.5.3, "Gate Configuration Dialog"](#), on page 84.

### Display

See [Chapter 7.1, "Display Settings"](#), on page 46.

### Resolution

Available for the scalar displays.

See ["Resolution"](#) on page 47.

### 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 power 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 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 64.

**Trigger**

See Chapter 7.3, "Triggering", on page 54.

### 8.5.3 Gate Configuration Dialog

Access depends on the selected measurement type and display format:

- Time gate, scalar display: "Time Gate" > "Gates"
- Time gate, graphical display: Tap the lower pane where the gate information is displayed.
- Statistics: "Statistics" > "Evaluate" > "Statistics Timing", tap 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 you want to configure.

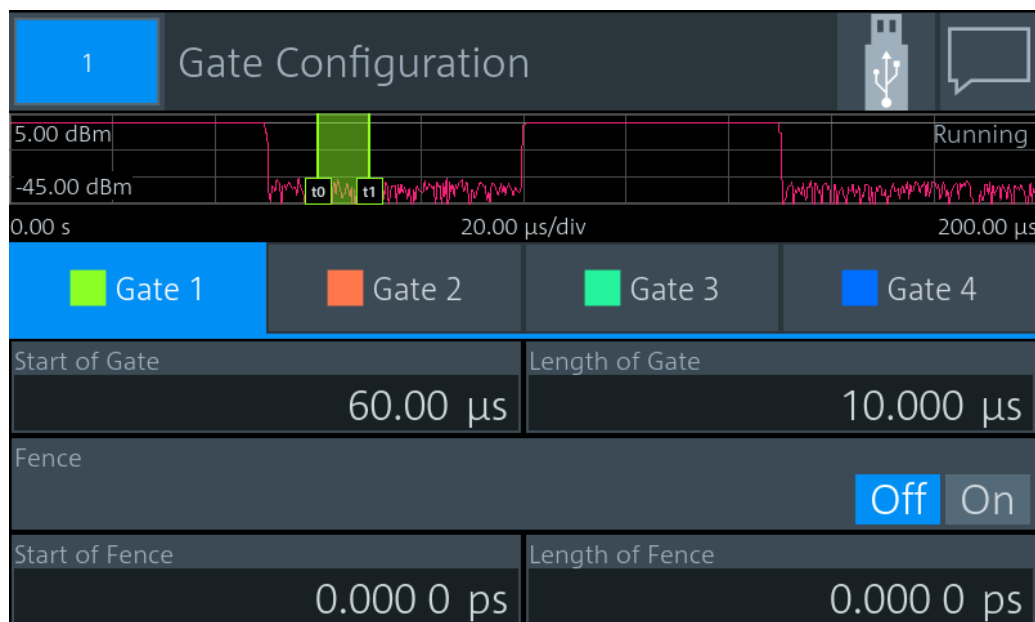


Figure 8-5: Example for time gate measurement type

Start of Gate.....	85
Length of Gate.....	85
Fence.....	85
Start of Fence.....	85
Length of Fence.....	85

### Start of Gate

Sets the start time of the gate.

Remote command:

`CALCulate<Measurement>[:POWER]:TGATe<Gate>[:AVG]:TIME` on page 246

### Length of Gate

Sets the length of the gate.

Remote command:

`CALCulate<Measurement>[:POWER]:TGATe<Gate>[:AVG]:OFFSet[:TIME]`  
on page 245

### Fence

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.

Remote command:

`CALCulate<Measurement>[:POWER]:TGATe<Gate>[:AVG][:EXCLude]:MID[:STATe]` on page 247

### 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:TIME` on page 246

### Length of Fence

Sets the length of the fence.

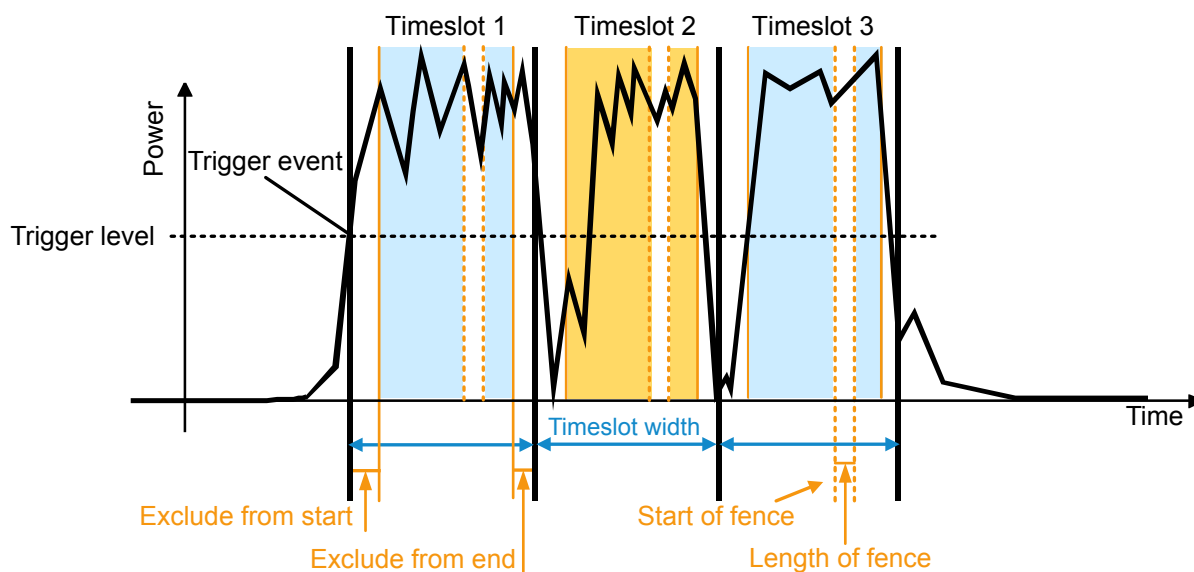
Remote command:

`CALCulate<Measurement>[:POWER]:TGATe<Gate>[:AVG][:EXCLude]:MID:OFFSet[:TIME]` on page 246

## 8.6 Timeslot

Supported by multipath and wideband power sensors. The power 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

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



**Figure 8-6: 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](#).....86
- [Timeslot Settings](#).....88
- [Timeslot Configuration Dialog](#).....89

### 8.6.1 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

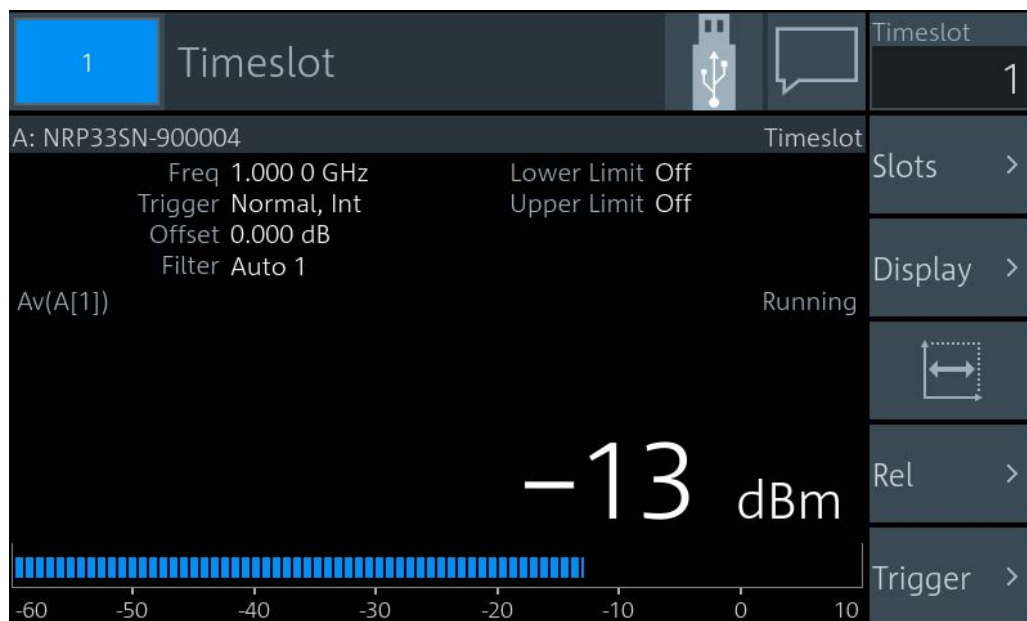


Figure 8-7: Timeslot, scalar digital display

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

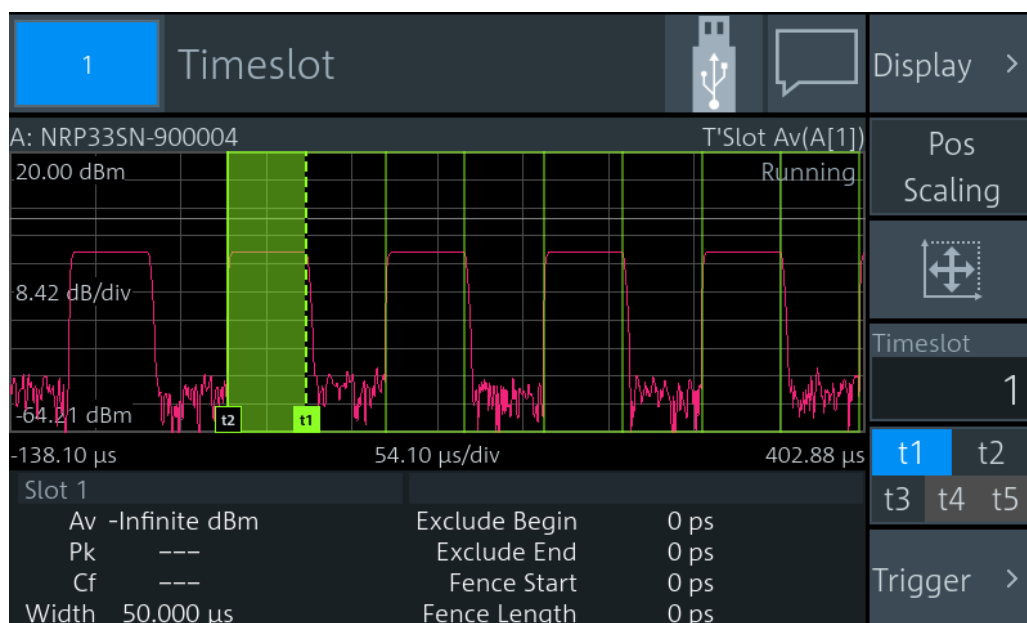


Figure 8-8: Timeslot, graphical display

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 colored area. You can change the timeslot configuration directly by using touch gestures. If you have a channel calculation function running that involves 2 power sensors, a legend in the upper right corner shows the assignment of curve to 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 tap the lower pane, the [Timeslot Configuration Dialog](#) opens.

### 8.6.2 Timeslot Settings

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

The available settings depend on the selected result display.

<a href="#">Timeslot</a> .....	88
<a href="#">Slots</a> .....	88
<a href="#">Display</a> .....	88
<a href="#">Resolution</a> .....	89
<a href="#">Pos / Scaling</a> .....	89
<a href="#">Autoscale</a> .....	89
<a href="#">t1, t2, t3, t4, t5</a> .....	89
<a href="#">Rel</a> .....	89
<a href="#">Trigger</a> .....	89

#### Timeslot

Selects a timeslot for the measurement.

Remote command:

[CALCulate<Measurement>\[:POWER\]:TSLot\[:AVG\]:SElection](#) on page 249

#### Slots

Available for the scalar displays.

Opens the "Timeslot Configuration" dialog, see [Chapter 8.6.3, "Timeslot Configuration Dialog"](#), on page 89.

#### Display

See [Chapter 7.1, "Display Settings"](#), on page 46.



**Resolution**

Available for the scalar displays.

See ["Resolution"](#) on page 47.

**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 power 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 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 64.

**Trigger**

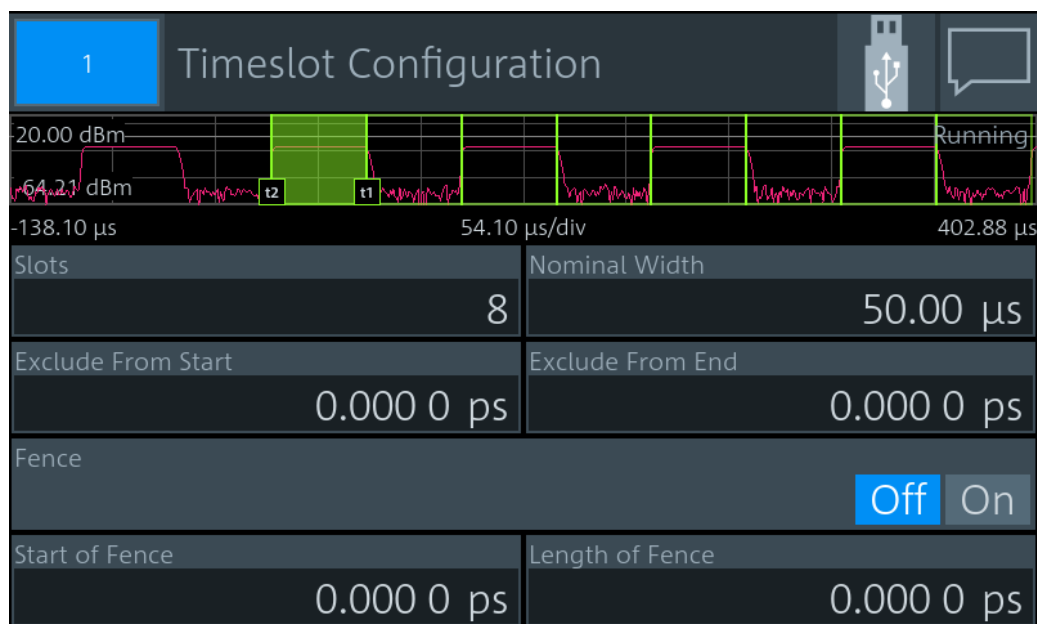
See [Chapter 7.3, "Triggering"](#), on page 54.

### 8.6.3 Timeslot Configuration Dialog

Access depends on the selected display format:

- Scalar display: "Timeslot" > "Slots"
- Graphical display: Tap the lower pane where the gate information is displayed.

Used for configuring the characteristics of the timeslots.



Slots.....	90
Nominal Width.....	90
Exclude from Start.....	90
Exclude from End.....	90
Fence.....	91
Start of Fence.....	91
Length of Fence.....	91

### Slots

Sets the number of simultaneously measured timeslots.

Remote command:

`CALCulate<Measurement>[:POWER]:TSLot[:AVG]:COUNT` on page 248

### Nominal Width

Sets the length of the timeslot.

Remote command:

`CALCulate<Measurement>[:POWER]:TSLot[:AVG]:WIDTH` on page 249

### 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 248

### 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 248

**Fence**

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.

Remote command:

`CALCulate<Measurement>[:POWER]:TSLot[:AVG][:EXCLude]:MID[:STATe]`  
on page 250

**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:TIME`  
on page 249

**Length of Fence**

Sets the length of the fence.

Remote command:

`CALCulate<Measurement>[:POWER]:TSLot[:AVG][:EXCLude]:MID:OFFSet[:TIME]` on page 249

## 8.7 Statistics




Supported by wideband power sensors. The power 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](#).....91
- [Statistics Settings](#).....93
- [Measurement Settings Dialog](#).....93
- [Scale Configuration Dialog](#).....95
- [Statistics Timing Dialog](#).....96

### 8.7.1 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.

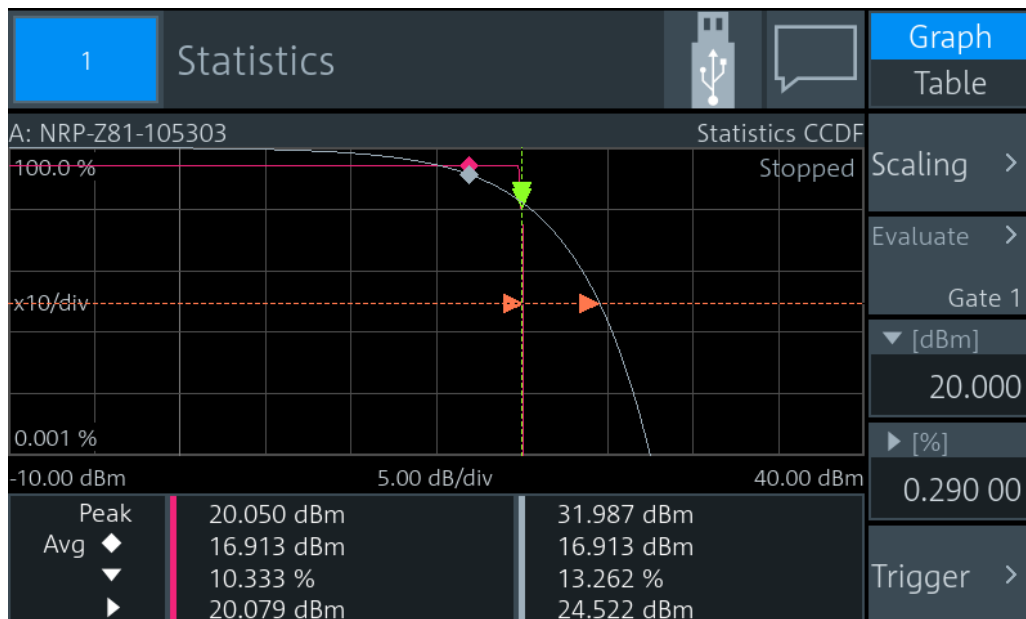


Figure 8-9: Statistics, graphical display

The graph displays the waveform of the selected trace.

Tap **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 power sensor or generated by an internal **AWGN** source. You can use the second trace as reference trace.

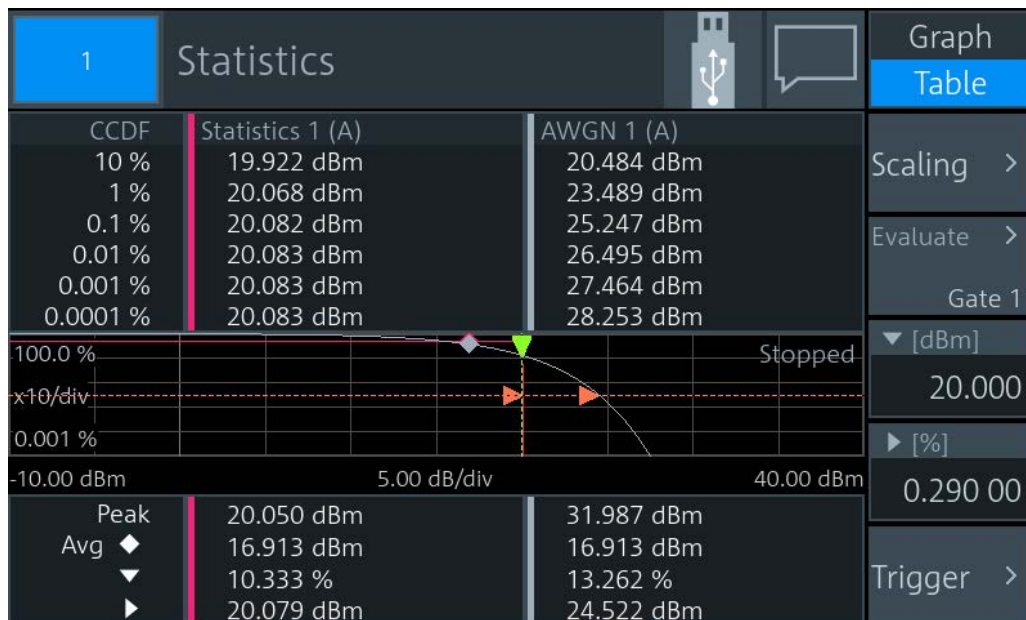


Figure 8-10: Statistics, tabular display

## 8.7.2 Statistics Settings

Access: "Measurement Settings" > "Measurement Type" > "Statistics"

Graph / Table.....	93
Scaling.....	93
Evaluate.....	93
[dBm] / [dB] marker.....	93
[%] marker.....	93
Trigger.....	93

### Graph / Table

Available if "CCDF" or "CDF" is set under [Statistics Function](#).

Shows or hides the measurement results table.

### Scaling

Opens the "Scale Configuration" dialog, see [Chapter 8.7.4, "Scale Configuration Dialog"](#), on page 95.

### Evaluate

Opens the "Statistics Timing" dialog, see [Chapter 8.7.5, "Statistics Timing Dialog"](#), on page 96.

### [dBm] / [dB] marker

Positions the x-marker to a power value. The associated measurement result is displayed in the lower pane, see [Figure 8-10](#).

Remote command:

`CALCulate<Measurement>:STATistics:MARKer:X:POSition:RELative`

on page 259

`CALCulate<Measurement>:STATistics:MARKer:X:POSition[:ABSolute]`

on page 259

### [%] marker

Positions the y-marker to a measurement value. The associated power value is displayed in the lower pane, see [Figure 8-10](#).

Remote command:

`CALCulate<Measurement>:STATistics:PDF:MARKer:Y:POSition`

on page 259

`CALCulate<Measurement>:STATistics[:CDF]:MARKer:Y:POSition`

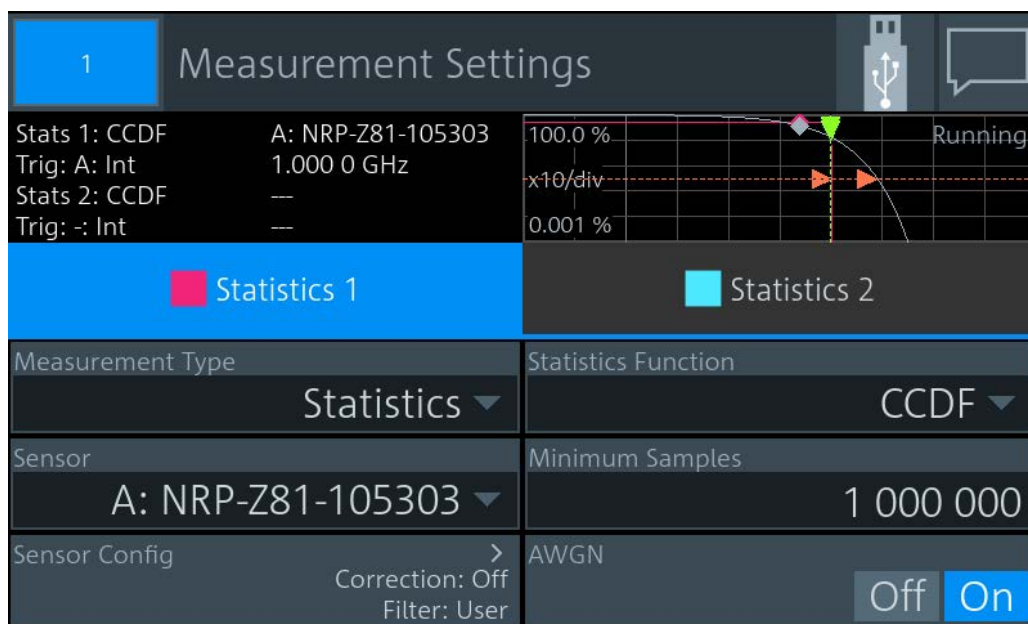
on page 258

### Trigger

See [Chapter 7.3, "Triggering"](#), on page 54.

## 8.7.3 Measurement Settings Dialog

Access: In the "Statistics" dialog, tap 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 61.
- "Sensor", see ["Primary Sensor, Secondary Sensor"](#) on page 61.
- "Sensor Config" > "Aperture"  
See ["Aperture"](#) on page 106.

The settings in the right column are specific for statistics measurements.

<a href="#">Statistics Function</a> .....	94
<a href="#">Minimum Samples</a> .....	95
<a href="#">AWGN</a> .....	95

### 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 (Av). Only linear scale is available.

Remote command:

`CALCulate<Measurement>[:CHANnel<Channel>]:FEED<Channel>`  
on page 215

**Minimum Samples**

Sets the minimum number of samples.

Remote command:

`CALCulate<Measurement>:STATistics:SAMPles[:MINimum]` on page 252

**AWGN**

Enables or disables the internal, additional white Gaussian noise (AWGN) source. If enabled, you cannot measure with a second power sensor.

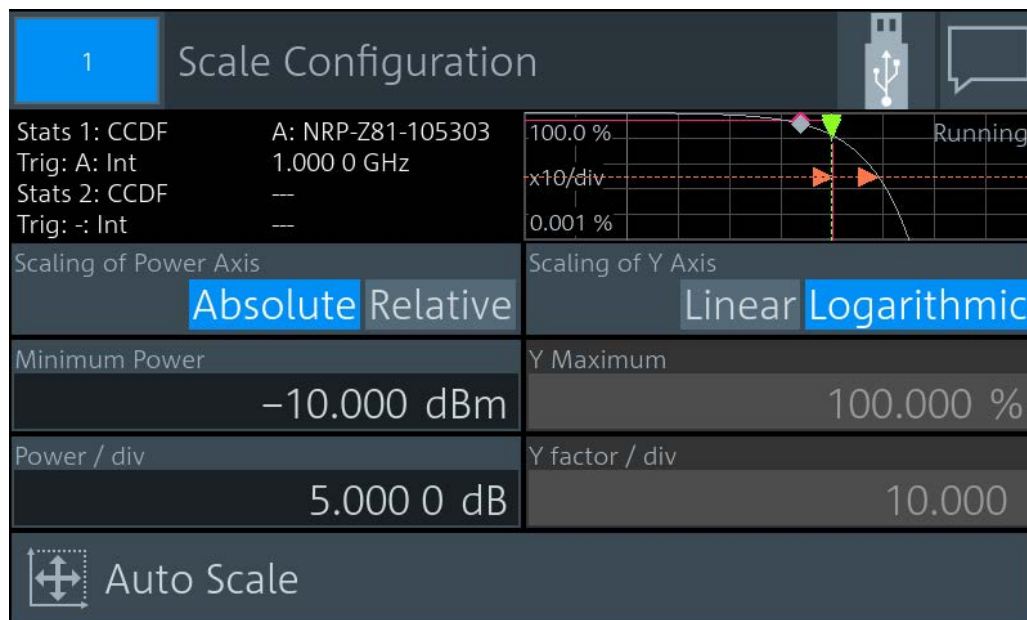
Remote command:

`CALCulate<Measurement>:STATistics:AWGN[:STATe]` on page 252

**8.7.4 Scale Configuration Dialog**

Access: "Statistics" > "Scaling"

Used for configuring the axes of the display.



Scaling of Power Axis.....	95
Minimum Power.....	96
Power / div.....	96
Scaling of Y Axis.....	96
Y Maximum.....	96
Y / div.....	96
Auto Scale.....	96

**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 256

#### Minimum Power

Sets the lower limit of the level range as reference for the graphical display.

Remote command:

`CALCulate<Measurement>:STATistics[:SCALE]:X:RLEVel[:ABSolute]`  
on page 257

`CALCulate<Measurement>:STATistics[:SCALE]:X:RLEVel:RELative`  
on page 257

#### Power / div

Sets the scaling of the power axis.

Remote command:

`CALCulate<Measurement>:STATistics[:SCALE]:X:POINTs` on page 256

`CALCulate<Measurement>:STATistics[:SCALE]:X:RANGe` on page 257

#### Scaling of Y Axis

Sets linear or logarithmic scaling for the y-axis.

Remote command:

`CALCulate<Measurement>:STATistics[:SCALE]:Y:SPACing` on page 258

#### 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 255

`CALCulate<Measurement>:STATistics[:CDF] [:SCALE]:Y[:LINear]:TOP`  
on page 256

#### 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 255

`CALCulate<Measurement>:STATistics[:CDF] [:SCALE]:Y[:LINear]:`  
`PDIVision` on page 255



#### Auto Scale

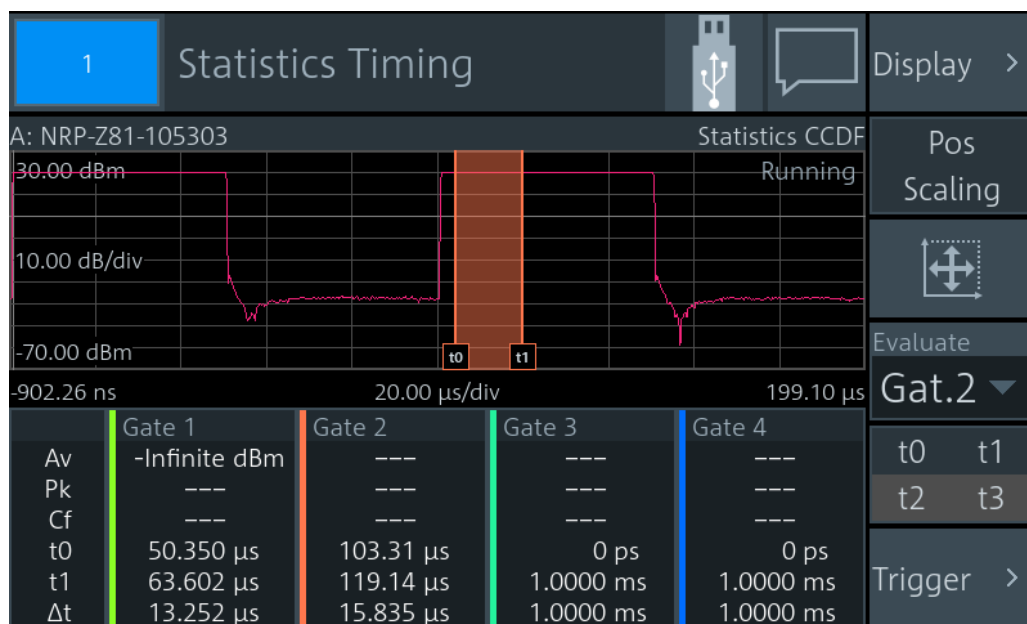
Adapts the scaling of the power axis to the trace.

### 8.7.5 Statistics Timing Dialog

Access: "Statistics" > "Evaluate"

Configures the sampling window of the measurement.





If you tap the lower pane, the "Gate Configuration" dialog opens, see [Chapter 8.5.3, "Gate Configuration Dialog"](#), on page 84.

<a href="#">Display</a> .....	97
<a href="#">Pos / Scaling</a> .....	97
<a href="#">Autoscale</a> .....	97
<a href="#">Evaluate</a> .....	97
<a href="#">t0 / t1 / t2 / t3</a> .....	98

### Display

Opens the "Trace Configuration" dialog that contains the scaling functions:

- "Start Time" on page 49
- "Time / Div" on page 50
- "Power Reference" on page 50
- "Power / Div" on page 50
- "Unit" on page 51

### 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 253

**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 83.

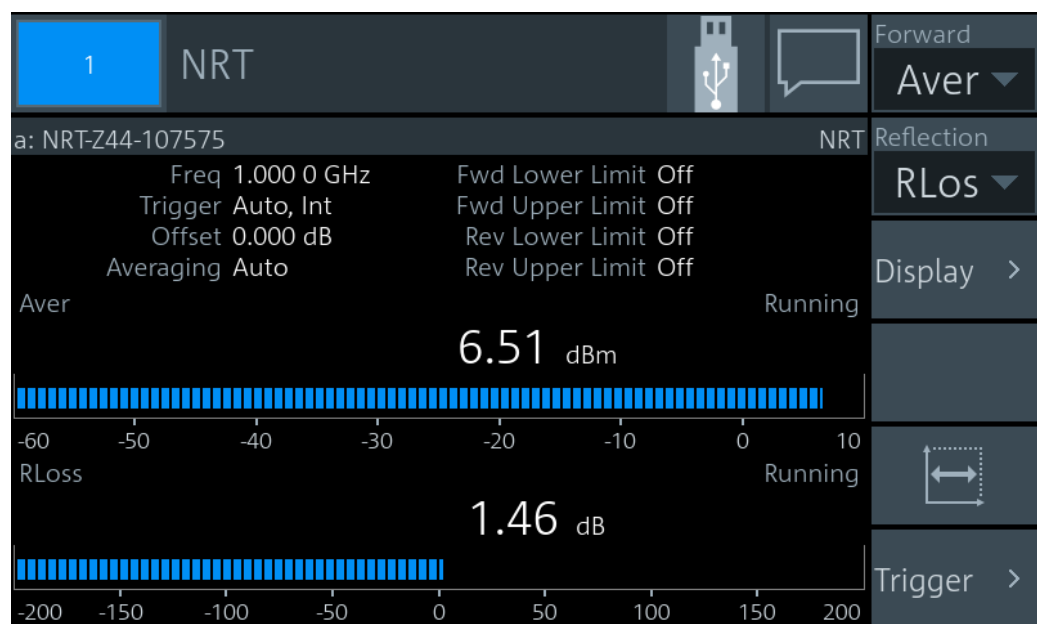
## 8.8 NRT

Requires the sensor interface for R&S NRT (R&S NRX-B9), see [Chapter 3.1.2, "Module Bay"](#), on page 14.

Used for power reflection measurements with the R&S NRT directional power sensors. The power sensor measures the forward and reverse power. The forward power is the power flux from the source to the load. For configuring the power sensor, see [Chapter 9.5, "For NRT Measurement Type"](#), on page 117.

### 8.8.1 NRT Result Display

The R&S NRX displays the forward and reverse power simultaneously.



Displays two scalar values, one for the selected **Forward** measurement and one for the **Reflection** measurement. In this example, **Average** ("Aver") and **Return Loss** ("RLoS") are selected.

## 8.8.2 NRT Settings

Access: "Measurement Settings" > "Measurement Type" > "NRT"

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L <b>Average</b> .....	100
L <b>CCDF</b> .....	100
L <b>Peak Envelope Power (PEP)</b> .....	100
L <b>Absorption Average</b> .....	100
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L <b>Reflection Ratio</b> .....	102
<b>Display</b> .....	102
<b>Autoscale</b> .....	102
<b>Trigger</b> .....	102

### Forward

Opens a dialog to measure power, power differences and envelope parameters.

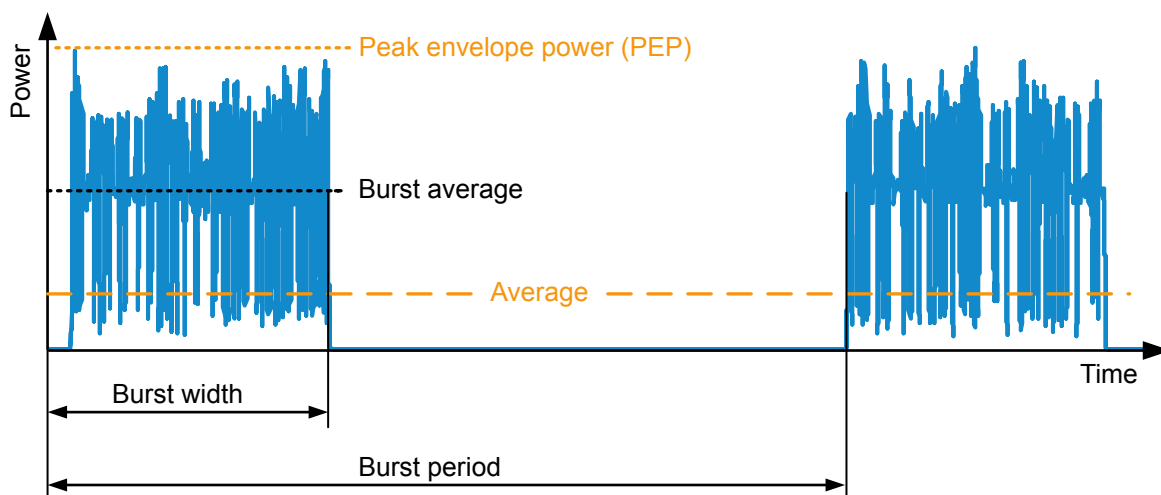


Figure 8-11: Forward power measurement parameters

**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 119.

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 absorbed power is less than one percent.

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 \(PEP\)](#) between forward and reverse 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 118.

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 \(PEP\)](#).

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 reverse 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 reverse 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**

Reverse 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 102.

Remote command:

```
CALCulate<Measurement>[:CHANnel<Channel>]:FEED<Channel>
"POWer:SWRatio"
```

**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"
```

**Reflection Coefficient ← Reflection**

$$\text{Reflection coefficient} = \sqrt{\frac{\text{Reverse power}}{\text{Forward power}}}$$

Remote command:

```
CALCulate<Measurement>[:CHANnel<Channel>]:FEED<Channel>
"POWer:RCoefficient"
```

**Reflection Ratio ← Reflection**

$$\text{Reflection ratio} = 100 \frac{\text{Reverse power}}{\text{Forward power}}$$

Remote command:

```
CALCulate<Measurement>[:CHANnel<Channel>]:FEED<Channel>
"POWer:RFRatio"
```

**Display**

See [Chapter 7.1, "Display Settings"](#), on page 46.

**Autoscale**

Adapts the scaling of the graphical display.

**Trigger**

Opens the "Measurement Trigger Configuration" dialog:

- ["Trigger Mode"](#) on page 57
- ["Trigger Source"](#) on page 57

### 8.8.3 Measurement Main Configuration Dialog

Access: In the "NRT" dialog, tap the *displayed table or graph*.

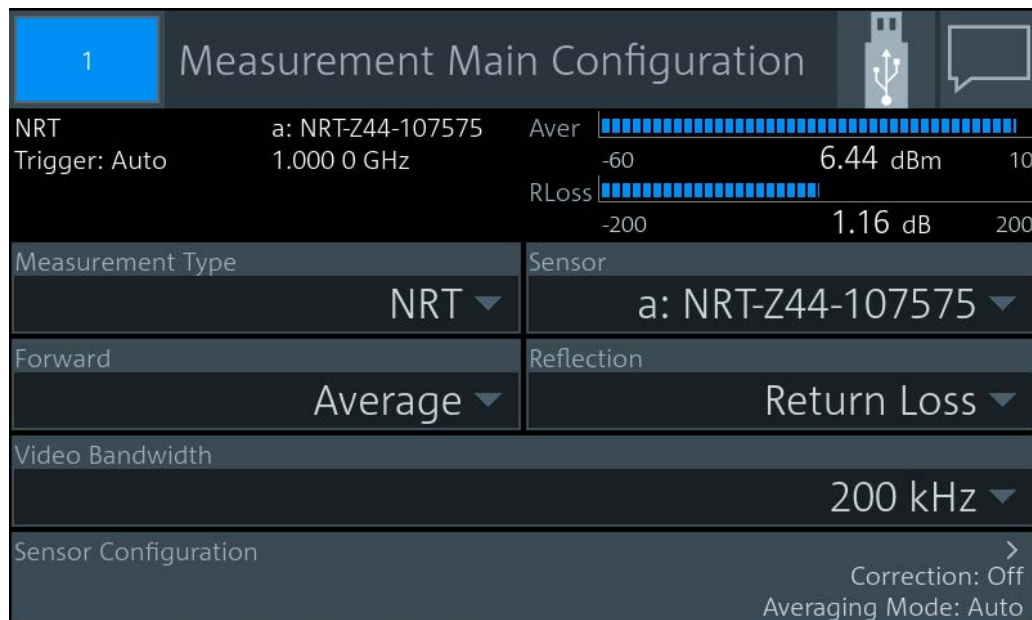


Figure 8-12: Measurement Main Configuration dialog

#### Measurement Type

See ["Measurement Type"](#) on page 61.

#### Sensor

Assigns the power sensor to the NRT measurement. Suitable are R&S NRT directional power sensors connected to the sensor interface for R&S NRT (R&S NRX-B9).

See also ["Primary Sensor, Secondary Sensor"](#) on page 61.

#### Forward

See ["Forward"](#) on page 99.

#### Reflection

See ["Reflection"](#) on page 101.

#### Video Bandwidth

See ["Video Bandwidth"](#) on page 121.

#### Sensor Configuration

See [Chapter 9.5, "For NRT Measurement Type"](#), on page 117.

## 9 Sensor Configuration

Access: "Measurement Settings" > "Primary Sensor Config" or "Secondary Sensor Config"

1 Primary Sensor	
2	3
Continuous Average Trigger: Auto	B: NRP33SN-900004 50.00 MHz  <b>-84.63 dBm</b>
Mode Duty Cycle: Off Evaluate: Average Aperture: 20.000 ms Smoothing: Off	Correction Effective Offset: 0.000 dB S-Parameter: Off Source Gamma: Off
Filter Filter: Auto (64)	Range Range: Auto User Def Transition: 0.000 dB Attenuation: 30.000 dB

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 R&S NRX. These sensors are called primary sensor and secondary sensor.

Further information:

- ["Primary Sensor, Secondary Sensor"](#) on page 61
- [Chapter 8, "Measurement Types and Result Displays"](#), on page 63
- [Mode Settings](#)..... 104
- [Correction Settings](#)..... 108
- [Filter Settings](#)..... 111
- [Range Settings](#)..... 115
- [For NRT Measurement Type](#)..... 117

### 9.1 Mode Settings

Access:

"Measurement Settings" > "Primary Sensor Config" > "Mode"

"Measurement Settings" > "Secondary Sensor Config" > "Mode"

Available for all measurement types.



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Duty Cycle.....	105
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Aperture.....	106
Sampling Rate.....	106
Smoothing.....	107
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### 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 305

### 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 R&S NRX takes this percentage into account 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 305

**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 306

`CALCulate<Measurement>:TRACe:MEASurement:TRANsition:ESAMpling:`

`AUTO[:STATe]` on page 308

**Evaluate**

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

Sets the display type.

- |           |  |
|-----------|--|
| "Average" | Fixed setting for multipath power sensors.<br>Average power value, resulting in a flicker-free display and smooth trace. |
| "Random"  | Requires a wideband power sensor.<br>Power of a randomly selected sample, i.e. a realistic display with signal details.  |
| "Peak"    | Requires a wideband power sensor.<br>Highest power measured (peak power).  |

Remote command:

`CALCulate<Measurement>[:CHANnel<Channel>]:FEED<Channel>`

on page 215

**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 307

`CALCulate<Measurement>:STATistics:APERture` on page 252

**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 to avoid measurement errors caused due to aliasing effects. However, this setting extends the measurement time.

Remote command:

`CALCulate<Measurement>[:CHANnel<Channel>]:SAMPling` on page 306

### 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 307

### Dropout Tolerance

Available for burst average measurements.

Detects the falling edge of a burst. If power keeps low for at least this 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 306

### Exclude from Start, Exclude from End

Available for burst average measurements.

Sets the time interval at the beginning or end of bursts that is excluded from the measurement. Thus, signal overshoots are omitted.

Remote command:

CALCulate<Measurement>[:CHANnel<Channel>]:BURSt:TIMing:EXCLude:START on page 304

CALCulate<Measurement>[:CHANnel<Channel>]:BURSt:TIMing:EXCLude:STOP on page 304

## 9.2 Correction Settings

Access:

"Measurement Settings" > "Primary Sensor Config" > "Correction"

"Measurement Settings" > "Secondary Sensor Config" > "Correction"

Available for all measurement types.

### Offset corrections

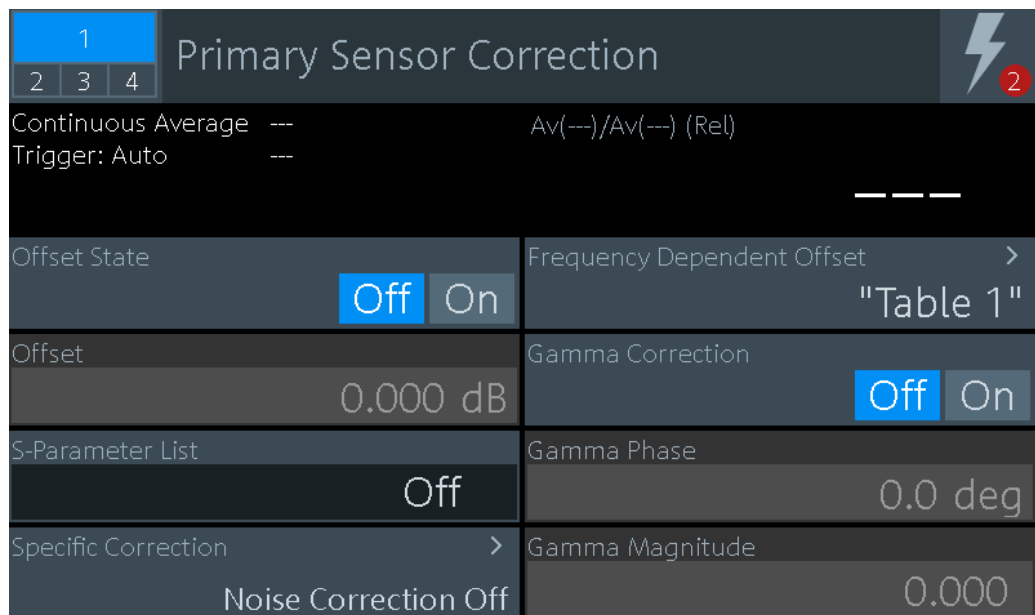
Add a fixed level offset in dB to compensate for external losses or gains. If you take the attenuation of an attenuator located ahead of the power sensor or the coupling attenuation of a directional coupler into account, use a positive offset. That means the power sensor calculates the power at the input 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 power 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 power sensor and the component is considered. For information on how to proceed, see the user manual of the power 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 power sensor.



**Primary Sensor Correction**

Continuous Average --- Av(---)/Av(---) (Rel)  
 Trigger: Auto ---

Offset State **Off** On Frequency Dependent Offset > "Table 1"

Offset 0.000 dB Gamma Correction **Off** On

S-Parameter List Off Gamma Phase 0.0 deg

Specific Correction > Gamma Magnitude 0.000  
 Noise Correction Off

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L Edit table "<table name>".....	110
L Export file name, Import file name.....	111
L Export table to file, Import table from file.....	111
Gamma Correction.....	111
Gamma Phase.....	111
Gamma Magnitude.....	111

### Offset State

Enables or disables the offset entered under [Offset](#).

Remote command:

CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:OFFSet:  
 STATe on page 310

### Offset

Sets a fixed offset for compensating external signal losses or gains. See also "[Offset corrections](#)" on page 108.

Remote command:

CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:OFFSet[:  
 MAGNitude] on page 311

**S-Parameter List**

Enables or disables the S-parameter data set stored in the calibration data of the power sensor. See also "[S-Parameter corrections](#)" on page 108.

Remote command:

[\[SENSe<Sensor>:\]CORRection:SPDevice:STATe](#) on page 309

[\[SENSe<Sensor>:\]CORRection:SPDevice:SELEct](#) on page 309

[\[SENSe<Sensor>:\]CORRection:SPDevice:LIST?](#) on page 308

**Frequency Dependent Offset**

Opens the [Primary Sensor Offsets](#), [Secondary Sensor Offsets](#) dialogs.

**Primary Sensor Offsets, Secondary Sensor Offsets dialogs ← Frequency Dependent Offset**

Configures the power sensor offsets.

Remote command:

[MEMory:TABLE:...](#), see [Chapter 14.11, "Managing Setups and Correction Tables"](#), on page 346.

**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 311

**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 310

[MEMory:TABLE:SELEct](#) on page 352

**Edit table name ← Primary Sensor Offsets, Secondary Sensor Offsets dialogs ← Frequency Dependent Offset**

Enter the table name.

Remote command:

[MEMory:TABLE:MAP?](#) on page 351

**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 350

`MEMory:TABLE:FREQuency:POINts?` on page 351

`MEMory:TABLE:GAIN:POINts?` on page 351

`MEMory:TABLE:GAIN[:MAGNitude]` on page 351

**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 108.

Remote command:

`CALCulate<Measurement>[:CHANnel<Channel>]:SGAMma:CORRection:STATE` on page 311

### 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 312

### 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 312

## 9.3 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 power 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 power sensor.

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Video Bandwidth.....	115

### 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 317

`CALCulate<Measurement>[:CHANnel<Channel>]:TRACe:AVERage[:STATe]`

on page 319



**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:ENUM](#)

on page 315

[CALCulate<Measurement>\[:CHANnel<Channel>\]:TRACe:AVERage:COUNT\[:VALue\]](#) on page 318

**Recalc Filter Length**

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

Recalculates the number of readings that are averaged for one measured value.

**Clear Filter Buffer**

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

Clears the filter buffer.

Remote command:

[\[SENSe<Sensor>:\]AVERage:RESet](#) on page 313

**Fixed Noise Mode**

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

Sets the autofilter.

"Normal" Sets the averaging number so that the intrinsic noise of the power sensor, 2 standard deviations, does not exceed the specified ["Noise Content"](#) on page 113.

"Fixed Noise" Limits the averaging number as specified in [Maximum Settling Time](#) to avoid very long settling times.

Remote command:

[CALCulate<Measurement>\[:CHANnel<Channel>\]:AVERage:COUNT:AUTO:TYPE](#) on page 315

**Noise Content**

If [Fixed Noise Mode](#) is set to "Normal", available for continuous average, burst average, time gate measurements.

Sets the averaging number so that the intrinsic noise of the power sensor does not exceed the specified value.

Remote command:

[CALCulate<Measurement>\[:CHANnel<Channel>\]:AVERage:COUNT:AUTO:NSRatio](#) on page 314

**Maximum Settling Time**

If [Fixed Noise Mode](#) is set to "Fixed Noise", available for continuous average, burst average, time gate 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 314

### Timeslot

Available for continuous average, burst average, time gate 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 314

### 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 316

`CALCulate<Measurement>[:CHANnel<Channel>]:TRACE:AVERage:TCONTROL:AUTO` on page 318

### Moving Average

Available for continuous average, burst average, trace, pulse analysis, timeslot, statistics measurements.

Defines how the measurement results are output. This is 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 very long. |

Remote command:

`CALCulate<Measurement>[:CHANnel<Channel>]:AVERage:TCONTROL[:ENUM]` on page 316

`CALCulate<Measurement>[:CHANnel<Channel>]:TRACE:AVERage:TCONTROL[:ENUM]` on page 318

### Averaging Domain

Requires an R&S frequency selective power sensor.

Sets the averaging method. See also the user manual of the power sensor.

- |         |                       |
|---------|-----------------------|
| "Power" | Power averaging       |
| "Video" | Logarithmic averaging |

"Linear"                      Amplitude averaging

Remote command:

`CALCulate<Measurement>[:CHANnel<Channel>]:AVERage:TYPE` on page 317

#### Video Bandwidth

Requires an 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 320

## 9.4 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 power sensors have only one measurement range, others have two or three measurement ranges. For details, see the data sheet of the power 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.

1 Primary Sensor Range

2 3 4

Continuous Average A: NRP33SN-900004 Av(A)  
Trigger: Auto 50.00 MHz

0.00 dBm

Range State User Auto

Attenuator Mode User Auto Once

Range Low Mid High

Attenuation ---

User Defined Transition Off On

Offset 0.000 dB

Range State.....	116
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User Defined Transition.....	116
Offset.....	117
Attenuator Mode.....	117
Attenuation.....	117

### Range State

Enables or disables the automatic measurement path selection.

Remote command:

CALCulate<Measurement>[:CHANnel<Channel>][:POWer][:AVG]:RANGe:  
AUTO on page 321

### Range

Available if [Range State](#) is set to "User".

Sets the active measurement path in which the power sensor is measuring.

Remote command:

CALCulate<Measurement>[:CHANnel<Channel>][:POWer][:AVG]:RANGe[:  
VALue] on page 323

### User Defined Transition

Available if [Range State](#) is set to "Auto".

Enables or disables the reduction of the transition range between the measurement paths, entered under [Offset](#).

Remote command:

CALCulate<Measurement>[:CHANnel<Channel>][:POWer][:AVG]:RANGe:  
CLEVel:STATe on page 322

**Offset**

Reduces the transition range 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 S/N ratio is reduced at the lower limits of the transition ranges.

Remote command:

`CALCulate<Measurement>[:CHANnel<Channel>][:POWer][:AVG]:RANGe:CLEVel[:VALue]` on page 322

**Attenuator Mode**

Requires an R&S 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 320

**Attenuation**

Requires an R&S 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 321

## 9.5 For NRT Measurement Type

Requirements:

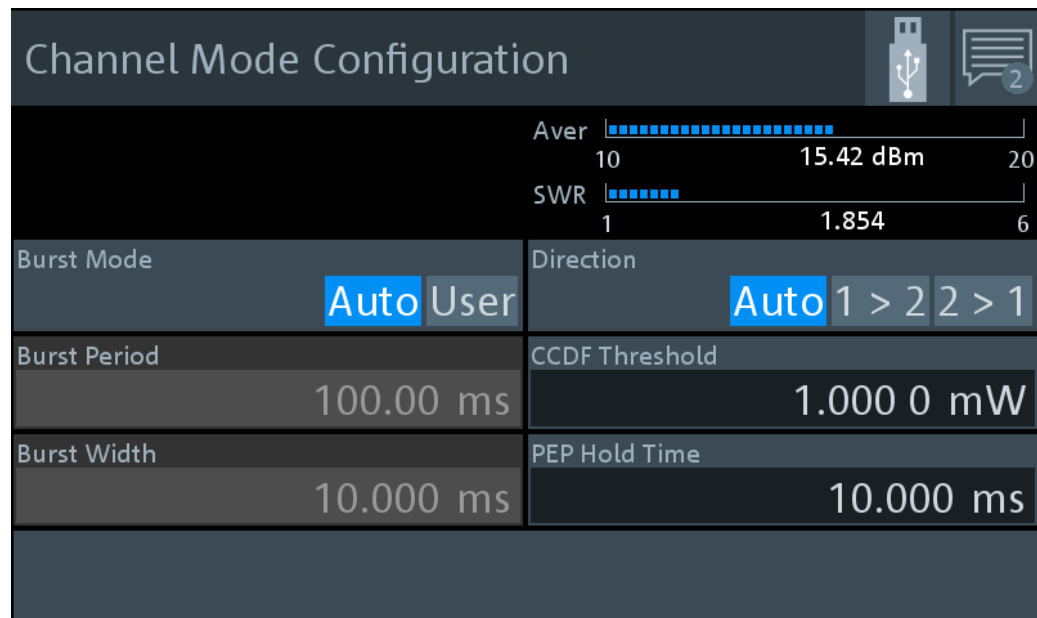
- "Measurement Settings" > "Measurement Type" > "NRT"
- Sensor interface for R&S NRT (R&S NRX-B9), see [Chapter 3.1.2, "Module Bay"](#), on page 14.
- R&S directional power sensors

Further information:

- [Chapter 8.8, "NRT"](#), on page 98
- [NRT Mode Settings](#)..... 118
- [NRT Correction Settings](#)..... 119
- [NRT Filter Settings](#)..... 121

### 9.5.1 NRT Mode Settings

Access: "Measurement Main Configuration" > "Sensor Configuration" > "Mode"



Burst Mode.....	118
Burst Period.....	118
Burst Width.....	119
Direction.....	119
CCDF Threshold.....	119
PEP Hold Time.....	119

#### Burst Mode

Defines how the average burst power is determined.

"Auto" Not supported by all power sensors.  
The power 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`

on page 326

#### Burst Period

Available if "User" is set under "[Burst Mode](#)" on page 118.

Sets the burst period.

Remote command:

`CALCulate<Measurement>[:CHANnel<Channel>]:NRT:BURSt:PERiod`  
on page 327

### Burst Width

Available if "User" is set under "Burst Mode" on page 118.

Sets the burst width.

Remote command:

`CALCulate<Measurement>[:CHANnel<Channel>]:NRT:BURSt:WIDTh`  
on page 327

### Direction

Automatically determines the direction of the forward power or sets a fixed direction.

"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`  
on page 328

### CCDF Threshold

Sets the threshold for the complementary cumulative distribution function, [CCDF](#).

Remote command:

`CALCulate<Measurement>[:CHANnel<Channel>]:NRT:CCDF:THReshold`  
on page 327

### PEP Hold Time

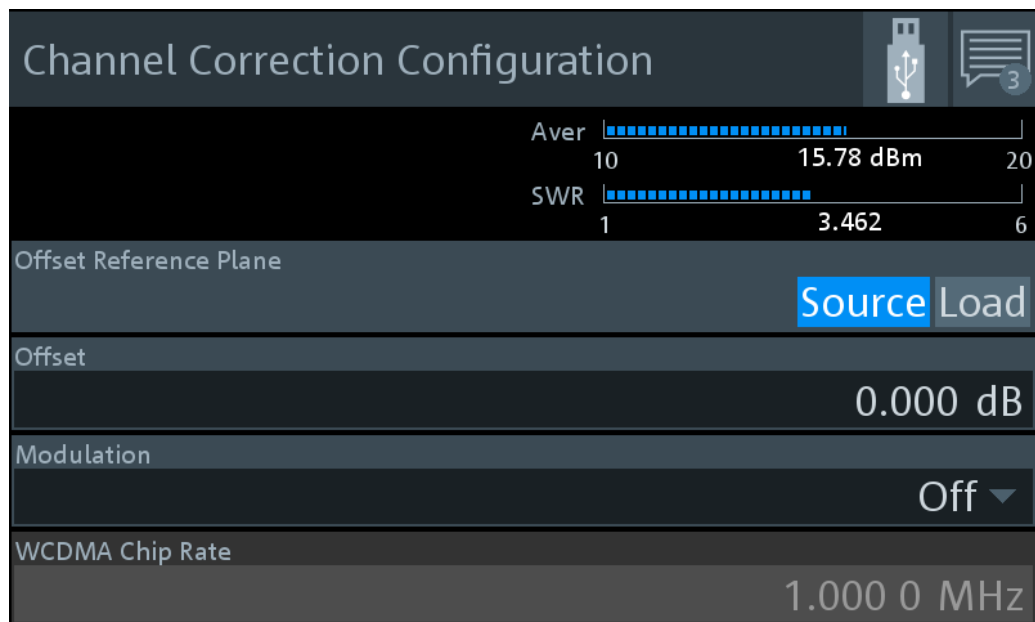
Sets the hold time of the peak hold circuit of the power sensor. See also [Peak Envelope Power \(PEP\)](#).

Remote command:

`CALCulate<Measurement>[:CHANnel<Channel>]:NRT:PEP:HOLD:TIME`  
on page 328

## 9.5.2 NRT Correction Settings

Access: "Measurement Main Configuration" > "Sensor Configuration" > "Correction"



Offset Reference Plane.....	120
Offset.....	120
Modulation.....	120
WCDMA Chip Rate.....	121

#### Offset Reference Plane

Selects the reference plane. It defines at which sensor port the forward and reverse power is measured.

"Source" Source connector of the power sensor

"Load" Load connector of the power sensor

Remote command:

`CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:OFFSet:RPLane` on page 329

`INPut<Sensor>:PORT:POSition` on page 331

#### Offset

Considers the transmission loss in a cable that connects the desired measurement point, set by `INPut<Sensor>:PORT:POSition`, and the power sensor.

Remote command:

`INPut<Sensor>:PORT:OFFSet` on page 331

#### 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.

"DVB-T" DVB-T standard for terrestrial DVB TV transmitters.



"DAB"                    DAB standard for radio transmitters.

Remote command:

```
CALCulate<Measurement>[:CHANnel<Channel>]:NRT:DMODulation[:  
VALue] on page 330  
[SENSe<Sensor>:]DM:STANdard on page 329
```

**WCDMA Chip Rate**

Available if "WCDMA" is set under [Modulation](#).

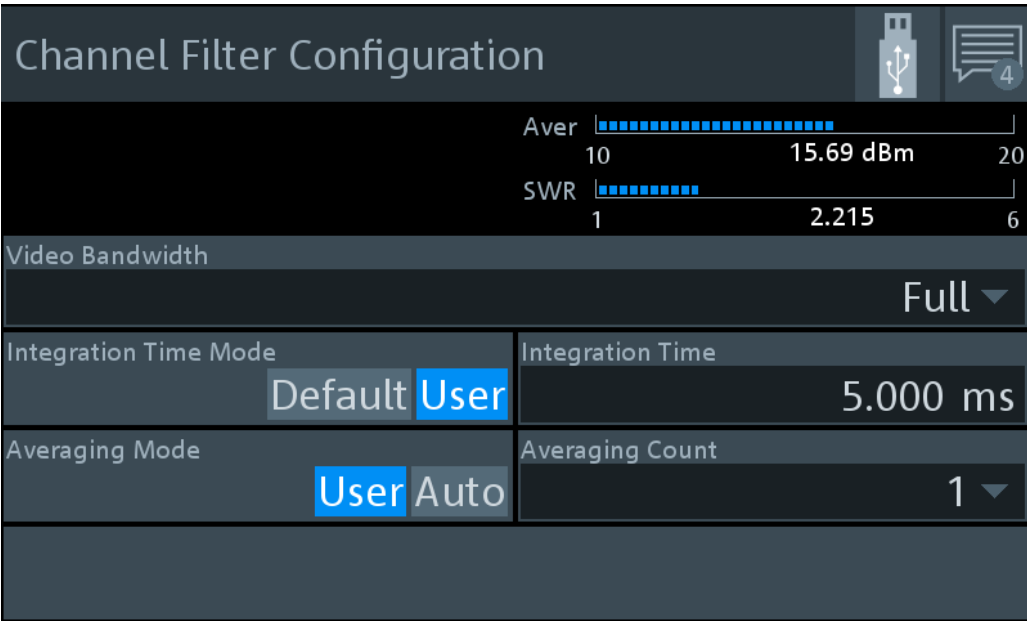
Sets the chip rate for the WCDMA communication standard.

Remote command:

```
CALCulate<Measurement>[:CHANnel<Channel>]:NRT:DMODulation:WCDMa:  
CRATe on page 330
```

**9.5.3 NRT Filter Settings**

Access: "Measurement Main Configuration" > "Sensor Configuration" > "Filter"



<a href="#">Video Bandwidth</a> .....	121
<a href="#">Integration Time Mode</a> .....	122
<a href="#">Integration Time</a> .....	122
<a href="#">Averaging Mode</a> .....	122
<a href="#">Averaging Count</a> .....	122

**Video Bandwidth**

For measuring the peak envelope power, specify the video bandwidth that is used for measuring the detected RF signal.

"4 kHz"                    The bandwidth of the sensor is set to 4 kHz.

"200 kHz"                The bandwidth of the sensor is set to 200 kHz.

"Full" The maximum bandwidth of the sensor is used.

Remote command:

`CALCulate<Measurement>[:CHANnel<Channel>]:NRT:VBWidth[:VALue]`

on page 333

`[SENSe<Sensor>:]BANDwidth:VIDeo:FNUMber` on page 333

`[SENSe<Sensor>:]BWIDth:VIDeo:FNUMber` on page 333

### 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`

on page 332

### 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]`

on page 333

### 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]` on page 332

### 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]`

on page 332

## 10 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 4.7, "Switching On or Off"](#), on page 25.

If you want to return to a defined initial state, perform a preset. See ["Preset"](#) on page 124.

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

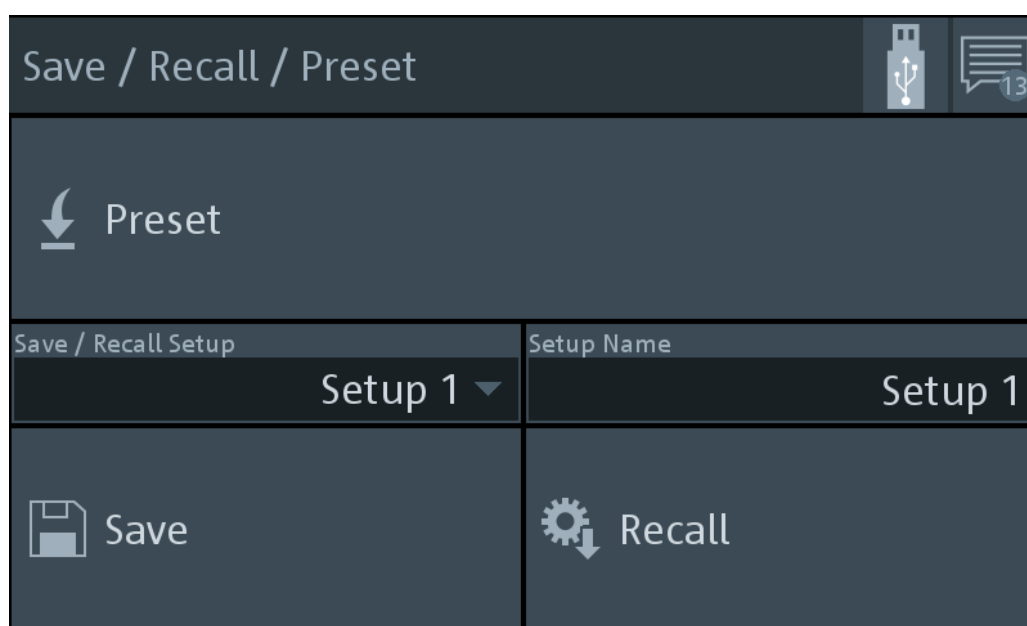


Figure 10-1: Save / Recall / Preset dialog

### 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. Tap "Save".

### To recall settings

1. Press [Preset].
2. Under "Save / Recall Setup", select the setup you want to load, for example "Setup 2".

### 3. Tap "Recall".

Preset.....	124
Save / Recall Setup.....	124
Save.....	124
Setup Name.....	124
Recall.....	124

#### **Preset**

Sets the R&S NRX and the connected R&S power 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 6.5, "Settings Conflict"](#), on page 44.

For details on sensor settings, see the user manual of the R&S power sensor.

Remote command:

[SYSTem:PRESet](#) on page 353

[\\*RST](#) on page 169

#### **Save / Recall Setup**

Selects the setup file in which the instrument settings are saved.

Remote command:

[MEMory:STAtE:MAP?](#) on page 349

#### **Save**

Saves the current instrument settings in the selected setup file.

Remote command:

[\\*SAV](#) on page 170

#### **Setup Name**

Selects the setup file from which to load the instrument settings.

Remote command:

[MEMory:STAtE:MAP?](#) on page 349

#### **Recall**

Restores the selected instrument settings.

Remote command:

[\\*RCL](#) on page 169

## 11 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

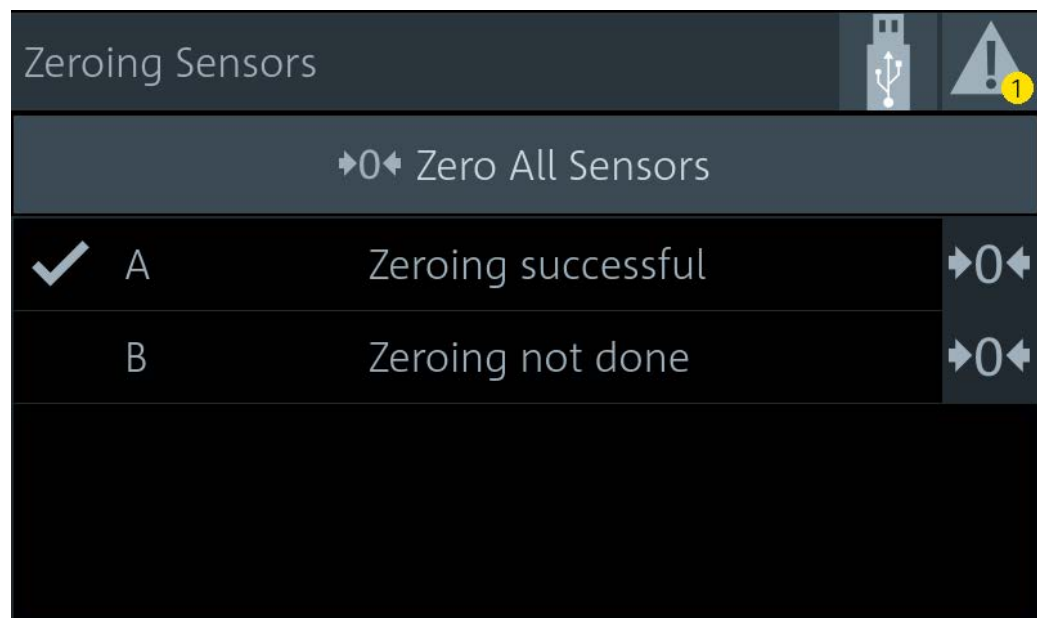


Figure 11-1: Zeroing Sensors dialog

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 you want to zero from all power sources. Any signal 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:

- Tap "Zero All Sensors".
- Tap  in the row of the sensor you want to zero.

The status changes from in progress to successful.

Remote command:

- See [Chapter 14.9, "Zeroing"](#), on page 343.

## 12 System Settings

The system settings do not affect the measurements directly.

Access: [System]

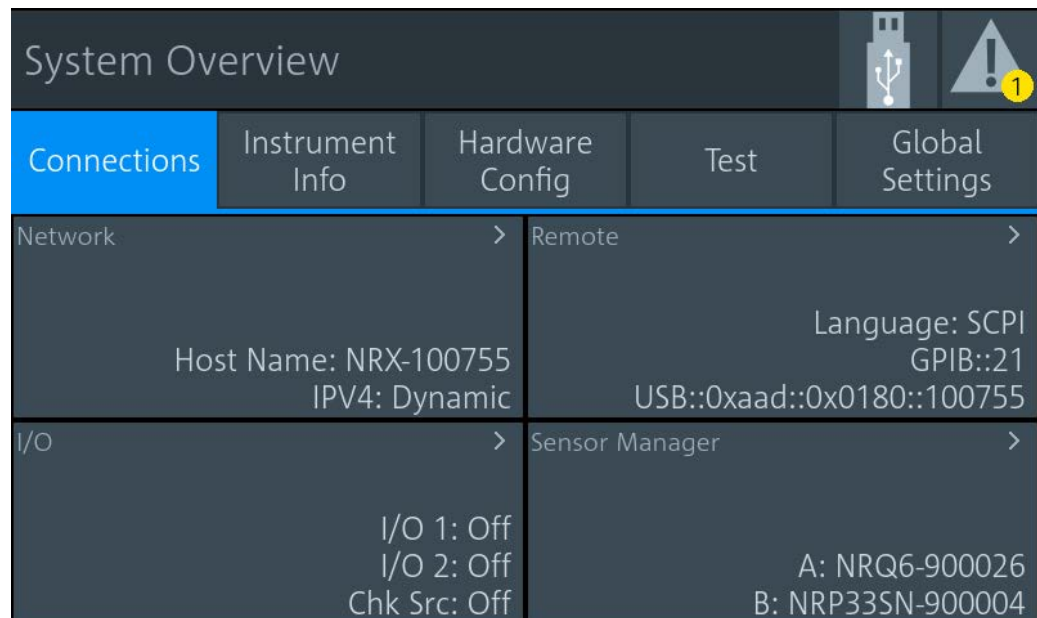


Figure 12-1: System Overview dialog

The "System Overview" dialog is divided into the following tabs:

• <a href="#">Connections</a> .....	127
• <a href="#">Instrument Info</a> .....	142
• <a href="#">Hardware Configuration</a> .....	153
• <a href="#">Test</a> .....	153
• <a href="#">Global Settings</a> .....	154

### 12.1 Connections

Access: [System] > "Connections"

See [Figure 12-1](#).

On this tab, you display and configure the following settings:

• <a href="#">Network Settings</a> .....	128
• <a href="#">Remote Settings</a> .....	131
• <a href="#">Input/Output Settings (I/O)</a> .....	134
• <a href="#">Sensor Manager</a> .....	139

### 12.1.1 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:

- R&S NRX and computer are connected to a common network (infrastructure network).
- R&S NRX and computer are connected only over the switch (peer-to-peer network).

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 5.3, "Remote Control"](#), on page 39.
- Remote desktop connection for remote operation or file transfer.  
See [Chapter 5.2, "Remote Operation"](#), on page 38.

The "Network" dialog is divided into the following tabs:

Overview tab.....	129
L Host Name.....	129
L IP Address.....	129
L Default Gateway.....	129
L DNS Server.....	130
IPv4 tab.....	130
L Address Mode.....	130
L DNS Suffix.....	130
L IPv4 Address.....	131
L Subnet Mask.....	131
L Default Gateway.....	131
L DNS Server.....	131



## Overview tab

Network	
Overview	IPv4
Host Name	NRX-100755
IP Address	Dynamic, 10.124.2.11
Default Gateway	10.124.0.1
DNS Server	10.0.2.166

Apart from the [Host Name](#), the other parameters are only displayed here. Configure them on the ["IPv4 tab"](#) on page 130.

**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.

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](#) on page 357

**IP Address ← Overview tab**

Displays the IP address, and whether it is static or dynamic.

Set the parameters under:

- ["Address Mode"](#) on page 130
- ["IPv4 Address"](#) on page 131

**Default Gateway ← Overview tab**

Displays the IP address of the default gateway of the local subnet. Set the parameter under ["Default Gateway"](#) on page 131.

**DNS Server ← Overview tab**

Displays the IP address of the DNS server of the local subnet. Set the parameter under "DNS Server" on page 131.

**IPv4 tab**

Network	
Overview	IPv4
Address Mode	DNS Suffix
Dynamic Static	rsint.net
IPv4 Address	
10.124.2.11	
Subnet Mask	Default Gateway
255.255.252.0	10.124.0.1
DNS Server	
10.0.2.166	

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, subnet mask and default gateway are assigned. If you want to integrate the R&S NRX into a network, contact your network administrator regarding the data to be set.

"Dynamic" Automatic assignment. A DHCP server must be available in the network.

"Static" Manual assignment. Obtain the IP address, subnet mask and gateway information from your network administrator and enter it.

Remote command:

`SYSTem:COMMUnicate:NETWork[:IPAdDress]:MODE` on page 358

`SYSTem:COMMUnicate:INET[:SELF]:MODE` on page 358

**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` on page 356

`SYSTem:COMMUnicate:INET[:SELF]:DNS:SUFFix` on page 356

**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]` on page 358

`SYSTem:COMMUnicate:INET[:SELF]:ADDRess` on page 358

**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` on page 358

`SYSTem:COMMUnicate:INET[:SELF]:SUBNetmask:ADDRess` on page 358

**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` on page 357

`SYSTem:COMMUnicate:INET[:SELF]:GATeway:ADDRess` on page 357

**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` on page 357

`SYSTem:COMMUnicate:INET[:SELF]:DNS:ADDRess` on page 357

**12.1.2 Remote Settings**



Access: [System] > "Connections" > "Remote"

Contains the settings for remote control.

The "Remote" dialog is divided into the following tabs:

VISA Resource tab.....	132
L Interface - VISA Resource table.....	132
Settings tab.....	132
L GPIB Address.....	133
Emulations tab.....	133
L Language.....	133
L Customization of *IDN?.....	133
L Customization of *OPT?.....	134
L Custom IDN String.....	134
L Custom OPT String.....	134

## VISA Resource tab



Remote			
VISA Resource		Settings	Emulations
Interface	VISA Resource		
HiSLIP	TCPIP::10.124.2.11::HISLIP		
VXI-11	TCPIP::10.124.2.11::INSTR		
IPv4 Socket	TCPIP::10.124.2.11::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, see [Table 15-1](#).

## Settings tab

Remote			
VISA Resource	Settings	Emulations	
GPIB Address			
		21	

**GPIB Address ← Settings tab**

Assigns the primary address for communication using the GPIB bus channel. See also [Chapter 15.1.3, "GPIB Interface"](#), on page 418.

"1" to "30" Channel address

Remote command:

`SYSTem:COMMunicate:GPIB[:SELF]:ADDRes` on page 359

**Emulations tab**

Remote

VISA Resource Settings **Emulations**

Language Rohde & Schwarz NRX ▼

Customization of \*IDN? Off **User** Set to Default Customization of \*OPT? Off **User** Set to Default

Custom IDN String Rohde&Schwarz,NRX,1424.7005k02/100755,02.20.190

Custom OPT String "NRX-B1: Sensor Check Source installed","NRX-B4: Real

**Language ← Emulations tab**

Sets the language for the remote commands.

"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" Emulation for the predecessor, the R&S NRP2.

Remote command:

`SYSTem:LANGuage` on page 360

**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` on page 360

**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](#) on page 361

**Custom IDN String ← Emulations tab**

Specifies the customized instrument identification string so that you can identify each R&S NRX individually.

Remote command:

[SYSTem:IDN:ANSWer](#) on page 360

**Custom OPT String ← Emulations tab**

Specifies the customized option identification string.

Remote command:

[SYSTem:OPT:ANSWer](#) on page 361

**12.1.3 Input/Output Settings (I/O)**

Access: [System] > "Connections" > "I/O"

The "I/O" dialog is divided into the following tabs:

<a href="#">Sensor Check Source tab</a> .....	134
L <a href="#">Signal Output</a> .....	135
L <a href="#">Frequency</a> .....	135
L <a href="#">Measurement for Preview</a> .....	135
L <a href="#">Power Level</a> .....	135
L <a href="#">Sensor Check Source Info</a> .....	136
<a href="#">I/O 1, I/O 2 tabs</a> .....	136
L <a href="#">Mode</a> .....	137
L <a href="#">Measurement for Recorder Output</a> .....	138
L <a href="#">0 V Equivalent</a> .....	138
L <a href="#">2.5 V Equivalent</a> .....	138
L <a href="#">Measurement for Limit Output</a> .....	139
L <a href="#">Fail Voltage</a> .....	139
L <a href="#">Trigger Source for Trigger Output</a> .....	139
L <a href="#">Impedance for Trigger Input</a> .....	139

**Sensor Check Source tab**

Requires the sensor check source (R&S NRX-B1). If the option is installed, this tab is displayed as first tab.

Configures the sensor check source (R&S NRX-B1) that is installed in the module bay. See ["Sensor check source \(R&S NRX-B1\)"](#) on page 15.

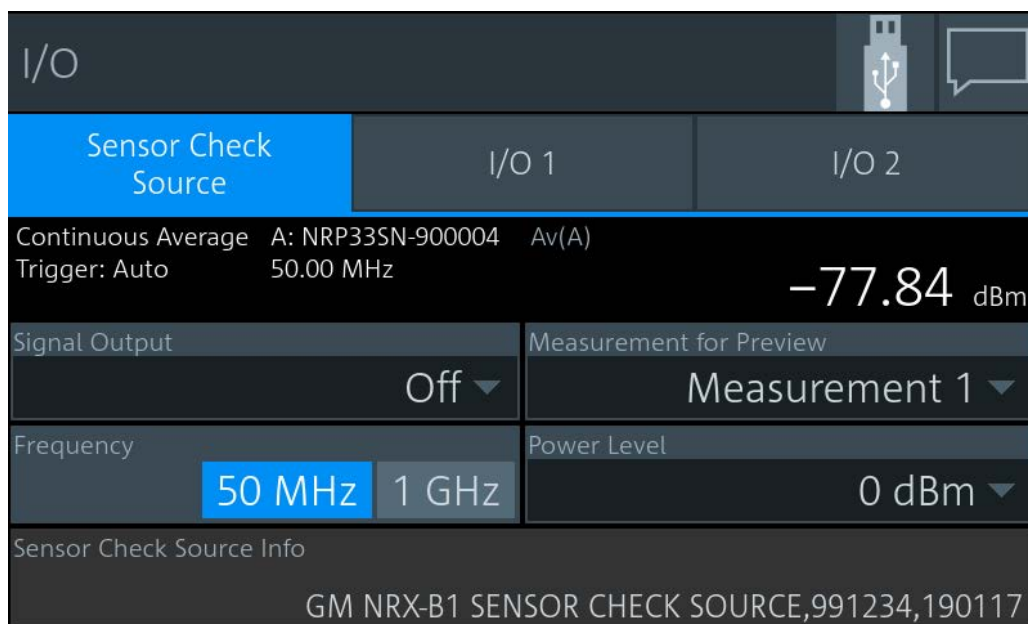


Figure 12-2: Sensor Check Source tab

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](#) on page 334

[OUTPut:SOURce:STATe](#) on page 334

[SOURce:PULM:STATe](#) on page 334

#### Frequency ← Sensor Check Source tab

Sets the frequency of the output signal.

Remote command:

[SOURce\[:RF\]:FREQuency\[:VALue\]](#) on page 335

#### Measurement for Preview ← Sensor Check Source tab

Selects the measurement that is displayed in the upper right corner.

#### Power Level ← Sensor Check Source tab

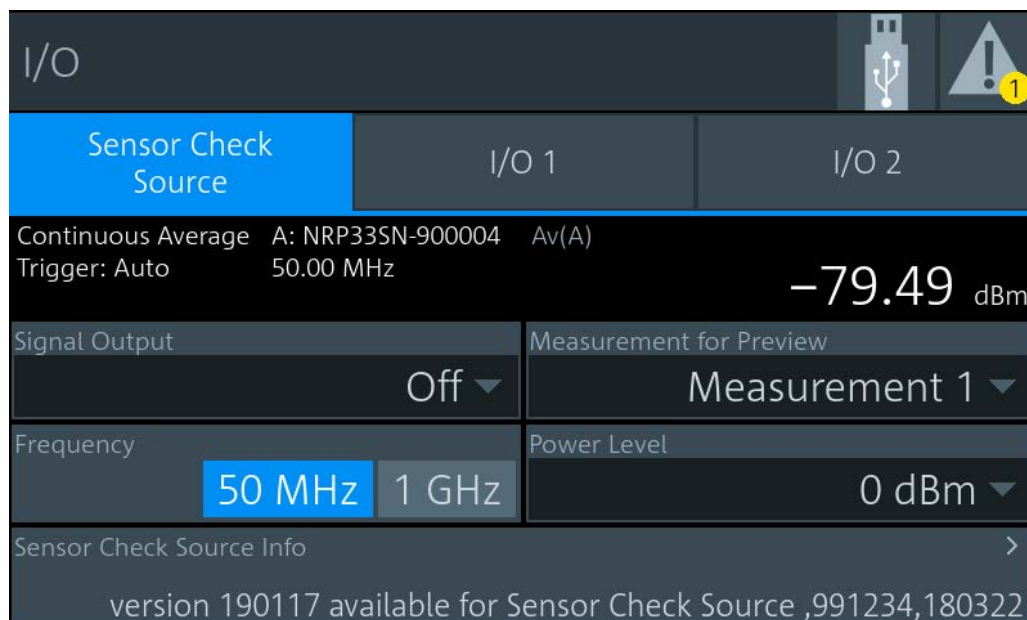
Sets the power level for the output signal.

Remote command:

[SOURce:POWer\[:VALue\]](#) on page 334

**Sensor Check Source Info ← Sensor Check Source tab**

The firmware of the R&S NRX includes a package for the sensor check source (R&S NRX-B1), but the sensor check source (R&S NRX-B1) 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 12-3](#). Tap the info field to update the sensor check source (R&S NRX-B1).



**Figure 12-3: 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 3.2.1, "Trig In / Out 2 and Out 1 / Trig Out Connectors"](#), on page 19.

- Use the "I/O 1" tab for Out 1 / Trig Out connector.
- Use the "I/O 2" tab for Trig In / Out 2 connector.



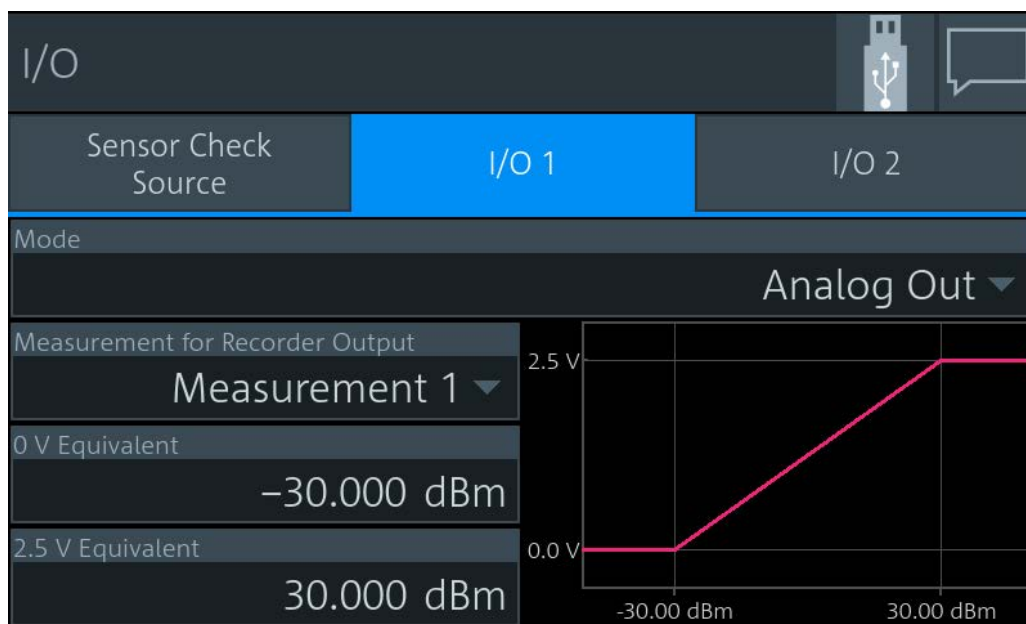


Figure 12-4: Example

**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"  
Available for:

- continuous average, burst average, time gate, timeslot measurements
- Out 1 / Trig Out BNC connector ("I/O 1" tab)

Sets the fail voltage that is output if a measured value causes a limit violation.

"Forw Limit Violation"  
Available for:

- NRT measurements
- Out 1 / Trig Out BNC connector ("I/O 1" tab)

Sets the fail voltage that is output if a value of the forward measurement causes a limit violation.

"Refl Limit Violation"  
Available for the Out 1 / Trig Out BNC connector ("I/O 1" tab).  
Sets the fail voltage that is output if a value of the reflection measurement causes a limit violation.

"Trigger Out" Available for the Out 1 / Trig Out BNC connector "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" Available for the Trig In / Out 2 BNC connector ("I/O 2" tab).  
Apply an external trigger signal at the Trig In / Out 2 connector. Set the termination resistance under [Impedance for Trigger Input](#).

Remote command:

[OUTPut:MODE<output>](#) on page 336

### 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:RERecorder<output>:FEED:INDEX](#) on page 337

### 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 the output voltage of 0 V.

Remote command:

[OUTPut:RERecorder<output>:LIMIT:LOWER:CCDF](#) on page 337

[OUTPut:RERecorder<output>:LIMIT:LOWER:POWER](#) on page 338

[OUTPut:RERecorder<output>:LIMIT:LOWER:RATIO:RCoefficient](#) on page 338

[OUTPut:RERecorder<output>:LIMIT:LOWER:RATIO:RFRatio](#) on page 339

[OUTPut:RERecorder<output>:LIMIT:LOWER:RATIO:RLOSS](#) on page 339

[OUTPut:RERecorder<output>:LIMIT:LOWER:RATIO:SWR](#) on page 339

[OUTPut:RERecorder<output>:LIMIT:LOWER:RATIO\[:VALUE\]](#) on page 340

[OUTPut:RERecorder<output>:LIMIT:LOWER\[:VALUE\]](#) on page 337

### 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 the output voltage of 2.5 V.

Remote command:

[OUTPut:RERecorder<output>:LIMIT:UPPER:CCDF](#) on page 340

[OUTPut:RERecorder<output>:LIMIT:UPPER:POWER](#) on page 341

[OUTPut:RERecorder<output>:LIMIT:UPPER:RATIO:RCoefficient](#) on page 341

[OUTPut:RERecorder<output>:LIMIT:UPPER:RATIO:RFRatio](#) on page 341

[OUTPut:RERecorder<output>:LIMIT:UPPER:RATIO:RLOSS](#) on page 342

[OUTPut:RERecorder<output>:LIMIT:UPPER:RATIO:SWR](#) on page 342

[OUTPut:RECOder<output>:LIMit:UPPer:RATio\[:VALue\]](#) on page 342

[OUTPut:RECOder<output>:LIMit:UPPer\[:VALue\]](#) on page 340

#### 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:

[OUTPut:LIMit:FEED:INDex](#) on page 336

#### 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" 5 V

Remote command:

[OUTPut:LIMit:FAIL](#) on page 336

#### 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](#) on page 343

#### Impedance for Trigger Input ← I/O 1, I/O 2 tabs

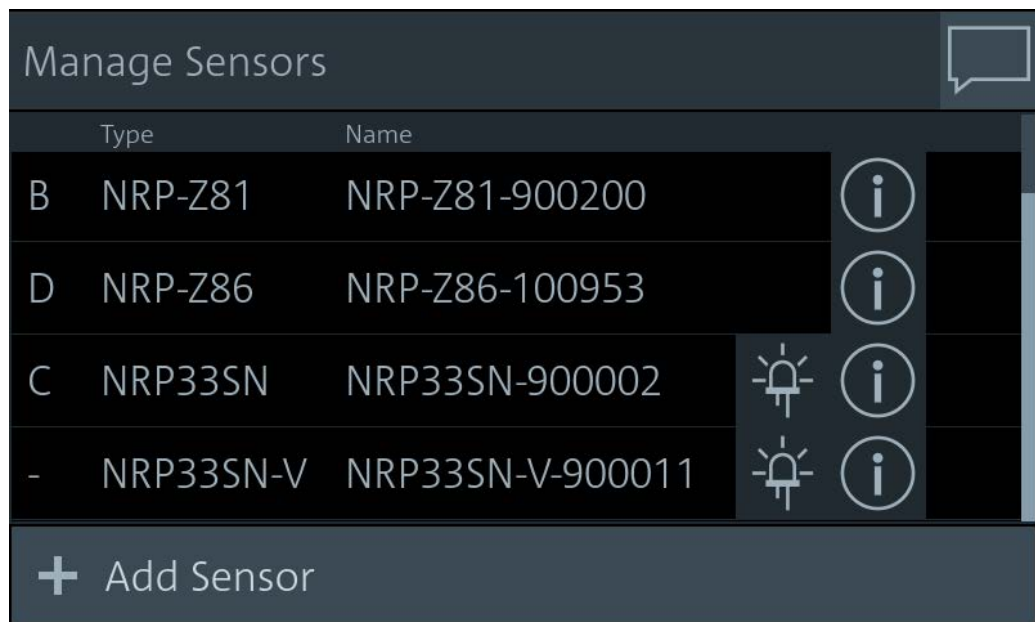
Available if [Mode](#) is set to "Trigger In".

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.

### 12.1.4 Sensor Manager

Access: [System] > "Connections" > "Sensor Manager"



Helps you to manage power sensors, for example, if more than 4 power sensors are connected, or if you want to connect a LAN power sensor.



The R&S NRX recognizes and adds the following power sensors:

- Connected to the ports A to D. They are assigned the letter of the port.
- Connected to one of the USB host interfaces; directly or indirectly, by USB hub. They are assigned the letters E to M.

R&S power sensors that are connected to the LAN interface are not recognized automatically. Add them, see ["To add a LAN power sensor"](#) on page 140.

Symbol	Description
	Tap the LED icon to identify a connected power sensor. If the power sensor has a status LED, it flashes yellow for 5 seconds.
	Tap the info icon to open the "Sensor Info" dialog, see <a href="#">"Sensor Info"</a> on page 141.

#### To add a LAN power sensor

1. In the "Manage Sensors" dialog, tap "Add Sensor".
2. Enter the hostname or IP address of the power sensor.
3. Tap "Check Sensor".
4. Tap "Accept".

The sensor manager gives access to:

<a href="#">Add Sensor</a> .....	141
<a href="#">Sensor Info</a> .....	141
<a href="#">Sensor Test</a> .....	142

**Add Sensor**

Adds a LAN power sensor. See ["To add a LAN power sensor"](#) on page 140.

Add Sensor	
ID Auto ▼	Host Name / IP Address
Check Sensor	
Type	
Firmware Version	Serial
Accept	Cancel

Remote command:

[\[SENSe<Sensor>:\]ADD](#) on page 324

**Sensor Info**

Displays information about the selected power sensor, including calibration data.

Sensor Info	
Connector Sensor A	ID A ▼
Type NRP33SN	
Serial 900004	Firmware Version 18.06.14.01
Sensor Name NRP33SN-900004	
Sensor Test >	
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-900004
IP Address	0.0.0.0

Remote command:

[SYSTem:SENSor<Sensor>:INFO?](#) on page 363

**Sensor Test**

Tap "Start Test" to start a selftest of the connected power sensor. The selftest provides detailed information that you can use for troubleshooting.

"Test Verdict" shows the status of the selftest.

The screenshot shows the 'Sensor Test' screen with the following details:

Field	Value
Type	NRP33SN
Serial	900004
Firmware Version	18.06.14.01
Test Verdict	FAIL
Sensor Name	NRP33SN-900004

**Calibration Data:**  
 Integrity of Factory Calibration Data Set:  
 Integrity of User Calibration Data Set:

**Operating Voltages:**

+3V3_VCC_MIO:	PASS (+3.31 V)
+1V8_PS:	PASS (+1.77 V)
+1V0_PS:	PASS (+0.96 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 (+0.98 V)
+1V0_LBDDP0_00P5:	PASS (+1.00 V)

A 'Start Test' button is located at the bottom right of the screen.

Remote command:

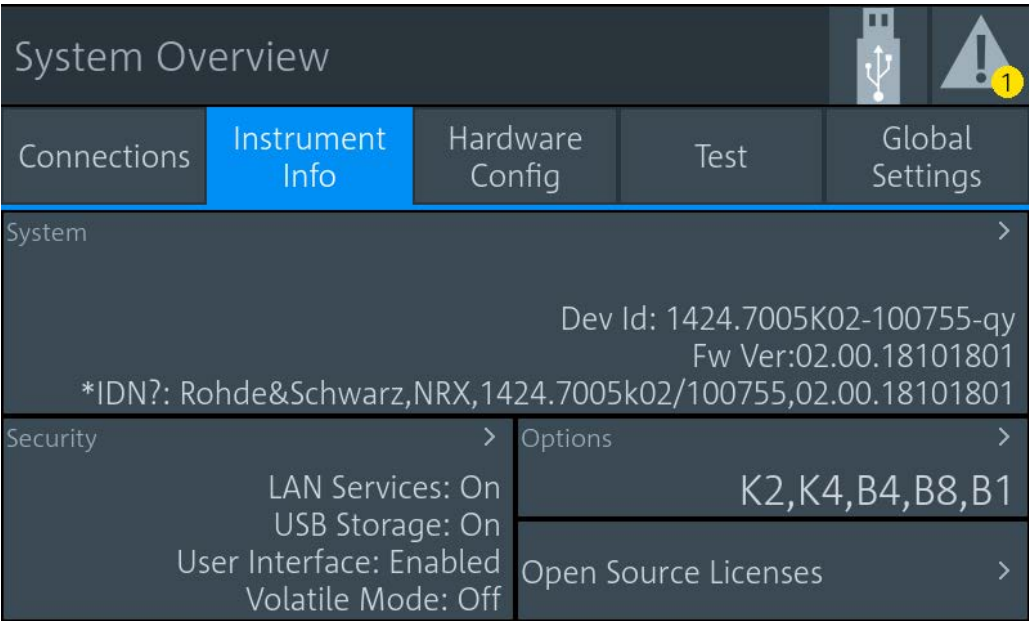
`SYSTem:SENSor<Sensor>:TEST?` on page 346

`TEST:SENSor<Sensor>?` on page 346

## 12.2 Instrument Info

Access: [System] > "Instrument Info"

For displaying information on a connected power sensor, see "[Sensor Info](#)" on page 141.



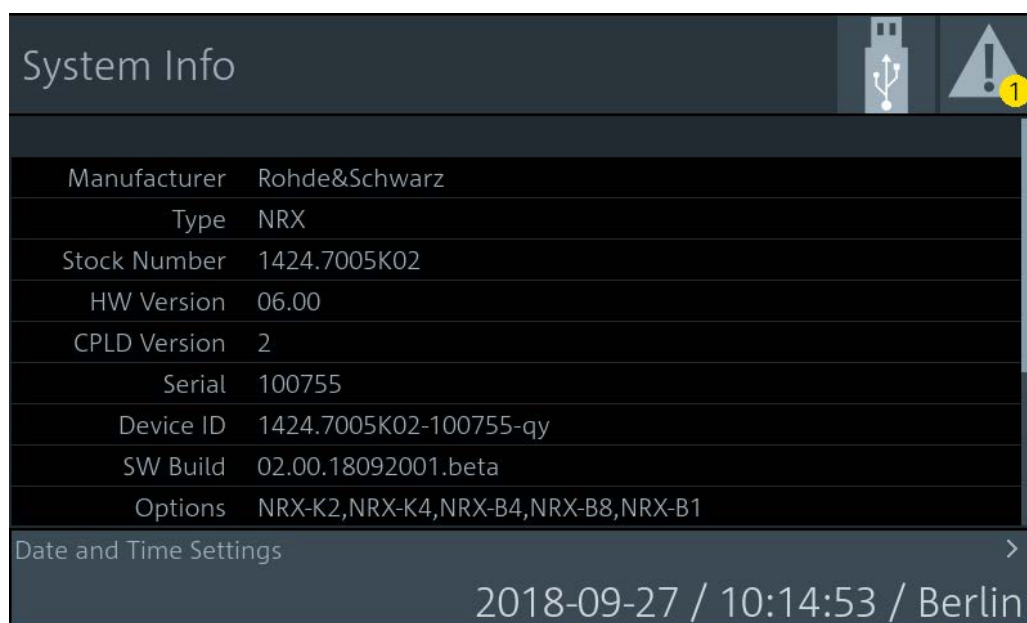
On this tab, you display and configure the following settings:

- [System Info](#)..... 143
- [Security Settings](#)..... 146
- [Options Settings](#)..... 149
- [Open Source Licenses](#)..... 152

12.2.1 System Info

Access: [System] > "Instrument Info" > "System Info"

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	02.00.18092001.beta
Options	NRX-K2,NRX-K4,NRX-B4,NRX-B8,NRX-B1

Date and Time Settings >

2018-09-27 / 10:14:53 / Berlin

System Info.....	144
Date and Time Settings.....	145
L Date.....	145
L Time.....	145
L Time Zone Region.....	145
L Time Zone.....	145

### System Info

Displays the information on the R&S NRX:

- "Manufacturer"
- "Type"
- "Stock Number"
- "HW Version"
- "CPLD Version"  
Complex programmable logic device (CPLD) version
- "Serial"
- "Device ID"
- "SW Build"  
Version of software build
- "Options"  
Short names of the installed options
- "MAC Address"  
Ethernet hardware address
- "Hostname"
- "IP Address"
- \*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\[:INFO\]? on page 363](#)

### Date and Time Settings

Opens the "Date and Time" dialog.



#### Date ← Date and Time Settings

Sets the current date in the format YYYY-MM-DD.

Remote command:

[SYSTem:DATE:UTC on page 365](#)

[SYSTem:DATE:LOCa1 on page 365](#)

#### Time ← Date and Time Settings

Sets the current time in the format HH:MM:SS.

Remote command:

[SYSTem:TIME:UTC on page 367](#)

[SYSTem:TIME:LOCa1 on page 367](#)

#### Time Zone Region ← Date and Time Settings

Sets the time zone region.

Remote command:

[SYSTem:TIME:DSTime:RULE on page 366](#)

[SYSTem:TIME:DSTime:RULE:CATalog? on page 366](#)

#### Time Zone ← Date and Time Settings

Sets the time zone.

Remote command:

`SYSTem:TIME:DSTime:RULE` on page 366

`SYSTem:TIME:DSTime:RULE:CATalog?` on page 366

## 12.2.2 Security Settings

Access: [System] > "Instrument Info" > "Security"

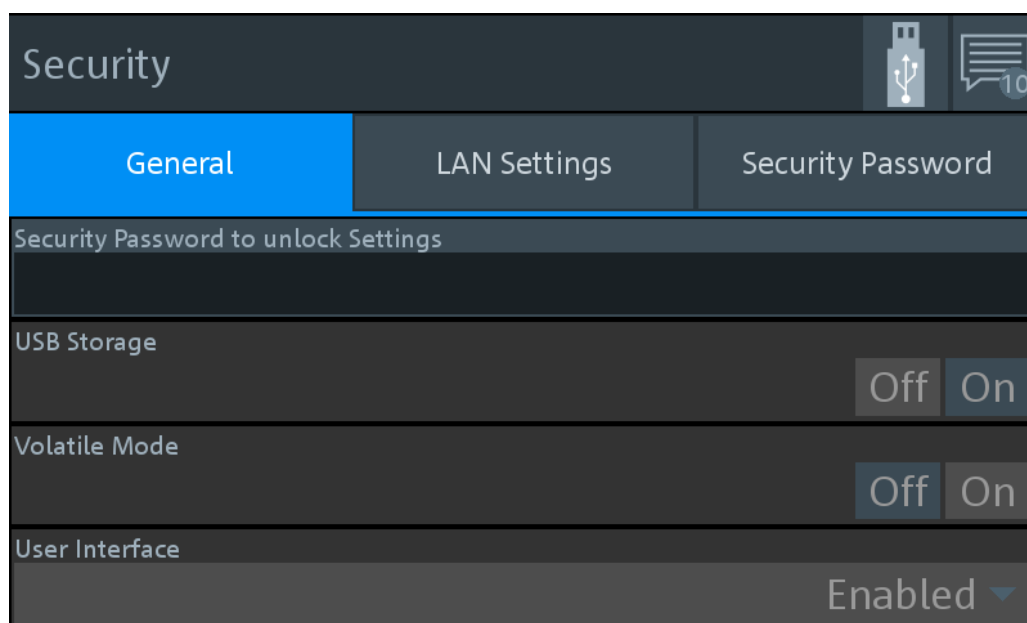
Contains the settings for access rights, LAN security and passwords.

The "Security" dialog is divided into the following tabs:

General tab.....	146
L Security Password to Unlock Settings.....	147
L USB Storage.....	147
L Volatile Mode.....	147
L User Interface.....	147
LAN Settings tab.....	147
L LAN Services.....	148
L SCPI over LAN.....	148
L Web Server.....	148
L VNC.....	148
L Avahi (Zeroconf).....	148
L SSH.....	148
L Software Update.....	148
Security Password tab.....	148
L Old Password.....	149
L New Password.....	149
L Confirm Password.....	149
L Change Password.....	149

### 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. When you leave the "Security" dialog, the settings are disabled automatically.

For default value and further information, see "[Security Password tab](#)" on page 148.

**USB Storage ← General tab**

Enables or disables the file transfer via USB storage.

**Volatile Mode ← General tab**

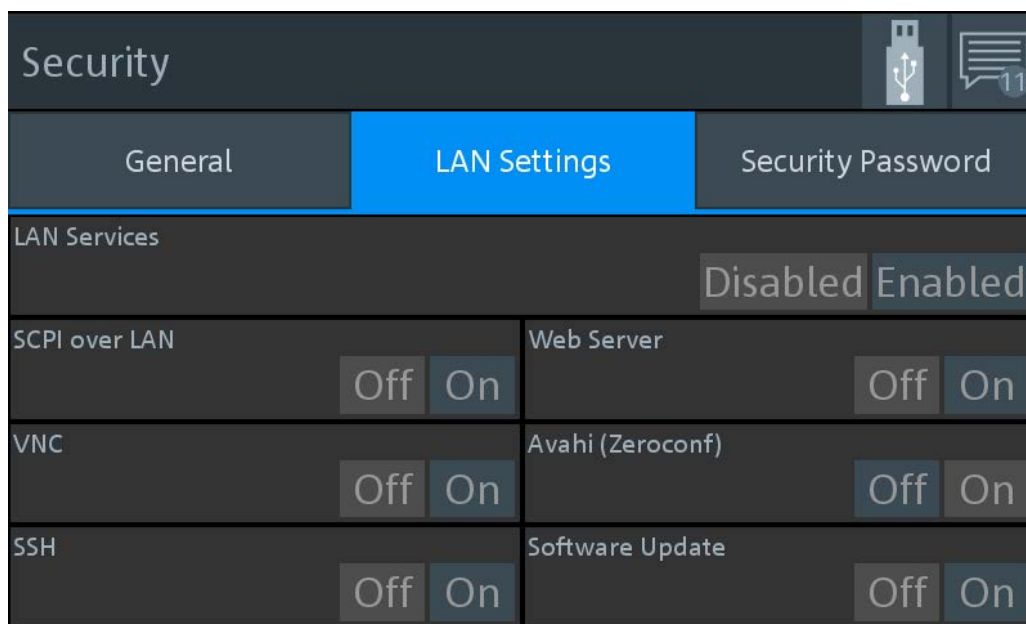
If enabled, allows you to write information to the hard disk memory permanently.

**User Interface ← General tab**

Enabled. Fixed setting.

**LAN Settings tab**

Configures the LAN interface in general or all LAN services individually.

**LAN Services ← LAN Settings tab**

Enables or disables the LAN services in general. 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.

**Web Server ← LAN Settings tab**

Enables or disables a web server that is required to access using a web application.

**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 [Chapter 5.2, "Remote Operation"](#), on page 38.

**Avahi (Zeroconf) ← LAN Settings tab**

Enables or disables Avahi, a service for automatic configuration of the R&S NRX in a network environment.

**SSH ← LAN Settings tab**

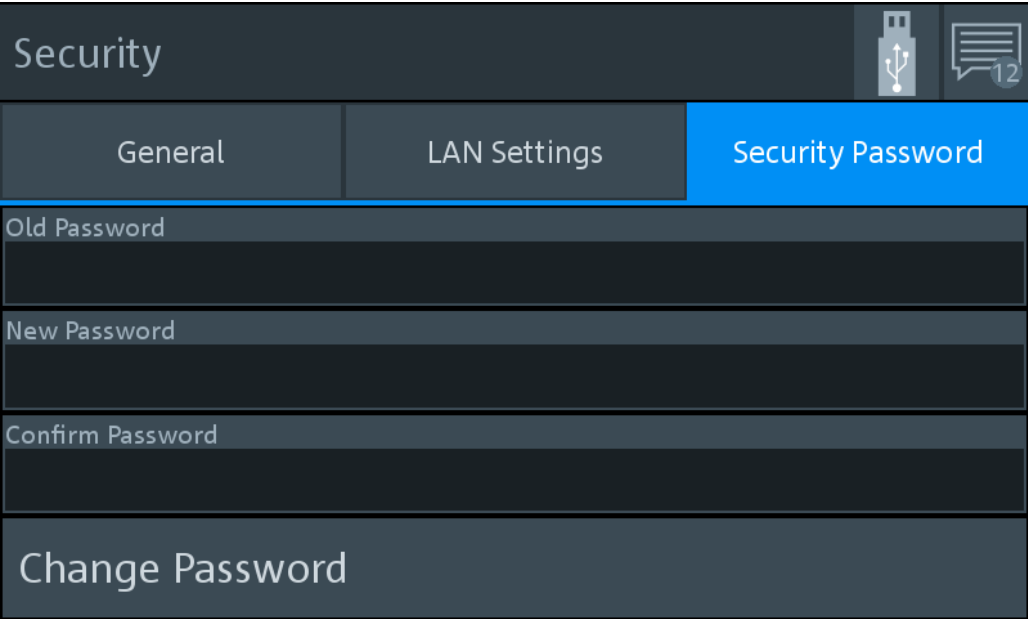
Enables or disables access using a secure shell (SSH), a network protocol for secure data communication.

**Software Update ← LAN Settings tab**

Enables or disables the software update over LAN.

**Security Password tab**

Used to change the security password.



**Old Password ← Security Password tab**  
Currently used security password. The default password is 123456.

**Note:** We recommend that you change the default password before connecting the R&S NRX to a network.

The security password is required for changing security settings in the "Security" dialog.

**New Password ← Security Password tab**  
New security password.

**Confirm Password ← Security Password tab**  
New security password for confirmation.

**Note:** The new password is not assigned until you tap "Change Password".

**Change Password ← Security Password tab**  
Sets the new password as security password.

12.2.3 Options Settings

Access: [System] > "Instrument Info" > "Options"

Displays installed options and offers an interface to install new options.

The "Options" dialog contains the following parameters:


HW Options tab.....	150
SW Options tab.....	150
Manage License Keys tab.....	151
L Enter License Key.....	151


L Import.....	151
L Export.....	151
Details tab.....	151

**HW Options tab**

Displays the installed hardware options.

Options





HW Options

SW Options

Manage License Keys

Details

Option	Description
NRX-B4	Rear Sensor Connector
NRX-B8	GPIB Remote Control
NRX-B1	Sensor Check Source


Remote command:


\*OPT? on page 168

**SW Options tab**

Displays all software options and their status.

Options





HW Options

SW Options

Manage License Keys

Details

Show Inactive

Off

On

Show Deactivated

Off

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 any more, for example because the license key is expired.

Remote command:

\*OPT? on page 168

### Manage License Keys tab

Used to install or deinstall software options.

The screenshot shows the 'Options' menu with the following structure:

- Options** (Header)
- HW Options** | **SW Options** | **Manage License Keys** (Selected) | **Details**
- Enter License Key** (Section Header)
- License Key Input Field (Masked with asterisks)
- Import** | **Export** (Buttons)
- License Key From File...** | **Deactivation Response to File...** (Sub-buttons)
- Option** | **Description** | **Expiration Date** (Table Headers)

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 a list of all installed hardware and software options.

Options


HW Options



SW Options

Manage License Keys

Details

</

If you want to see more information on a specific option, tap .

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	-
			Key	120012202210752570071121005116

#### 12.2.4 Open Source Licenses



Access: [System] > "Instrument Info" > "Open Source Licenses"

Displays the license texts of open source software packages used in the R&S NRX software.



## 12.3 Hardware Configuration







Access: [System] > "Hardware Configuration"

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 VERBINDUNGSBOARD NRX		1424.7511.02	100944	03.01	
ED SENSORBUCHSEINHEIT		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.

## 12.4 Test

Access: [System] > "Test"

System Overview				
Connections	Instrument Info	Hardware Config	Test	Global Settings
 Test Keyboard		Keyboard Test Verdict		
		Passed 2018-06-12 08:55		
 Test Display		Display Test Verdict		
		Passed 2018-06-12 08:55		
 Test Touch Panel		Touch Test Verdict		
		Passed 2018-06-12 08:58		
 Create R&S Support Information				

On this tab, you can test whether the user interfaces are in working order and create information useful for troubleshooting.

For testing a connected power sensor, see "[Sensor Test](#)" on page 142.

#### Testing the user interfaces

1. Tap the test you want to perform.

A dialog with detailed test instructions is displayed.

2. Read and follow the instructions.
3. Exit the test with PASS or FAIL.

**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 345

#### Creating information for troubleshooting

1. If you want to save the information on a memory stick, connect a USB stick (FAT32).
2. Tap "Create R&S Support Information".

An archive file (\*.tar.gz) is created containing the following information:

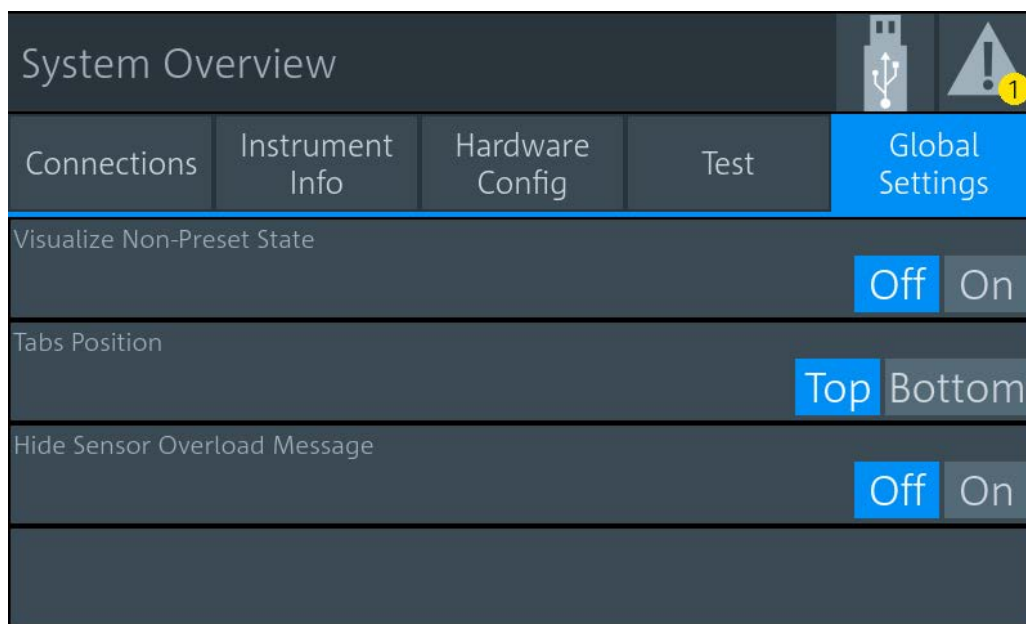
- Software errors
- Hardware status
- Current device footprint
- Current device settings

If a memory stick is connected, the archive file is saved there.

Alternatively, you can transfer the information using secure shell (SSH). See "[SSH](#)" on page 148.

## 12.5 Global Settings

Access: [System] > "Global Settings"



On this tab, you configure the following settings:

<a href="#">Visualize Non-Preset State</a> .....	155
<a href="#">Tabs Position</a> .....	155
<a href="#">Hide Sensor Overload Message</a> .....	155

### 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.

### Hide Sensor Overload Message

If enabled, hides the sensor overload message. But be aware that overload can damage the power sensor, depending on the amount of power and the duration of the overload condition. The maximum power is specified in the data sheet of the power sensor. Or you can query it using `SYSTem:SENSor<Sensor>:INFO?`.

Remote command:

`DISPlay:OVERload[:STATe]` on page 181

## 13 Firmware Update

This chapter contains information on installing/updating the firmware on the R&S NRX.

The latest firmware update files are available on our Internet site at [www.rohde-schwarz.com](http://www.rohde-schwarz.com).

---

### NOTICE

#### Potential damage to the firmware of the device

Disconnecting the power supply while an update is in progress can lead to missing or faulty firmware.

Special care must be taken on not disconnecting the power supply while the 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.

---

### 13.1 Firmware Update via PC and USB or Ethernet Connection

This chapter contains information on installing/updating the firmware on the R&S NRX via PC and USB or Ethernet connection.

Use the Firmware Update program (PureFW) to load new firmware for the R&S NRX. It is part of the R&S NRP Toolkit.

#### 13.1.1 Hardware and Software Requirements

The system requirements to perform a firmware update via PC are as follows:

- PC with free USB port (alternatively: PC and instrument are connected to an Ethernet network)
- USB cable (USB-A plug to USB-B plug) (alternatively: Ethernet cable)
- Operating system Microsoft Windows 7, Microsoft Windows 8 or Microsoft Windows 10
- **VISA software must be installed on your PC.**
- The R&S NRP Toolkit software must be installed on your PC (includes Firmware Update program).
- A Rohde & Schwarz update file (\*.rsu) for the sensor must be available.

### 13.1.2 Preparing an Update

To prepare an update via USB connection:

1. Make sure a recent VISA software is installed. Firmware update with PureFW can only be performed with the device recognized as a VISA device.
2. Connect the R&S NRX to the PC using a USB cable. If the instrument is off, switch it on.

Shortly afterwards, the PC should have identified the new USB hardware in case the instrument is connected via USB.

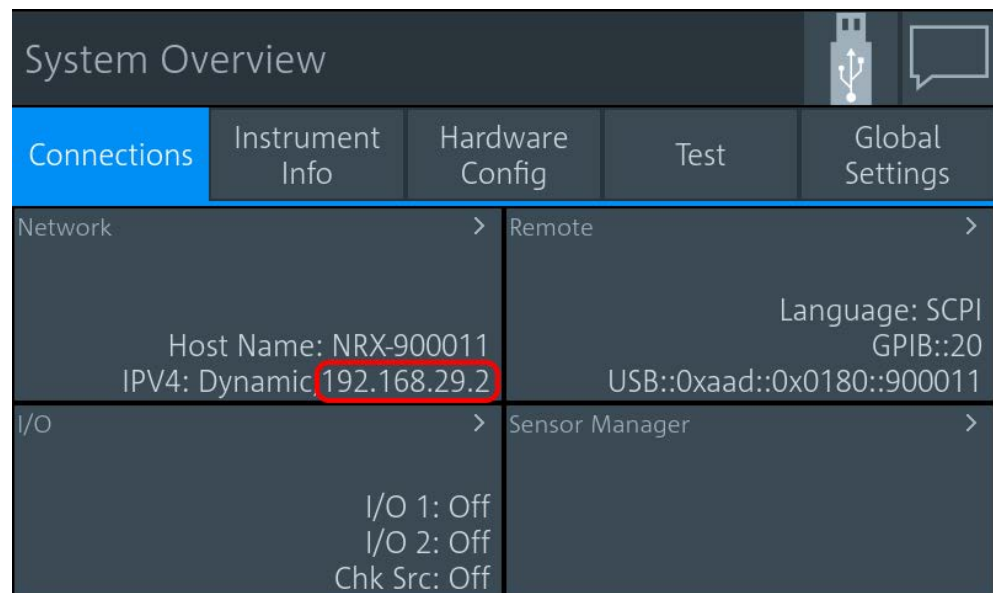
If no recent VISA software is installed, Windows will try in vain to find a USB driver for the instrument. If this happens, the instrument is highlighted by a yellow exclamation mark in the Windows device manager.

⇒ Abort the installation process and install a recent VISA software.

To prepare an update via network connection:

1. Make sure a recent VISA software is installed. Firmware update with PureFW can only be performed with the device recognized as a VISA device.
2. Connect the R&S NRX to the network. If the instrument is off, switch it on.

To check that the instrument is assigned an IP address, press the hardkey [System] on the front of the R&S NRX, choose the "Connections" tab, and check the IPv4 status under "Network":



If the instrument is not assigned an IP address, perform the following:

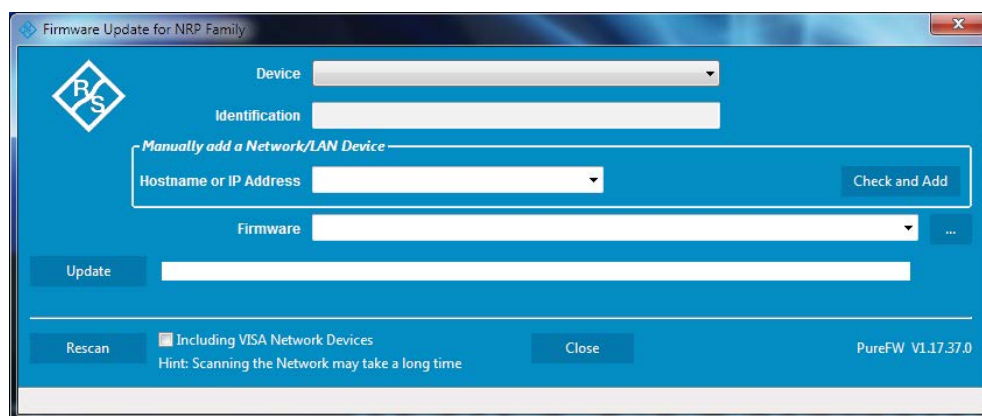
- a) Open the dialog "Network" and check whether the network settings are correct.
- b) Check the cable used to connect the instrument to the network.

3. Register the instrument as a VISA device. Refer to documentation of your VISA software for details.

### 13.1.3 Updating the Application Firmware

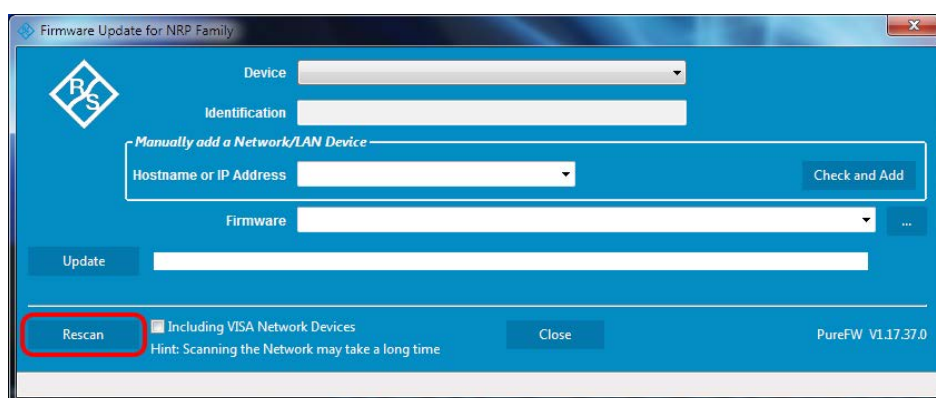
To perform a firmware update:

1. Start the Firmware Update program (PureFW) via "Start menu > NRP-Toolkit > Firmware Update". The following window should appear:

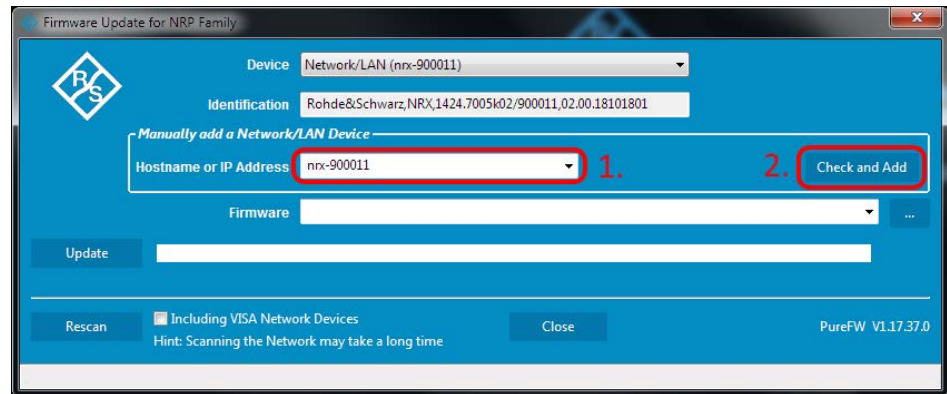


The program automatically starts scanning for R&S power sensors and meters attached via USB. When the scan is completed, all recognized power sensors and meters are listed in the "Device" dropdown control.

2. If the instrument you want to update is not listed in the "Device" dropdown control, perform one of the following:
  - a) If the instrument is connected to the PC via USB, press "Rescan" to search for R&S power sensors and meters attached via USB.

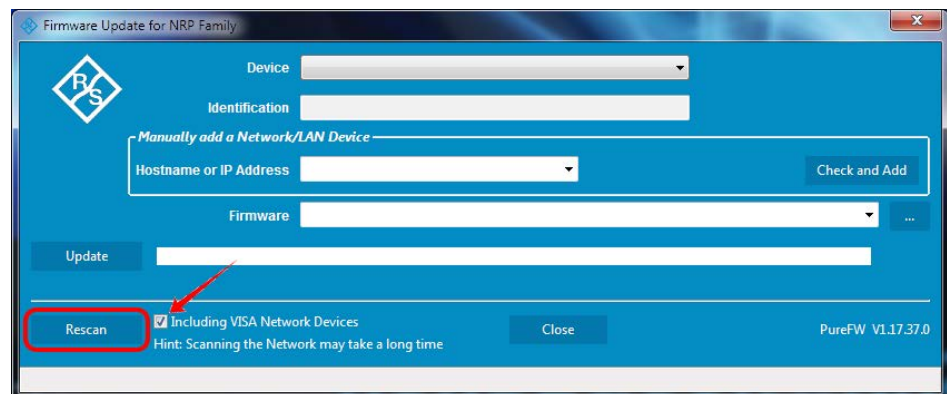


- b) If the instrument is connected to the network, enter the hostname or the IP address of the instrument in the field "Manually add a Raw SCPI Device" and then press "Check and Add" or Enter.



The program searches for the specified instrument on the network and adds it to the "Device" list.

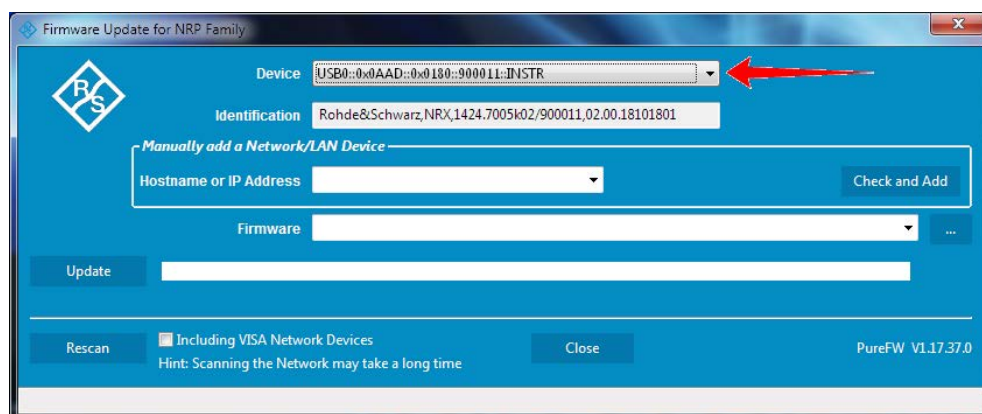
- c) It is also possible to scan the local network for VISA network devices automatically. This can be more time-consuming than adding the device manually as described above. To do this, check the setting "Including VISA Network Devices" before you press "Rescan".



- d) Check whether a VISA library is installed on the computer.  
If no VISA library is installed on the computer, no VISA instrument will be accessible.  
If a network connection is used: Check whether the instrument is registered as a VISA device.

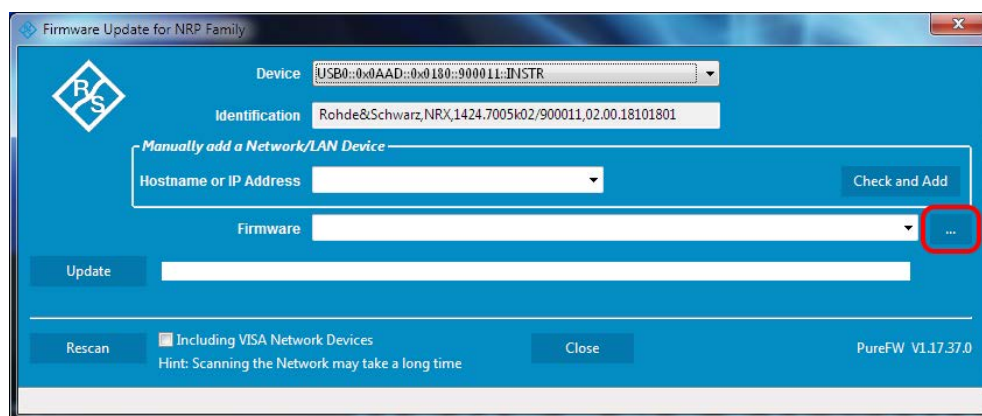
3. In the "Device" line select the instrument you want to update.



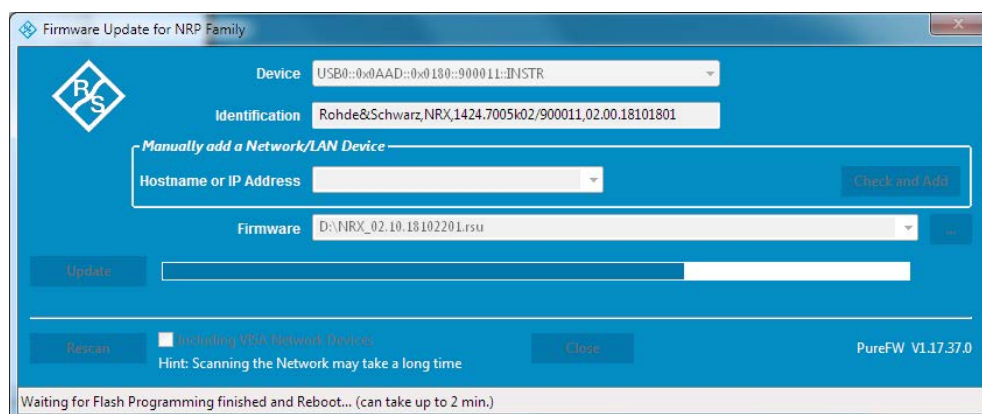


The "Hostname or IP Address" field is not used during this procedure and should therefore be left empty.

4. In the "Firmware" field enter the full path and file name of the update file or press the ellipsis button to browse the file system for it. New firmware for the R&S NRX generally has an \*.rsu (Rohde & Schwarz Update) extension.



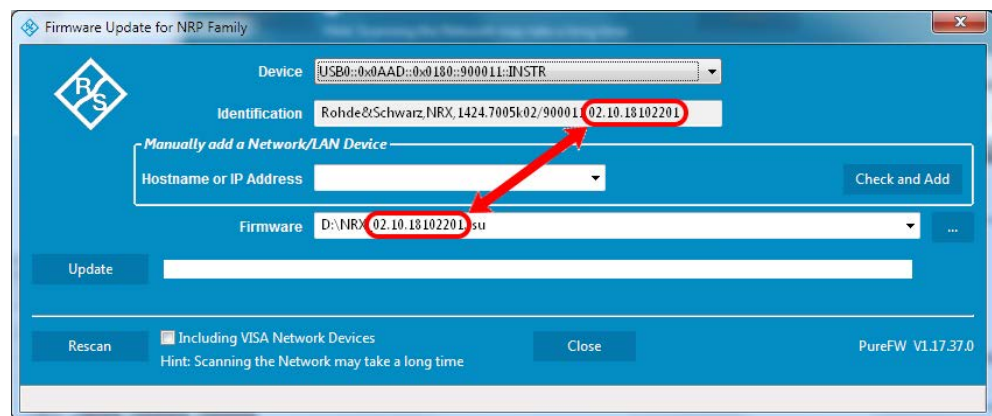
5. Select "Update" to download the new firmware and program it into the flash memory of the instrument.



During the update process the progress is shown through a progress bar. The update sequence may take a couple of minutes.



6. Check if the update was successful. This is the case if the firmware version in the "Identification" field is the same as the one you loaded in the "Firmware" field.



## 13.2 Firmware Update via a USB Flash Memory Stick

This chapter contains information on installing/updating the firmware on the R&S NRX via a USB flash memory stick.

### 13.2.1 Hardware and Software Requirements

The system requirements to perform a firmware update via a USB flash memory stick are as follows:

- PC or mobile device with free USB port running any operating system and software that supports copying files to the USB flash memory stick
- USB flash memory stick (USB 2.0 or 3.0, with USB-A plug, FAT32 file system, and sufficient space for the firmware file)
- A Rohde & Schwarz update file (\*.rsu) for the sensor must be available.

### 13.2.2 Preparing an Update

To prepare an update via USB flash memory stick:

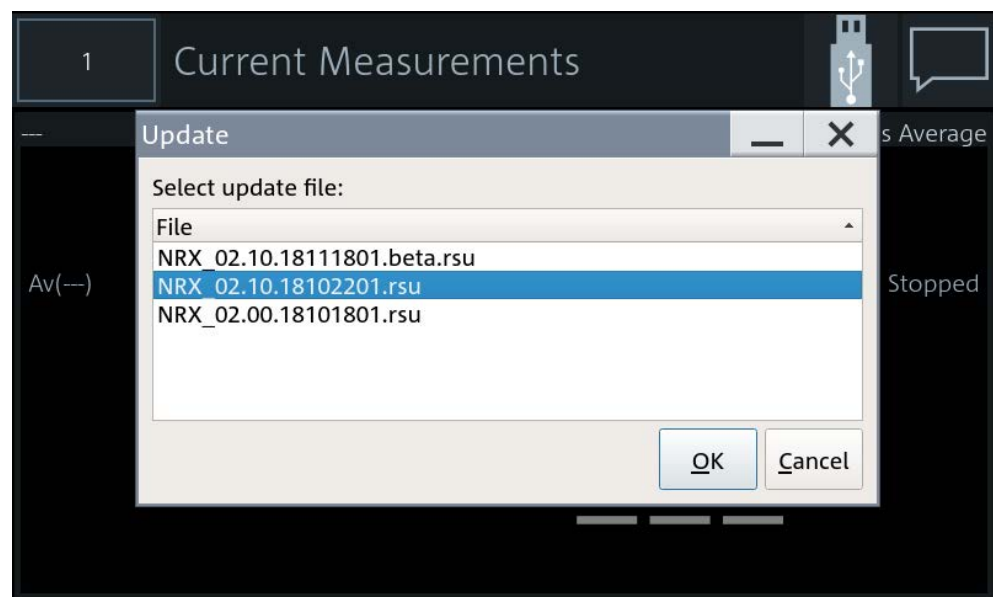
1. Copy the Rohde & Schwarz update file to the root directory of the USB flash memory stick.
2. Disconnect the USB flash memory stick from the PC or mobile device. If the instrument is off, switch it on.

### 13.2.3 Updating the Application Firmware

To perform a firmware update:

1. Connect the USB flash memory stick to the front or rear USB host port of the R&S NRX.

Shortly afterwards, the instrument should have identified the USB flash memory stick. A dialog will appear that allows selection of the Rohde & Schwarz update file (if there is more than one that matches the instrument) and asks for confirmation to start the update.



2. If there are more than one matching Rohde & Schwarz update files, select the file you want to use for the update. The latest version is on top. Then, press "Update" to start the update process.
3. After copying the Rohde & Schwarz update file to internal memory, a dialog will appear that asks you to remove the installation medium (USB flash memory stick) and press "OK" to reboot the instrument. Remove the stick and confirm with "OK". (If the stick is not removed at this point of the update process, the firmware update process will start another time after the reboot. In this case, interrupt it by pressing "Cancel" when the selection dialog appears.)

## 14 Remote Control Commands

### 14.1 Conventions Used in SCPI Command Descriptions

Note the following conventions 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.

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 14.4.1.3, "Units"](#), on page 188.

For further information on units, see also ["Units"](#) on page 421.

### 14.2 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.

<a href="#">&amp;ABO</a> .....	164
<a href="#">&amp;DFC</a> .....	164
<a href="#">&amp;GET</a> .....	165

&GTL.....	165
&GTM.....	165
&GTR.....	165
&HFC.....	165
&LLO.....	165
&NREN.....	165
*CLS.....	165
*DEV.....	166
*DMC.....	166
*EMC.....	166
*ESE.....	166
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*GWAI.....	167
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*IST?.....	167
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*OPC.....	168
*OPT?.....	168
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*SRQ?.....	170
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*TST?.....	171
*WAI.....	171
*XESE.....	171
*XESR?.....	171
*XPRES.....	171
*XSRE.....	172
*XSTB?.....	172

---

**&ABO**

Device clear

**Usage:**                      Event

---

**&DFC**

Disable flow control

**Usage:** Event

---

#### **&GET**

Group execute trigger

**Usage:** Event

---

#### **&GTL**

Goto local

**Usage:** Event

---

#### **&GTM**

Goto local with remote state.

**Usage:** Event

---

#### **&GTR**

Goto remote

**Usage:** Event

---

#### **&HFC**

Hardware flow control

**Usage:** Event

---

#### **&LLO**

Local lockout

**Usage:** Event

---

#### **&NREN**

Not remote enabled (goto local)

**Usage:** Event

---

#### **\*CLS**

CLear Status

Resets the:

- Status byte (STB)

- Standard event register (ESR)
- EVENT part of the QUESTionable and the OPERATION register
- Error/event queue

The command does not alter the ENABLE and TRANSition parts of the registers.

**Usage:** Event

---

**\*DEV** [<instrument\_no>]

This command returns the selected "instrument" of the device. The command can be used to select between different "instruments" in a multichannel device.

**Parameters:**

<instrument\_no>      The assigned instrument.

---

**\*DMC** <Label>, <Macro>

**\*DMC?** <Label>

Defines a macro command.

**Parameters:**

<Macro>

**Parameters for setting and query:**

<Label>

---

**\*EMC** <Enable>

Enables 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 query

Returns the contents of the event status register in decimal form (0 to 255) and subsequently 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?**

Analogon 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 query

Returns a string with information on the sensor's identity (device identification code). In addition, the version number of the installed firmware is indicated.

**Usage:** Query only

---

**\*IST?**

Individual SStatus query

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. This bit can be used to initiate a service request. \*OPC must be sent at the end of a program message.

The query form returns a "1" when all previous commands have been processed. It is important that the read timeout is set sufficiently long.

Since \*OPC? waits until all previous commands are executed, "1" is returned in all cases.

\*OPC? basically functions like the \*WAI command, but \*WAI does not return a response.

\*OPC? is preferred to \*WAI because with \*OPC?, the execution of commands can be queried from a controller program before new commands are sent. This prevents overflow of the input queue when too many commands are sent that cannot be executed.

Unlike \*WAI, \*OPC? must be sent at the end of a program message.

---

### **\*OPT?**

OPTion identification query

Returns a comma-separated list of installed options.

**Usage:** Query only

**Manual operation:** See "HW Options tab" on page 150  
See "SW Options tab" on page 150

---

### **\*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 124

---

**\*RMC <Label>**

Remove macro content.

**Setting parameters:**

&lt;Label&gt;

**Usage:** Setting only

---

**\*RST**

ReSeT

Sets the instrument to a defined default status. The default settings are indicated in the description of commands.

The command corresponds to [SYSTem:PRESet](#).**Usage:** Event**Manual operation:** See ["Preset"](#) on page 124

---

**\*SAV** <num>

SAVe

Saves the current instrument settings in the specified intermediate memory.

**Setting parameters:**

<number>	Number of the intermediate memory
Range:	0 to 19
*RST:	0

**Usage:** Setting only**Manual operation:** See "Save" on page 124

---

**\*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:**

<register>	Range:	0 to 255
	*RST:	0

---

**\*SRQ?** [<timeout>]A generic `srq wait` command to be used without `srq event transport`. It is simply read from the interface.**Query parameters:**

&lt;timeout&gt;

**Return values:**

&lt;srq&gt;

**Usage:** Query only

---

**\*STB?**

STatus Byte query

Returns the contents of the status byte in decimal form.

**Usage:** Query only

---

**\*TRG**

TRiGger

Triggers a measurement. This command is only valid if the power sensor is in the waiting for trigger state and the trigger source is set to `BUS`

**Usage:** Event

---

### **\*TST?**

Selftest query

Triggers a self test of the instrument and outputs an error code in decimal form. 0 indicates that no errors have occurred.

**Example:**            \*TST?  
Query  
0  
Response: Passed

**Example:**            \*TST?  
Query  
1  
Response: Failed

**Usage:** Query only

---

### **\*WAI**

WAI 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.

**\*XSRE <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

## 14.3 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 7.3, "Triggering"](#), on page 54
- [Chapter 14.4.2, "Configuring the Trigger"](#), on page 206

<a href="#">ABORt&lt;Measurement&gt;</a> .....	173
<a href="#">ABORt&lt;undef&gt;:ALL</a> .....	173
<a href="#">INITiate&lt;Measurement&gt;:CONTInuous</a> .....	173
<a href="#">INITiate&lt;Undef&gt;:ALL:CONTInuous</a> .....	174
<a href="#">INITiate&lt;Measurement&gt;:DISable</a> .....	174
<a href="#">INITiate&lt;Undef&gt;:ALL:DISable</a> .....	174
<a href="#">INITiate&lt;Measurement&gt;[:IMMediate]</a> .....	174
<a href="#">INITiate&lt;Undef&gt;:ALL[:IMMediate]</a> .....	175

**ABORt<Measurement>**

Immediately interrupts the current measurement. If the measurement has been started as a single measurement (`INITiate<Measurement>[:IMMediate]`), the power sensor goes into the idle state. However, if a continuous measurement is in progress (`INITiate<Measurement>:CONTInuous ON`), the trigger system of the power sensor enters the waiting for trigger state, and if the trigger condition is met, a new measurement is immediately started.

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 using `SYSTem:LANGuage "NRP2"`.

**Suffix:**

<Measurement>      1 to 4  
Measurement channel

**Usage:**              Event

**ABORt<undef>:ALL**

Applies to all connected power sensors. See `ABORt<Measurement>` on page 173.

**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 power 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 using `SYSTem:LANGuage "NRP2"`.

**Suffix:**

<Measurement>      1 to 4  
Measurement channel

**Parameters:**

<state>

**ON**

Measurements are performed continuously. If a measurement is completed, the power 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 power sensor to the idle state.

\*RST:              0

**INITiate<Undef>:ALL:CONTInuous <state>**

Applies to all connected power sensors. See [INITiate<Measurement>:CONTInuous](#) on page 173.

**Suffix:**

<Undef>                      1 to n  
No suffix required.

**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 power sensor starts a measurement if [INITiate<Undef>: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 using [SYSTem:LANGuage](#) "NRP2".

**Suffix:**

<Measurement>            1 to 4  
Measurement channel

**Parameters:**

<state>                      \*RST:            0

**INITiate<Undef>:ALL:DISable <state>**

Applies to all connected power sensors. See [INITiate<Measurement>:DISable](#) on page 174.

**Suffix:**

<Undef>                      1 to n  
No suffix required.

**Setting parameters:**

<state>

**Usage:**                      Setting only

**INITiate<Measurement>[:IMMediate]**

Starts a single measurement cycle. The power sensor changes from the idle state to the waiting for trigger state. As soon as 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 power sensor enters the waiting for trigger state several times. Once the entire measurement is completed, a measurement result is available, and the power sensor enters the idle state again.

Use the command only after the continuous measurement mode has been disabled (`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 using `SYSTem:LANGuage "NRP2"`.

**Suffix:**

<Measurement>      1 to 4  
Measurement channel

**Usage:**              Event

---

**INITiate<Undef>:ALL[:IMMediate]**

Applies to all connected power sensors. See `INITiate<Measurement>[:IMMediate]` on page 174.

**Suffix:**

<Undef>              1 to n  
No suffix required.

**Usage:**              Event

## 14.4 Measurement Settings and Results

Further information:

- [Chapter 14.5, "Calculation Functions"](#), on page 270
- [Configuring the Display](#)..... 175
- [Configuring the Trigger](#)..... 206
- [Selecting the Measurement](#)..... 215
- [Selecting the Power Sensor](#)..... 218
- [Continuous Average](#)..... 219
- [Trace](#)..... 221
- [Pulse Analysis](#)..... 231
- [Time Gate](#)..... 245
- [Timeslot](#)..... 247
- [Statistics](#)..... 250
- [NRT](#)..... 259
- [Querying Measurement Results](#)..... 269

### 14.4.1 Configuring the Display

Further information:

- [Chapter 7.1, "Display Settings"](#), on page 46

#### 14.4.1.1 General Settings

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CALCulate<Measurement>:DMODE.....	176
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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 4  
Measurement channel

###### Parameters:

<value>              NONE | EXTRemes | STATistics  
\*RST:                NONE

**Manual operation:** See "Auxiliary Values" on page 48

---

##### CALCulate<Measurement>:DMODE <mode>

Selects the display mode.

###### Suffix:

<Measurement>      1 to 4  
Measurement channel



**Parameters:**

<mode> SDIGital | SANalog | MARKer | GRID | INFO | PULSe |  
 STATistics | MARKer | TABLE  
 \*RST: SDIGital

**Manual operation:** See ["Display Format"](#) on page 48

**CALCulate<Measurement>:EXTRemes:RESet**

Stores 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 4  
 Measurement channel

**Usage:** Event

**CALCulate<Measurement>:HOLD:FUNCTION <function>**

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

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

**Suffix:**

<Measurement> 1 to 4  
 Measurement channel

**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 51

**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 4  
Measurement channel

**Parameters:**

<state> OFF | ON | RESet  
\*RST: OFF

**Manual operation:** See "[Max Hold](#)" on page 51

**CALCulate<Measurement>:LIMit<undef>:TYPE <type>**

Alias for [CALCulate<Measurement>:HOLD:FUNction](#) on page 177.

**Suffix:**

<Measurement> 1 to 4  
Measurement channel

<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\[:STATe\]](#) on page 177.

**Suffix:**

<Measurement> 1 to 4  
Measurement channel

<undef> 1 to n  
No suffix required.

**Parameters:**

<state>

**CALCulate<Measurement>:RESolution <resolution>**

Selects the result resolution relating to dB. This affects both the display resolution as well as resolution settings for the sensor(s).

**Suffix:**

<Measurement> 1 to 4  
Measurement channel

**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 47

---

**CALCulate<Measurement>[:CHANnel<Channel>]:PSET <value>**

Sets the parameter set for a specific sensor.

**Suffix:**

<Measurement>	1 to 4
	Measurement channel

<Channel>	1 to 2
	1 = primary sensor, 2 = secondary sensor

**Parameters:**

<value>	DEFault
*RST:	DEFault

---

**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 by pressing the [DEL] key.

**Parameters:**

&lt;state&gt;

---

**DISPlay:MESSage:TEXT:CLEar**

Deletes the text for user-defined messages.

Define the message text using [DISPlay:MESSage:TEXT\[:DATA\]](#).**Usage:** Event

---

**DISPlay:MESSage:TEXT[:DATA]** <string>

Defines the text for user-defined messages.

**Parameters:**

<string>                      ASCII characters from code 32 to code 126  
                                  Line break: string "\n"  
                                  The length depends on the message type: max. 4 lines for messages and max. 2 lines for queries. The length of a line depends on the characters used. Too long lines are cut off, indicated by "... " at the end of the line.

---

**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 by pressing the [MENU] key.

**MESSage**  
 Remote control command processing is immediately continued. Close the dialog containing the message 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 using [DISPlay:MESSage:TEXT\[:DATA\]](#).

**Parameters:**

<state>

---

**DISPlay:LAYout** <layout>

Sets the number of measurement panes. See also [Chapter 5.1.5, "Selecting the Display Layout"](#), on page 34.

**Parameters:**

<layout>                      L1 | L2 | L3 | L4  
                                  \*RST:                      L1

**DISPlay:OVERload[:STATe] <state>**

If enabled, hides the sensor overload message. But be aware that overload can damage the power 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 data sheet of the power 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 ["Hide Sensor Overload Message"](#) on page 155

**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. See also [Chapter 5.1.5, "Selecting the Display Layout"](#), on page 34.

**Suffix:**

<Window> 1 to 4  
Measurement channel

**Parameters:**

<state>

**DISPlay[:WINDow<Window>]:POSition <position>**

Defines the position of a measurement pane in the user interface.

**Suffix:**

<Window>                      1 to 4  
Measurement channel

**Parameters:**

<position>                      Range:        0 to 3  
                                     \*RST:        0

**SYSTem:SPEEd <mode>**

You can increase the data processing speed using **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.

**Parameters:**

<mode>                          NORMal | FAST | SLOW | FREeze  
                                     \*RST:        NORMal

**14.4.1.2    Scaling**

CALCulate<Measurement>:TRACe:X[:SCALe]:LEFT.....	183
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[SENSe<Sensor>:]TRACe:OFFSet:TIME.....	188
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**CALCulate<Measurement>:TRACe:X[:SCALe]:LEFT <value>**

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

**Suffix:**

<Measurement>      1 to 4  
Measurement channel

**Parameters:**

<value>              Range:      -15.0 to 15.0  
                         \*RST:      0.0  
                         Default unit: s

**Manual operation:**    See ["Start Time"](#) on page 49

**CALCulate<Measurement>:TRACe:X[:SCALe]:LENGth <value>**

Sets the duration of the trace.

**Suffix:**

<Measurement>      1 to 4  
Measurement channel

**Parameters:**

<value>              Range:      8.3e-9 to 30.0  
                         \*RST:      0.01  
                         Default unit: s

**Manual operation:**    See ["Trace Length"](#) on page 50

**CALCulate<Measurement>:TRACe:Y[:SCALe]:SPAN:DB <value>**

Effective for trace measurements.

Specifies the value range for the power axis.

**Suffix:**

<Measurement>      1 to 4  
Measurement channel

**Parameters:**

<value>              Range:      0.005 to 400.0  
                         \*RST:      50.0  
                         Default unit: dB

**Manual operation:**    See ["Power Span"](#) on page 50

**CALCulate<Measurement>:TRACe:Y[:SCALe]:SPAN:DBM <value>**

Effective for trace measurements.

Specifies the value range for the power axis.

**Suffix:**

<Measurement> 1 to 4  
Measurement channel

**Parameters:**

<value> Range: 0.005 to 400.0  
\*RST: 50.0  
Default unit: dBm

**Manual operation:** See ["Power Span"](#) on page 50

**CALCulate<Measurement>:TRACe:Y[:SCALe]:SPAN:DBUV <value>**

Effective for trace measurements.

Specifies the value range for the power axis.

**Suffix:**

<Measurement> 1 to 4  
Measurement channel

**Parameters:**

<value> Range: 0.005 to 400.0  
\*RST: 100.0  
Default unit: dBμV

**Manual operation:** See ["Power Span"](#) on page 50

**CALCulate<Measurement>:TRACe:Y[:SCALe]:SPAN:DPCT <value>**

Effective for trace measurements.

Specifies the value range for the power axis.

**Suffix:**

<Measurement> 1 to 4  
Measurement channel

**Parameters:**

<value> Range: 0.005 to 2e18  
\*RST: 200.0  
Default unit: dpct

**Manual operation:** See ["Power Span"](#) on page 50

**CALCulate<Measurement>:TRACe:Y[:SCALe]:SPAN:ONE <value>**

Effective for trace measurements.

Specifies the value range for the power axis without unit.

**Suffix:**

<Measurement> 1 to 4  
Measurement channel



**Parameters:**

<value>                      Range:        0.005 to 2e18  
                                  \*RST:        10.0  
                                  Default unit: -

**Manual operation:**    See ["Power Span"](#) on page 50

**CALCulate<Measurement>:TRACe:Y[:SCALe]:SPAN:WATT <value>**

Effective for trace measurements.

Specifies the value range for the power axis.

**Suffix:**

<Measurement>            1 to 4  
                                  Measurement channel

**Parameters:**

<value>                      Range:        1e-12 to 2e9  
                                  \*RST:        1e-3  
                                  Default unit: W

**Manual operation:**    See ["Power Span"](#) on page 50

**CALCulate<Measurement>:TRACe:Y[:SCALe]:TOP:DB <value>**

Effective for trace measurements.

Specifies the reference value for the power axis.

**Suffix:**

<Measurement>            1 to 4  
                                  Measurement channel

**Parameters:**

<value>                      Range:        -200.0 to 200.0  
                                  \*RST:        25.0  
                                  Default unit: dB

**Manual operation:**    See ["Power Reference"](#) on page 50

**CALCulate<Measurement>:TRACe:Y[:SCALe]:TOP:DBM <value>**

Effective for trace measurements.

Specifies the reference value for the power axis.

**Suffix:**

<Measurement>            1 to 4  
                                  Measurement channel

**Parameters:**

<value>                      Range:        -200.0 to 200.0  
                                  \*RST:        0.0  
                                  Default unit: dBm

**Manual operation:**    See ["Power Reference"](#) on page 50

**CALCulate<Measurement>:TRACe:Y[:SCALe]:TOP:DBUV <value>**

Effective for trace measurements.

Specifies the reference value for the power axis.

**Suffix:**

<Measurement>            1 to 4  
                                  Measurement channel

**Parameters:**

<value>                      Range:        -100.0 to 300.0  
                                  \*RST:        150.0  
                                  Default unit: dBuV

**Manual operation:**    See ["Power Reference"](#) on page 50

**CALCulate<Measurement>:TRACe:Y[:SCALe]:TOP:DPCT <value>**

Effective for trace measurements.

Specifies the reference value for the power axis.

**Suffix:**

<Measurement>            1 to 4  
                                  Measurement channel

**Parameters:**

<value>                      Range:        -1e18 to 1e18  
                                  \*RST:        100.0  
                                  Default unit: dpct

**Manual operation:**    See ["Power Reference"](#) on page 50

**CALCulate<Measurement>:TRACe:Y[:SCALe]:TOP:ONE <value>**

Effective for trace measurements.

Specifies the reference value for the power axis without unit.

**Suffix:**

<Measurement>            1 to 4  
                                  Measurement channel

**Parameters:**

<value>                      Range:        -1e18 to 1e18  
                                  \*RST:        10.0  
                                  Default unit: -

**Manual operation:**    See ["Power Reference"](#) on page 50

**CALCulate<Measurement>:TRACe:Y[:SCALe]:TOP:WATT <value>**

Effective for trace measurements.

Specifies the reference value for the power axis.

**Suffix:**

<Measurement>            1 to 4  
                                  Measurement channel

**Parameters:**

<value>                      Range:        -1e9 to 1e9  
                                  \*RST:        1e-3  
                                  Default unit: W

**Manual operation:**    See ["Power Reference"](#) on page 50

**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 channel

**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 channel

**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 channel

**Parameters:**

<value>                      See [DISPlay\[:WINDow<Window>\]:METer:LOWer](#)  
on page 187.

---

**[SENSe<Sensor>:]TRACe:OFFSet: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:        -15.0 to 15.0  
                              \*RST:        0.0  
                              Default unit: s

**Manual operation:**    See ["Trace Length"](#) on page 50

---

**[SENSe<Sensor>:]TRACe:TIME <time>**

Sets the vertical scaling.

**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 to 30.0  
                              \*RST:        0.01  
                              Default unit: s

**Manual operation:**    See ["Power / Div"](#) on page 50

#### 14.4.1.3 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 421.

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>UNIT&lt;Measurement&gt;:POWer:RATio</code> .....	189
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<code>UNIT&lt;Measurement&gt;:POWer:RELative:STATe</code> .....	190
<code>UNIT&lt;Measurement&gt;:POWer[:VALue]</code> .....	190

---

#### **UNIT<Measurement>:POWer:RATio <unit>**

Sets the output unit for the measured power ratio values.

##### **Suffix:**

<Measurement>      1 to 4  
Measurement channel

##### **Parameters:**

<unit>              DB | DPCT | O  
The character O stands for One (x1).  
\*RST:              DB

**Manual operation:**    See "Unit" on page 47  
                              See "Forward Unit" on page 48

---

#### **UNIT<Measurement>:POWer:REFlection <unit>**

Effective if `CALCulate<Measurement>[:CHANnel<Channel>]:FEED<Channel>`  
"POWer:REVerse" is set.

Defines how the matching of the load is measured.

##### **Suffix:**

<Measurement>      1 to 4  
Measurement channel

##### **Parameters:**

<unit>              RCO | RL | SWR | RFR  
**RCO**  
Reflection coefficient (0 to 1, without unit)  
**RL**  
Return loss (in dB)  
**SWR**  
Standing wave ratio (1 to  $\infty$ , without unit)  
**RFR**  
Ratio between forward and reverse power (0% to 100%)  
\*RST:              SWR

**Example:** `UNIT1:POW:REFL RCO`

---

#### **UNIT<Measurement>:POWer:RELative:STATe <state>**

Defines whether the forward power, reverse power and absorbed power are output in absolute or relative units.

##### **Suffix:**

<Measurement>      1 to 4  
Measurement channel

##### **Parameters:**

<state>                **ON**  
Relative units are used.  
**OFF**  
Absolute units are used.  
\*RST:                0

**Example:** `UNIT1:POW:REL:STAT ON`

---

#### **UNIT<Measurement>:POWer[:VALue] <unit>**

Sets the output unit for the measured power values.

##### **Suffix:**

<Measurement>      1 to 4  
Measurement channel

##### **Parameters:**

<unit>                DBM | DBUV | W  
\*RST:                DBM

**Manual operation:** See ["Unit"](#) on page 47  
See ["Forward Unit"](#) on page 48

### **14.4.1.4 Limits**

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---

#### **CALCulate<Measurement>:LIMit<undef>:CLEar:AUTO <mode>**

Automatically resets the limit monitoring state and the internal counter for limit violations if any of the following commands is executed:

- INITiate<Measurement>[:IMMediate]
- INITiate<Measurement>:CONTinuous ON
- MEASure<Measurement>... query
- READ<Measurement>... query

##### **Suffix:**

<Measurement>      1 to 4  
Measurement channel

<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 4  
Measurement channel

<undef> 1 to n  
No suffix required.

**Usage:** Event

#### **CALCulate<Measurement>:LIMit<undef>:FAIL?**

Queries whether upper or lower limits have been exceeded. The status is reset if one of the following events occurs:

- Device is switched on.
- Reset is performed (\*RST).
- CALCulate<Measurement>:LIMit<undef>:CLEar[:IMMediate] is executed.

**Suffix:**

<Measurement> 1 to 4  
Measurement channel

<undef> 1 to n  
No suffix required.

**Usage:** Query only

#### **CALCulate<Measurement>:LIMit<undef>:FCOunt?**

Queries the number of limit violations that occurred. The counter is zeroed if one of the following events occurs:

- Device is switched on.
- Reset is performed (\*RST).
- CALCulate<Measurement>:LIMit<undef>:CLEar[:IMMediate] is executed.

**Suffix:**

<Measurement> 1 to 4  
Measurement channel

<undef> 1 to n  
No suffix required.

**Usage:** Query only

#### **CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer:STATe <state>**

Enables or disables the checking of the lower limit.

**Suffix:**

<Measurement> 1 to 4  
Measurement channel



<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 51  
See "[Forward Lower Limit State, Reflection Lower Limit State](#)" on page 52

**CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer[:DATA] <value>**

Sets a lower limit for the measured values.

**Suffix:**

<Measurement> 1 to 4  
Measurement channel

<DirectionalChannel> 1 to 2  
1 = forward, 2 = reflection (reverse)

**Parameters:**

<value>

**Manual operation:** See "[Forward Lower Limit, Reflection Lower Limit](#)" on page 52

**CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer[:DATA]:CCDF  
<value>**

Lower limit value for CCDF.

**Suffix:**

<Measurement> 1 to 4  
Measurement channel

<DirectionalChannel> 1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value> Range: 0.0 to 100.0  
\*RST: 0.0  
Default unit: pct

**Manual operation:** See "[Lower Limit](#)" on page 51

**CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer[:DATA]:RATio:  
RCoefficient <value>**

Lower limit value for reflection coefficient.

**Suffix:**

<Measurement> 1 to 4  
Measurement channel

<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 51

**CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer[:DATA]:RATio:  
RFRatio <value>**

Lower limit value for ratio of forward/reverse power.

**Suffix:**

<Measurement> 1 to 4  
Measurement channel

<DirectionalChannel> 1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value> Range: 0.0 to 100.0  
\*RST: 0.0  
Default unit: pct

**Manual operation:** See "[Lower Limit](#)" on page 51

**CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer[:DATA]:RATio:  
RLOSs <value>**

Lower limit value for return loss.

**Suffix:**

<Measurement> 1 to 4  
Measurement channel

<DirectionalChannel> 1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value> Range: -200.0 to 200.0  
\*RST: -200.0  
Default unit: dB

**Manual operation:** See "[Lower Limit](#)" on page 51

---

**CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer[:DATA]:RATio:  
SWR <value>**

Lower limit value for SWR.

**Suffix:**

<Measurement> 1 to 4  
Measurement channel

<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 51

---

**CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer[:DATA]:RATio[:  
VALue] <value>**

Lower limit value for power ratio.

If you enter a value without unit, the unit is defined by [UNIT<Measurement>:POWer:RATio](#). For further information, see [Chapter 14.4.1.3, "Units"](#), on page 188.

**Suffix:**

<Measurement> 1 to 4  
Measurement channel

<DirectionalChannel> 1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value> Range: -180.0 to +180.0  
\*RST: -20.0  
Default unit: dB

**Manual operation:** See "[Lower Limit](#)" on page 51

---

**CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer[:DATA]:POWer  
<value>**

Lower limit value for power value.

If you enter a value without unit, the unit is defined by [UNIT<Measurement>:POWer\[:VALue\]](#). For further information, see [Chapter 14.4.1.3, "Units"](#), on page 188.

**Suffix:**

<Measurement> 1 to 4  
Measurement channel

<DirectionalChannel> 1 to 2

1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value>                      Range:        -120.0 to +150.0  
                                  \*RST:        -60.0  
                                  Default unit: dBm

**Manual operation:**    See "[Lower Limit](#)" on page 51

**CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer[:DATA] <value>**

Sets a upper limit for the measured values.

**Suffix:**

<Measurement>            1 to 4  
                                  Measurement channel

<DirectionalChannel> 1 to 2

1 = forward, 2 = reflection (reverse)

**Parameters:**

<value>

**Manual operation:**    See "[Forward Upper Limit, Reflection Upper Limit](#)" on page 53

**CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer:STATe <state>**

Enables or disables the checking of the upper limit.

**Suffix:**

<Measurement>            1 to 4  
                                  Measurement channel

<DirectionalChannel> 1 to 2

1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<state>                      \*RST:        OFF

**Manual operation:**    See "[Upper Limit State](#)" on page 52  
                                  See "[Forward Upper Limit State, Reflection Upper Limit State](#)"  
                                  on page 52

**CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer[:DATA]:CCDF  
                                  <value>**

Upper limit value for CCDF.

**Suffix:**

<Measurement>            1 to 4  
                                  Measurement channel

<DirectionalChannel> 1 to 2

1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value>                      Range:        0.0 to 100.0  
                                      \*RST:        100.0  
                                      Default unit: pct

**Manual operation:**    See "[Upper Limit](#)" on page 52

**CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer[:DATA]:RATio:  
 RCOefficient <value>**

Upper limit value for reflection coefficient.

**Suffix:**

<Measurement>            1 to 4  
                                      Measurement channel

<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 52

**CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer[:DATA]:RATio:  
 RFRatio <value>**

Upper limit value for ratio of forward/reverse power.

**Suffix:**

<Measurement>            1 to 4  
                                      Measurement channel

<DirectionalChannel> 1 to 2

1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value>                      Range:        0.0 to 100.0  
                                      \*RST:        100.0  
                                      Default unit: pct

**Manual operation:**    See "[Upper Limit](#)" on page 52

---

**CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer[:DATA]:RATio:  
RLOSs <value>**

Upper limit value for return loss.

**Suffix:**

<Measurement> 1 to 4  
Measurement channel

<DirectionalChannel> 1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value> Range: -200.0 to 200.0  
\*RST: 200.0  
Default unit: dB

**Manual operation:** See "[Upper Limit](#)" on page 52

---

**CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer[:DATA]:RATio:SWR  
<value>**

Upper limit value for SWR.

**Suffix:**

<Measurement> 1 to 4  
Measurement channel

<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 52

---

**CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer[:DATA]:RATio[:  
VALue] <value>**

Upper limit value for 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 14.4.1.3, "Units"](#), on page 188.

**Suffix:**

<Measurement> 1 to 4  
Measurement channel

<DirectionalChannel> 1 to 2

1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value>                      Range:        -180.0 to +180.0  
                                  \*RST:        +20.0  
                                  Default unit: dB

**Manual operation:**    See ["Upper Limit"](#) on page 52

**CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer[:DATA]:POWer**  
                                  <value>

Upper limit value for 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 14.4.1.3, "Units"](#), on page 188.

**Suffix:**

<Measurement>            1 to 4  
                                  Measurement channel

<DirectionalChannel> 1 to 2

1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value>                      Range:        -120.0 to +150.0  
                                  \*RST:        +10.0  
                                  Default unit: dBm

**Manual operation:**    See ["Upper Limit"](#) on page 52

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

Lower limit value for CCDF bargraph display.

**Suffix:**

<Measurement>            1 to 4  
                                  Measurement channel

<DirectionalChannel> 1 to 2

1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value>                      Range:        0.0 to 100.0  
                                  \*RST:        0.0  
                                  Default unit: pct

**Manual operation:**    See ["Scale Lower Limit"](#) on page 49

---

**CALCulate<Measurement>:METer<DirectionalChannel>:LOWer[:DATA]:RATio:RCOefficient <value>**

Lower limit value for reflection coefficient bargraph display.

**Suffix:**

<Measurement> 1 to 4  
Measurement channel

<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 49

---

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

Lower limit value for ratio of forward/reverse power bargraph display.

**Suffix:**

<Measurement> 1 to 4  
Measurement channel

<DirectionalChannel> 1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value> Range: 0.0 to 100.0  
\*RST: 0.0  
Default unit: pct

**Manual operation:** See ["Scale Lower Limit"](#) on page 49

---

**CALCulate<Measurement>:METer<DirectionalChannel>:LOWer[:DATA]:RATio:RLOSSs <value>**

Lower limit value for return loss bargraph display.

**Suffix:**

<Measurement> 1 to 4  
Measurement channel

<DirectionalChannel> 1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)



**Parameters:**

<value>                      Range:        -200.0 to 200.0  
                                  \*RST:        -200.0  
                                  Default unit: dB

**Manual operation:**    See ["Scale Lower Limit"](#) on page 49

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

Lower limit value for SWR bargraph display.

**Suffix:**

<Measurement>            1 to 4  
                                  Measurement channel

<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 49

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

Lower limit value for 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 14.4.1.3, "Units"](#), on page 188.

**Suffix:**

<Measurement>            1 to 4  
                                  Measurement channel

<DirectionalChannel> 1 to 2  
                                  1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 =  
                                  reflection (reverse)

**Parameters:**

<value>                      Range:        -180.0 to +180.0  
                                  \*RST:        -20.0  
                                  Default unit: dB

**Manual operation:**    See ["Scale Lower Limit"](#) on page 49

---

**CALCulate<Measurement>:METer<DirectionalChannel>:LOWer[:DATA][:POWER]**  
 <value>

Lower limit value for 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 14.4.1.3, "Units"](#), on page 188.

**Suffix:**

<Measurement> 1 to 4  
 Measurement channel

<DirectionalChannel> 1 to 2  
 1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value> Range: -120.0 to +150.0  
 \*RST: -60.0  
 Default unit: dBm

**Manual operation:** See ["Scale Lower Limit"](#) on page 49

---

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

Upper limit value for CCDF bargraph display.

**Suffix:**

<Measurement> 1 to 4  
 Measurement channel

<DirectionalChannel> 1 to 2  
 1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value> Range: 0.0 to 100.0  
 \*RST: 100.0  
 Default unit: pct

**Manual operation:** See ["Scale Upper Limit"](#) on page 49

---

**CALCulate<Measurement>:METer<DirectionalChannel>:UPPer[:DATA]:RATio:RCOefficient <value>**

Upper limit value for reflection coefficient bargraph display.

**Suffix:**

<Measurement> 1 to 4  
 Measurement channel

<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 49

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

Upper limit value for ratio of forward/reverse power bargraph display.

**Suffix:**

<Measurement>            1 to 4  
                                  Measurement channel

<DirectionalChannel> 1 to 2

1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value>                      Range:        0.0 to 100.0  
                                  \*RST:        100.0  
                                  Default unit: pct

**Manual operation:**    See ["Scale Upper Limit"](#) on page 49

**CALCulate<Measurement>:METer<DirectionalChannel>:UPPer[:DATA]:RATio:  
 RLOSS <value>**

Upper limit value for return loss bargraph display.

**Suffix:**

<Measurement>            1 to 4  
                                  Measurement channel

<DirectionalChannel> 1 to 2

1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value>                      Range:        -200.0 to 200.0  
                                  \*RST:        200.0  
                                  Default unit: dB

**Manual operation:**    See ["Scale Upper Limit"](#) on page 49

---

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

Upper limit value for SWR bargraph display.

**Suffix:**

<Measurement> 1 to 4  
Measurement channel

<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 49

---

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

Upper limit value for 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 14.4.1.3, "Units"](#), on page 188.

**Suffix:**

<Measurement> 1 to 4  
Measurement channel

<DirectionalChannel> 1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value> Range: -180.0 to +180.0  
\*RST: +20.0  
Default unit: dB

**Manual operation:** See "Scale Upper Limit" on page 49

---

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

Upper limit value for 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 14.4.1.3, "Units"](#), on page 188.

**Suffix:**

<Measurement> 1 to 4  
Measurement channel

<DirectionalChannel> 1 to 2

1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value>                      Range:        -120.0 to +150.0  
                                  \*RST:        +10.0  
                                  Default unit: dBm

**Manual operation:**    See "Scale Upper Limit" on page 49

#### 14.4.1.5 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 | HEXadecimal | OCTal | BINary  
                                  \*RST:        ASCii

**Example:**                      FORM:SREG ASC

---

#### FORMat[:READings]:BORDER <border>

Selects the order of bytes in 64-bit binary data.

**Parameters:**

<border>                      NORMal | SWAPped

**NORMal**

The 1st byte is the most significant byte (MSB), the 8th byte the least significant byte (LSB).

Fulfills the Big Endian (the big end comes first) convention.

**SWAPped**

The 1st byte is the LSB, the 8th byte the MSB.

Fulfills the Little Endian convention.

\*RST:                      NORMal

**Example:**                      FORM:BORD NORM

---

#### FORMat[:READings][:DATA] [<data,length>, <arg1>]

Specifies whether numeric data is sent as block data in binary form (REAL) or as character strings in plain text (ASCII). Also specifies the length.

**Parameters:**

<data,length>      ASCII | REAL  
                          \*RST:      ASCII  
 <arg1>              Range:      0 to 63  
                          \*RST:      0

**Example:**              FORM ASCII,12

**SYSTem:HCOPY** [<filename>]

Triggers a screenshot (hardcopy) of the current display. If a filename is given, this is used as a target file. Otherwise an internal name is generated which can be read by the query function.

The hardcopy is saved to the root directory of the first detected USB stick. If no USB stick is connected, the hardcopy is saved to the volatile directory of the FTP directory.

**Parameters:**

<filename>

**Manual operation:**    See ["Screenshot"](#) on page 16

**14.4.2 Configuring the Trigger**

Further Information:

- [Chapter 7.3, "Triggering"](#), on page 54

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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 delay time is set using **TRIGger<Measurement>[:CHANnel<Channel>]:DELay[:VALue]**.

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 using **SYSTem:LANGuage** "NRP2".

**Suffix:**

<Measurement>	1 to 4 Measurement channel
<Channel>	1 to 2 1 = primary sensor, 2 = secondary sensor

**Parameters:**

<stat>	ON   OFF
*RST:	OFF

---

**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 in conjunction with buffered measurements. 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 using **SYSTem:LANGuage** "NRP2".

**Suffix:**

<Measurement>	1 to 4 Measurement channel
<Channel>	1 to 2 1 = primary sensor, 2 = secondary sensor

**Parameters:**

<count>	Range:	Depends on power sensor
	*RST:	1

---

**TRIGger<undef>:ALL:DELay:AUTO <stat>**
**TRIGger<Measurement>[:CHANnel<Channel>]:DELay:AUTO <stat>**

If enabled, no measurement is started until the power 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 using **SYSTem:LANGuage "NRP2"**.

**Suffix:**

<Measurement>	1 to 4 Measurement channel
<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 (integration).

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 using **SYSTem:LANGuage "NRP2"**.

**Suffix:**

<Measurement>	1 to 4 Measurement channel
<Channel>	1 to 2 1 = primary sensor, 2 = secondary sensor



**Parameters:**

<delay>                      Range:        -5.0 to 10.0  
                                  \*RST:        0.0  
                                  Default unit: s

**Manual operation:**    See ["Delay"](#) on page 58

**TRIGger<undef>:ALL:DTIME <dropout>**

**TRIGger<Measurement>[:CHANnel<Channel>]:DTIME <dropout>**

Sets the dropout time for the internal trigger source. During this time, the signal power must exceed (negative trigger slope) or undercut (positive trigger slope) the level defined by the trigger level and trigger hysteresis. At least, this time must elapse before triggering can occur again.

See [Chapter 7.3.3, "Dropout Time"](#), on page 55.

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 using [SYSTem:LANGuage](#) "NRP2".

**Suffix:**

<Measurement>            Measurement channel  
 <Channel>                1 to 2  
                                  1 = primary sensor, 2 = secondary sensor

**Parameters:**

<dropout>                      Range:        0.0 to 10.0  
                                  \*RST:        0.0  
                                  Default unit: s

**Manual operation:**    See ["Dropout"](#) on page 58

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

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

**Suffix:**

<Measurement>            1 to 4  
                                  Measurement channel  
 <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

**HIGH**

~10 kΩ

**LOW**

50 kΩ

\*RST: HIGH

**Manual operation:** See ["Trigger 2 Input Impedance"](#) on page 60

**TRIGger<undef>:ALL:HOLDoff <holdoff>**

**TRIGger<Measurement>[:CHANnel<Channel>]:HOLDoff <holdoff>**

Sets the hold-off time, see [Chapter 7.3.4, "Hold-Off Time"](#), on page 56.

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 using `SYSTem:LANGuage "NRP2"`.

**Suffix:**

<Measurement> 1 to 4  
Measurement channel

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<holdoff> Range: 0.0 to 10.0  
\*RST: 0.0  
Default unit: s

**Manual operation:** See ["Holdoff"](#) on page 58

**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 using `SYSTem:LANGuage "NRP2"`.

**Suffix:**

<Measurement> 1 to 4  
Measurement channel

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<hysteresis>            Range:        0.0 to 10.0  
                              \*RST:        0.0  
                              Default unit: dB

**Manual operation:**    See "[Hysteresis](#)" on page 58

**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 4  
                              Measurement channel

<Channel>                1 to 2  
                              1 = primary sensor, 2 = secondary sensor

**Parameters:**

<method>                COMPensate | MEASure | NONE

**COMPensate**  
 Compensation means resampling of trace result.

**MEASure**  
 Does not perform resampling, but stores the measured trigger jitter.

\*RST:                    COMPensate

**Manual operation:**    See "[Jitter Suppression](#)" on page 59

**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 14.4.1.3, "Units"](#), on page 188.

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 using [SYSTem:LANGuage](#) "NRP2".

**Suffix:**

<Measurement>        1 to 4  
                              Measurement channel

<Channel>                1 to 2  
                              1 = primary sensor, 2 = secondary sensor

**Parameters:**

<level>                      Range:        -290.0 to +223.01  
                                  \*RST:        -10.0  
                                  Default unit: dBm

**Manual operation:**    See ["Trigger Level"](#) on page 57

**TRIGger<undef>:ALL:MODE <mode>**

**TRIGger<Measurement>:MODE <mode>**

Controls the trigger execution depending on the setting of the trigger source,  
[TRIGger<Measurement>\[:CHANnel<Channel>\]:SOURce](#).

**Suffix:**

<Measurement>            1 to 4  
                                  Measurement channel

**Parameters:**

<mode>                      NORMal | FREerun | SINGLE | AUTO

**NORMal**

Continuous triggering with regular trigger events.

**FREerun**

Automatically starts a measurement if

[TRIGger<Measurement>\[:CHANnel<Channel>\]:SOURce](#)  
 IMMEDIATE is set.

If another trigger source is set, this setting is automatically  
 changed to AUTO.

**SINGLE**

Disables continuous triggering so that only one trigger event at a  
 time is executed.

**AUTO**

Repetitive, automatic trigger event.

\*RST:                      AUTO

**Manual operation:**    See ["Trigger Mode"](#) on page 57

**TRIGger<Measurement>[:CHANnel<Channel>]:MASTER:PORT <port>**

Effective only if the connected sensor is trigger master, see

[TRIGger<Measurement>\[:CHANnel<Channel>\]:MASTER\[:STATe\]](#)

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

**Suffix:**

<Measurement>            1 to 4  
                                  Measurement channel

<Channel>                   1 to 2  
                                  1 = primary sensor, 2 = secondary sensor

**Parameters:**

<port>                   INTernal | EXT2 | EXTernal2  
                           \*RST:           INTernal

**Manual operation:**   See ["Trigger Master Port"](#) on page 59

**TRIGger<Measurement>[:CHANnel<Channel>]:MASTer[:STATe] <state>**

Enables or disables the trigger master mode of the power sensor. In this state, the power sensor can output a digital trigger signal in sync with its own trigger event.

If enabled, select the output port for the trigger signal using

[TRIGger<Measurement>\[:CHANnel<Channel>\]:MASTer:PORT](#).

Typically, the trigger master uses its internal trigger source. But you can also trigger the trigger master externally, because the power sensor has got two external trigger connectors. If you trigger the trigger master externally, use `EXTernal1` as external trigger input port (trigger source) and `EXTernal2` as trigger master output port or vice versa.

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 using [SYSTem:LANGuage](#) "NRP2".

**Suffix:**

<Measurement>       1 to 4  
                           Measurement channel  
  
 <Channel>            1 to 2  
                           1 = primary sensor, 2 = secondary sensor

**Parameters:**

<state>               ON | OFF  
                           \*RST:           OFF

**Manual operation:**   See ["Trigger Master State"](#) on page 59

**TRIGger<undef>:ALL:SLOPe <slope>****TRIGger<Measurement>[:CHANnel<Channel>]:SLOPe <slope>**

Effective only if [TRIGger<Measurement>\[:CHANnel<Channel>\]:SOURce](#) is set to `INTernal` or `EXTernal`.

Determines which edge of the envelope power, with internal triggering, or increasing voltage, with 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 using [SYSTem:LANGuage](#) "NRP2".

**Suffix:**

<Measurement>       1 to 4  
                           Measurement channel

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<slope> POSitive | NEGative  
\*RST: POSitive

**Manual operation:** See ["Slope"](#) on page 58

**TRIGger<undef>:ALL:SOURce** <source>

**TRIGger<Measurement>[:CHANnel<Channel>]:SOURce** <source>

Selects the source for the trigger event detector.

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 using [SYSTem:LANGuage](#) "NRP2".

**Suffix:**

<Measurement> 1 to 4  
Measurement channel

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<source> INTernal | INTA | INTB | INTC | INTD | EXTernal | EXT2 |  
EXTernal2 | CHKSource | BUS | HOLD | IMMEDIATE  
See [Chapter 7.3.2, "Trigger Sources"](#), on page 54.

**IMMEDIATE**

Measures immediately, does not wait for trigger condition.

\*RST: INTernal

**Manual operation:** See ["Trigger Source"](#) on page 57

**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 215.

**Suffix:**

<Measurement> 1 to 4  
Measurement channel

<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 59

---

**TRIGger<undef>:ALL:SYNChronize[:STATe] <state>**

**TRIGger<Measurement>[:CHANnel<Channel>]:SYNChronize[:STATe] <state>**

Usually used if [TRIGger<Measurement>\[:CHANnel<Channel>\]:MASTER\[:STATe\]](#) is enabled.

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 using [SYSTem:LANGuage](#) "NRP2".

**Suffix:**

<Measurement>	1 to 4 Measurement channel
<Channel>	1 to 2 1 = primary sensor, 2 = secondary sensor

**Parameters:**

<state>	ON   OFF
*RST:	OFF

**Manual operation:** See ["Trigger Synchronize State"](#) on page 59

---

**TRIGger<undef>:ALL[:IMMEDIATE]**

**TRIGger<Measurement>[:IMMEDIATE]**

This command triggers a measurement.

**Suffix:**

<Measurement>	1 to 4 Measurement channel
---------------	-------------------------------

**Usage:** Event

### 14.4.3 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 power sensor averages every measured value using a series of samples. If a **RANdOm** feed is selected, the power 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.

**Suffix:**

<Measurement>	1 to 4 Measurement channel
<Channel>	1 to 2 1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)
<Channel>	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:**

"<string>"	POWer:AVERage   POWer:PEAK   POWer:RANDOM Available for continuous average, burst average, trace, pulse analysis, time gate, timeslot measurements.
"<string>"	POWer:TRACe   POWer:PEAK:TRACe   POWer:RANDOM:TRACe   POWer:AVERage ON SWEep<1 to 4>   POWer:PTAverage ON SWEep<1 to 4>   POWer:PEAK ON SWEep<1 to 4> Available for trace measurements. The suffix <1 to 4> selects the time gate.
"<string>"	CCDF:TRACe   CDF:TRACe   PDF:TRACe Available for statistics measurements.
"<string>"	POWer:FORWard:AVERage   POWer:FORWard:CCDFunction   POWer:FORWard:PEP   POWer:ABSORption:AVERage   POWer:CFACTOR   POWer:ABSORption:PEP   POWer:FORWard:AVERage:BURSt   POWer:ABSORption:AVERage:BURSt Available for NRT measurements, forward direction.
"<string>"	POWer:OFF   POWer:REVerse   POWer:SWRatio   POWer:RLOSs   POWer:RCoefficient   POWer:RFRatio Available for NRT measurements, reverse direction. *RST:        POWer:AVERage



**Manual operation:** See ["Statistics Function"](#) on page 94  
 See ["Average"](#) on page 100  
 See ["CCDF"](#) on page 100  
 See ["Peak Envelope Power \(PEP\)"](#) on page 100  
 See ["Absorption Average"](#) on page 100  
 See ["Crest Factor \(CF\)"](#) on page 100  
 See ["Absorption PEP"](#) on page 101  
 See ["Burst Average"](#) on page 101  
 See ["Absorption Burst"](#) on page 101  
 See ["Off"](#) on page 101  
 See ["Reverse Power"](#) on page 101  
 See ["Standing Wave Ratio \(SWR\)"](#) on page 102  
 See ["Return Loss"](#) on page 102  
 See ["Reflection Coefficient"](#) on page 102  
 See ["Reflection Ratio"](#) on page 102  
 See ["Evaluate"](#) on page 106

---

#### **CALCulate<Measurement>:TYPE <type>**

Specifies the measurement type.

##### **Suffix:**

<Measurement>      1 to 4  
 Measurement channel

##### **Parameters:**

<type>                CONTav | NRT | TRACe | STATistics | TGATe | BURStav |  
 TSLot | PULSe  
 \*RST:                CONTav

**Manual operation:** See ["Measurement Type"](#) on page 61

---

#### **[SENSe<Sensor>:]AUXiliary <mode> <mode>**

Disables or selects 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**

By averaging the measured values in the sensor, extreme values are lost.

**RNDMax**

In contrast to **MINMax**, instead of the Min value the value of a randomly selected sample is returned. All evaluations occur using these values instead of the average values.

\*RST: NONE

#### 14.4.4 Selecting the Power Sensor

Further information:

- [Chapter 7.4, "Measurement Settings Dialog"](#), on page 60

<a href="#">[SENSe&lt;Sensor&gt;:]CATalog?</a> .....	218
<a href="#">CALCulate&lt;Measurement&gt;[:CHANnel&lt;Channel&gt;]:SENSe:INDex</a> .....	218

---

##### **[SENSe<Sensor>:]CATalog?**

Returns a list of all connected power sensors together with the suffix of the port where the power 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  
"1:NRP-Z81-105303", "2:NRP-Z85-900003"  
Response: NRP-Z81-105303 is connected at port 1, NRP-Z85-900003 is connected at port 2.

**Usage:** Query only

**Manual operation:** See ["Primary Sensor, Secondary Sensor"](#) on page 61

---

##### **CALCulate<Measurement>[:CHANnel<Channel>]:SENSe:INDex <index>**

Assigns a connected power sensor to a measurement.

**Suffix:**

<Measurement> 1 to 4  
Measurement channel

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<index> Addresses the sensors depending on how they are connected to the R&S NRX.

**1 to 4**  
Sensor connector A, B, C, D

**4 to 100**

USB connector

**101**

Optional connector: sensor interface for R&amp;S NRT (R&amp;S NRX-B9)

**102 to 128**

LAN interface

Range: 0 to 128

\*RST: 0

**Manual operation:** See "Primary Sensor, Secondary Sensor" on page 61

### 14.4.5 Continuous Average

Further information:

- [Chapter 8.1, "Continuous Average"](#), on page 63

[SENSe<Sensor>:][POWer:][AVG:]BUFFer:CLEar.....	219
[SENSe<Sensor>:][POWer:][AVG:]BUFFer:COUNT?.....	219
[SENSe<Sensor>:][POWer:][AVG:]BUFFer:DATA?.....	219
[SENSe<Sensor>:][POWer:][AVG:]BUFFer:INFO?.....	220
[SENSe<Sensor>:][POWer:][AVG:]BUFFer:SIZE.....	220
[SENSe<Sensor>:][POWer:][AVG:]BUFFer:STATe.....	220
[SENSe<Sensor>:]POWer:REFerence.....	220

---

**[SENSe<Sensor>:][POWer:][AVG:]BUFFer:CLEar**

Used in buffered mode to clear the 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?**

Shows the currently present number of results in buffered output 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

**Usage:** Query only

---

**[SENSe<Sensor>:][POWer:][AVG:]BUFFer:DATA?**

Inquires the results in the buffer even if the buffer is not full.

**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

**Usage:**

Query only

**[SENSe<Sensor>:][POWer:][AVG:]BUFFer:INFO? [<ITEM>]**

Only for compatibility reasons.

**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

**Query parameters:**

&lt;ITEM&gt;

**Usage:**

Query only

**[SENSe<Sensor>:][POWer:][AVG:]BUFFer:SIZE <count>**

Sets the number of desired values for the buffered continuous average measurement.

**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;count&gt;

Range: 1 to 131072

\*RST: 1

**[SENSe<Sensor>:][POWer:][AVG:]BUFFer:STATe <state>**

Enables or disables the buffered continuous average measurement. If enabled, data blocks rather than single measured values are returned and a higher data rate is achieved.

**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;

ON | OFF

\*RST: OFF

**[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[:VALue]`. For further information, see [Chapter 14.4.1.3, "Units"](#), on page 188.

**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 to +110.0  
\*RST: +30.0  
Default unit: dBm

**Manual operation:** See ["Reference Value"](#) on page 64

## 14.4.6 Trace

Further information:

- [Chapter 8.3, "Trace"](#), on page 67

### 14.4.6.1 Trace Measurement Settings

In a trace measurement, you can use commands that combine several setting commands. They are described in [Chapter 14.4.6.2, "Combining Trace Commands"](#), on page 223.

The same principle is used for the calculation functions, see [Chapter 14.5.2, "Using a Calculation Function"](#), on page 272.

<code>CALCulate&lt;Measurement&gt;:TRACe:X:POINts</code> .....	221
<code>[SENSe&lt;Sensor&gt;:]BWIDth:VIDeo:LIST?</code> .....	222
<code>[SENSe&lt;Sensor&gt;:]BANDwidth:VIDeo:LIST?</code> .....	222
<code>[SENSe&lt;Sensor&gt;:]TRACe:MEASurement:AUTO[:STATe]</code> .....	222
<code>[SENSe&lt;Sensor&gt;:]TRACe:MEASurement[:STATe]</code> .....	222
<code>[SENSe&lt;Sensor&gt;:]TRACe:REALtime</code> .....	222

---

#### **`CALCulate<Measurement>:TRACe:X:POINts` <points>**

Sets the number of required values per trace sequence.

**Suffix:**

<Measurement> 1 to 4  
Measurement channel

**Parameters:**

<points> Range: 1 to 8192  
\*RST: 660

**[SENSe<Sensor>:]BWIDth:VIDeo:LIST?****[SENSe<Sensor>:]BANDwidth:VIDeo:LIST?**

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>:]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 in a continuous measurement with [INITiate<Measurement>:CONTinuous](#) ON are synchronously displayed.

For pulse measurements, enable this setting.

**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[:STATe] <value>**

Enables or disables automatic pulse measurements. If pulse measurement is on, the sensor automatically determines the pulse parameters for the currently measured trace. For pulse measurements, also set [\[SENSe<Sensor>:\]TRACe:MEASurement:AUTO\[:STATe\]](#) on page 222 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:**

<value> ON | OFF  
\*RST: OFF

**[SENSe<Sensor>:]TRACe:REALtime <state>**

If disabled, each measurement from the sensor is averaged. If enabled, the averaging of each measurement is disabled and thus the measurement speed is increased. With a higher measurement speed, the measured values of an individual measurement are immediately delivered.

**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;

ON | OFF

\*RST: OFF

**14.4.6.2 Combining Trace Commands****Parameter list**

The following parameters are used.

- <scope\_size>  
Mandatory. Number of test points on the time axis.  
Corresponds to [\[SENSe<Sensor>:\] TRACe:POINts](#) on page 413.
- <capture\_time>  
Mandatory. Period within which measured data are captured in the trace measurements.  
Corresponds to [\[SENSe<Sensor>:\] TRACe:TIME](#) on page 188.
- <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.

The used parameters are described in "[Parameter list](#)" on page 223.

**Suffix:**

&lt;Measurement&gt;

1 to 4

Measurement channel

**Query parameters:**

&lt;scope\_size&gt;

&lt;expr&gt;

&lt;capture\_time&gt;

Default unit: s

&lt;source\_list&gt;

&lt;expr&gt;

**Usage:**

Query only

---

**CONFigure<Measurement>:XTIME[:POWer]:NONE** <scope\_size>, <capture\_time>, <source\_list>

Disables trace 2. In contrast, trace 1 is always active.

The used parameters are described in "[Parameter list](#)" on page 223.

**Suffix:**

<Measurement>      1 to 4  
Measurement channel

**Setting parameters:**

<scope\_size>      <expr>  
<capture\_time>      Default unit: s  
<source\_list>      <expr>

**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 measured by two power sensors.

The used parameters are described in "[Parameter list](#)" on page 223.

**Suffix:**

<Measurement>      1 to 4  
Measurement channel

**Query parameters:**

<scope\_size>      <expr>  
<capture\_time>      Default unit: s  
<source\_list>      <expr>

**Usage:**      Query only

### 14.4.6.3 Using Markers

CALCulate<Measurement>:TRACe:MARKer<Marker>:XDELta?	225
CALCulate<Measurement>:TRACe:MARKer<Marker>:YDELta?	225
CALCulate<Measurement>:TRACe:MARKer<Marker>:YPOSition?	225
DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:FEED:INDex	226
DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:FUNCTion	226
DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:MODE	227
DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:MODE	227



DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:POWER:DBM.....	228
DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:POWER:DBUV.....	228
DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:RELative:POWER:DB.....	229
DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:POWER:RATio:DB.....	229
DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:RELative:POWER:DPCT..	229
DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:POWER:RATio:DPCT.....	229
DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:RELative:POWER:O.....	230
DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:POWER:RATio:O.....	230
DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:RELative:POWER:WATT..	230
DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:POWER:WATT.....	230
DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:RELative:TIME.....	230
DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:TIME.....	230
DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:REFerence.....	231
DISPlay[:WINDow<Window>]:TRACe:MARKer<Undef>:SELection.....	231

---

#### **CALCulate<Measurement>:TRACe:MARKer<Marker>:XDELta?**

Effective for trace measurements.

Queries the time difference between two markers if the value is valid.

##### **Suffix:**

<Measurement>      1 to 4  
Measurement channel

<Marker>            1 to 4  
Marker (M1 to M4)

**Usage:**            Query only

---

#### **CALCulate<Measurement>:TRACe:MARKer<Marker>:YDELta?**

Effective for trace measurements.

Queries the power difference between two markers if the value is valid.

##### **Suffix:**

<Measurement>      1 to 4  
Measurement channel

<Marker>            1 to 4  
Marker (M1 to M4)

**Usage:**            Query only

---

#### **CALCulate<Measurement>:TRACe:MARKer<Marker>:YPOSition?**

Effective for trace measurements.

Queries the position of a marker on the time axis.

##### **Suffix:**

<Measurement>      1 to 4  
Measurement channel

<Marker> 1 to 4  
Marker (M1 to M4)

**Usage:** Query only

---

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

Selects the trace.

**Suffix:**

<Window> 1 to 4  
Measurement channel

<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

---

**DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:FUNCTION <function>**

**Suffix:**

<Window> 1 to 4  
Measurement channel

<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 to the power value of the reference marker.

**RTIME**

Measures the time difference to the time position of the reference marker.

**RPAverage**

Measures the average power on selected trace between time positions of the marker and its reference marker.

\*RST: POWER

**Manual operation:** See ["Measurement Mode"](#) on page 72

---

### DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:MODE <mode>

Sets the mode for the selected marker.

**Suffix:**

<Window>            1 to 4  
Measurement channel

<Marker>            1 to 4  
Marker (M1 to M4)

**Parameters:**

<mode>            OFF | RULer | MEASure

**OFF**

The measurement is off.

**RULer**

Draws a line at the power or time position of the marker.

**MEASure**

Measures power (ratio) or time (difference).

\*RST:            OFF

**Manual operation:** See ["Marker Mode"](#) on page 70

---

### DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:MODE <mode>

Defines where the marker is placed.

**Suffix:**

<Window>            1 to 4  
Measurement channel

<Marker>            1 to 4  
Marker (M1 to M4)

**Parameters:**

<mode>            FTIME | FPOWER | RPOSITION | RPOWER | RPLeft | RPRight |  
PSEarch | MSEARCH | RPSLeft | RPSRight | RMSLeft |  
RMSRight

**FTIME**

Fixed time

**FPOWER**

Fixed power

**RPOSITION**

Relative to reference position

**RPOWER**

Relative to reference power

**RPLLeft**

From reference power left

**RPRight**

From reference power right

**PSEarch**

Peak search

**MSEarch**

Minimum search

**RPSLeft**

Peak search from reference left

**RPSRight**

Peak search from reference right

**RMSLeft**

Minimum search from reference left

**RMSRight**

Minimum search from reference right

\*RST: FTIMe

**Manual operation:** See ["Position Mode"](#) on page 70**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 227.**Suffix:**

<Window>	1 to 4 Measurement channel
<Marker>	1 to 4 Measurement channel

**Parameters:**

<power>	Range: -200.0 to 200.0
	*RST: 0.0
	Default unit: dBm

**Manual operation:** See ["Position"](#) on page 71**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 227.**Suffix:**

<Window>	1 to 4 Measurement channel
<Marker>	1 to 4 Marker (M1 to M4)

**Parameters:**

<power>                      Range:        -100.0 to 300.0  
                                  \*RST:        0.0  
                                  Default unit: dBuV

**Manual operation:**    See "[Position](#)" on page 71

**DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:RELative:  
 POWER:DB <power>**

**DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:POWER:RATio:  
 DB <power>**

Sets a relative power value for the marker position defined under [DISPlay\[:  
 WINDow<Window>\]:TRACe:MARKer<Marker>:POSition:MODE](#) on page 227.

**Suffix:**

<Window>                      1 to 4  
                                  Measurement channel

<Marker>                      1 to 4  
                                  Marker (M1 to M4)

**Parameters:**

<power>                      Range:        -200.0 to 200.0  
                                  \*RST:        0.0  
                                  Default unit: dB

**Manual operation:**    See "[Position](#)" on page 71

**DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:RELative:  
 POWER:DPCT <power>**

**DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:POWER:RATio:  
 DPCT <power>**

Sets a relative value for the marker position defined under [DISPlay\[:  
 WINDow<Window>\]:TRACe:MARKer<Marker>:POSition:MODE](#) on page 227.

**Suffix:**

<Window>                      1 to 4  
                                  Measurement channel

<Marker>                      1 to 4  
                                  Measurement channel

**Parameters:**

<power>                      Range:        -1e18 to 1e18  
                                  \*RST:        0.0  
                                  Default unit: dpct

**Manual operation:**    See "[Position](#)" on page 71

---

**DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:RELative:POWER:O** <power>

**DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:POWER:RATio:O** <power>

Sets a relative value for the marker position defined under [DISPlay\[:WINDow<Window>\]:TRACe:MARKer<Marker>:POSition:MODE](#) on page 227.

**Suffix:**

<Window>                      1 to 4  
Measurement channel

<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 71

---

**DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:RELative:POWER:WATT** <power>

**DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:POWER:WATT** <power>

Sets an absolute power value for the marker position defined under [DISPlay\[:WINDow<Window>\]:TRACe:MARKer<Marker>:POSition:MODE](#) on page 227.

**Suffix:**

<Window>                      1 to 4  
Measurement channel

<Marker>                      1 to 4  
Marker (M1 to M4)

**Parameters:**

<power>                      Range:        -100e-3 to 1e12  
                                 \*RST:        1e-3  
                                 Default unit: W

**Manual operation:**    See "[Position](#)" on page 71

---

**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 227.

**Suffix:**

<Window>                      1 to 4  
Measurement channel

<Marker> 1 to 4  
Marker (M1 to M4)

**Parameters:**

<time> Range: -15.0 to 15.0  
\*RST: 0.0  
Default unit: s

**Manual operation:** See ["Position"](#) on page 71

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

Sets one the available markers as reference.

**Suffix:**

<Window> 1 to 4  
Measurement channel

<Marker> 1 to 4  
Marker (M1 to M4)

**Parameters:**

<reference> Range: 1 to 4  
\*RST: 1

**Manual operation:** See ["Reference Marker"](#) on page 72

**DISPlay[:WINDow<Window>]:TRACe:MARKer<Undef>:SELection <markerNo>**

Shows the selected marker in the trace.

**Suffix:**

<Window> 1 to 4  
Measurement channel

<Undef> 1 to n  
No suffix required.

**Parameters:**

<markerNo> NONE | M1 | M2 | M3 | M4  
\*RST: NONE

**Manual operation:** See ["M1 / M2 / M3 / M4"](#) on page 68

### 14.4.7 Pulse Analysis

Further information:

- [Chapter 8.4, "Pulse Analysis"](#), on page 72

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---

**[SENSe<Sensor>:]TRACe:MEASurement:OFFSet:TIME <value>**

Sets the length of the gate.

**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 the length of the gate in which the pulse analysis is performed.

**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 to 30.0  
                              \*RST:        0.01  
                              Default unit: s

---

**[SENSe<Sensor>:]TRACe:MID:TIME <time>**

Sets the start time of the gate in which the pulse analysis is performed.

**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 to 30.0  
                              \*RST:        0.01  
                              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 4  
Measurement channel

**Parameters:**

<value> HISTogram | INTegration | PEAK  
 \*RST: HISTogram

**Manual operation:** See ["Algorithm"](#) on page 79

---

**CALCulate<Measurement>:TRACe:MEASurement:DEFine:DURation:REFerence**  
 <value>

Effective for pulse analysis measurements.

Sets the medial reference level in terms of percentage of the pulse power amplitude. This level is used to define the pulse width, pulse start time and pulse stop time.

**Suffix:**

<Measurement> 1 to 4  
 Measurement channel

**Parameters:**

<value> Range: 0.0 to 100.0  
 \*RST: 50.0  
 Default unit: pct

---

**CALCulate<Measurement>:TRACe:MEASurement:DEFine:TRANsition: HREFerence** <value>

Effective for pulse analysis measurements.

Sets the high reference level in terms of percentage of the pulse power amplitude. The high reference level defines the end of the rising edge and the start of the falling edge of the pulse. These values are needed for measurement of the rise / fall time.

**Suffix:**

<Measurement> 1 to 4  
 Measurement channel

**Parameters:**

<value> Range: 0.0 to 100.0  
 \*RST: 90.0  
 Default unit: pct

---

**CALCulate<Measurement>:TRACe:MEASurement:DEFine:TRANsition: LREFerence** <value>

Effective for pulse analysis measurements.

Sets the low reference level in terms of percentage of the pulse power amplitude. The low reference level defines the start of the rising edge and the end of the falling edge of the pulse. These values are needed for measurement of the rise / fall time.

**Suffix:**

<Measurement> 1 to 4  
 Measurement channel

**Parameters:**

<value>                      Range:        0.0 to 100.0  
                                 \*RST:        10.0  
                                 Default unit: pct

---

**CALCulate<Measurement>:TRACe:MEASurement:POWer:AVG?**

Effective for pulse analysis measurements.

Queries the average power during the time the pulse is active.

**Suffix:**

<Measurement>            1 to 4  
                                 Measurement channel

**Usage:**                      Query only

---

**CALCulate<Measurement>:TRACe:MEASurement:POWer:HREFerence?**

Effective for pulse analysis measurements.

Queries the power level at `DISPlay[:WINDow<Window>]:TRACe:MEASurement:POWer:PULSe:HREFerence[:STATe]`.

**Suffix:**

<Measurement>            1 to 4  
                                 Measurement channel

**Usage:**                      Query only

---

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

Effective for pulse analysis measurements.

Queries the power level at `DISPlay[:WINDow<Window>]:TRACe:MEASurement:POWer:PULSe:LREFerence[:STATe]`.

**Suffix:**

<Measurement>            1 to 4  
                                 Measurement channel

**Usage:**                      Query only

---

**CALCulate<Measurement>:TRACe:MEASurement:POWer:MAX?**

Effective for pulse analysis measurements.

Queries the maximum power measured within the analysis window.

**Suffix:**

<Measurement>            1 to 4  
                                 Measurement channel

**Usage:**                      Query only

---

**CALCulate<Measurement>:TRACe:MEASurement:POWer:MIN?**

Effective for pulse analysis measurements.

Queries the minimum power measured within the analysis window.

**Suffix:**

<Measurement>      1 to 4  
                         Measurement channel

**Usage:**                      Query only

---

**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 4  
                         Measurement channel

**Usage:**                      Query only

---

**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 4  
                         Measurement channel

**Usage:**                      Query only

---

**CALCulate<Measurement>:TRACe:MEASurement:POWer:REFerence?**

Effective for pulse analysis measurements.

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

**Suffix:**

<Measurement>      1 to 4  
                         Measurement channel

**Usage:**                      Query only

**Manual operation:**      See "[Reference Level](#)" on page 80

---

**CALCulate<Measurement>:TRACe:MEASurement:PULSe:DCYCLE?**

Effective for pulse analysis measurements.

Queries the ratio is expressed as a value between 0 and 1.

**Suffix:**

<Measurement>      1 to 4  
Measurement channel

**Usage:**              Query only

---

**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 4  
Measurement channel

**Usage:**              Query only

---

**CALCulate<Measurement>:TRACe:MEASurement:PULSe:PERiod?**

Effective for pulse analysis measurements.

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

**Suffix:**

<Measurement>      1 to 4  
Measurement channel

**Usage:**              Query only

---

**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 4  
Measurement channel

**Usage:**              Query only

---

**CALCulate<Measurement>:TRACe:MEASurement:TRANSition:NEGative:  
DURation?**

Effective for pulse analysis measurements.

Queries the time the pulse requires to transition from the pulse top level to the pulse base level.

**Suffix:**

<Measurement>      1 to 4  
                                 Measurement channel

**Usage:**                      Query only

---

**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 4  
                                 Measurement channel

**Usage:**                      Query only

---

**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 4  
                                 Measurement channel

**Usage:**                      Query only

---

**CALCulate<Measurement>:TRACe:MEASurement:TRANSition:POSitive:  
DURation?**

Effective for pulse analysis measurements.

Queries the time the pulse requires to transition from the pulse base level to the pulse top level.

**Suffix:**

<Measurement>      1 to 4  
Measurement channel

**Usage:**              Query only

**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 4  
Measurement channel

**Usage:**              Query only

**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 4  
Measurement channel

**Usage:**              Query only

**CALCulate<Measurement>:TRACe:MEASurement:TRANSition:SPERiod?**

Effective for pulse analysis measurements.

Sets the number of samples per second.

**Suffix:**

<Measurement>      1 to 4  
Measurement channel

**Usage:** Query only

---

**DISPlay[:WINDow<Window>]:TRACe:MEASurement:POWer:AVG[:STATe] <value>**

Enables or disables the display of the average signal power.

**Suffix:**

<Window> 1 to 4  
Measurement channel

**Parameters:**

<value> \*RST: OFF

**Manual operation:** See ["Trace Avg"](#) on page 78

---

**DISPlay[:WINDow<Window>]:TRACe:MEASurement:POWer:MAXimum[:STATe] <value>**

Enables or disables the display of the maximum power measured within the analysis window.

**Suffix:**

<Window> 1 to 4  
Measurement channel

**Parameters:**

<value> \*RST: OFF

**Manual operation:** See ["Trace Peak"](#) on page 77

---

**DISPlay[:WINDow<Window>]:TRACe:MEASurement:POWer:MINimum[:STATe] <value>**

Enables or disables the display of the minimum power measured within the analysis window.

**Suffix:**

<Window> 1 to 4  
Measurement channel

**Parameters:**

<value> \*RST: OFF

**Manual operation:** See ["Trace Min"](#) on page 78

---

**DISPlay[:WINDow<Window>]:TRACe:MEASurement:POWer:PULSe:BASE[:STATe] <value>**

Enables or disables the display of the pulse base power.

**Suffix:**

<Window> 1 to 4  
Measurement channel



**Parameters:**

<value>                      \*RST:        OFF

**Manual operation:**    See ["Pulse Base"](#) on page 78

**DISPlay[:WINDow<Window>]:TRACe:MEASurement:POWer:PULSe:  
HREFerence[:STATe] <value>**

Enables or disables the display of the rising edge end and the falling edge start of the pulse.

**Suffix:**

<Window>                      1 to 4  
   Measurement channel

**Parameters:**

<value>                      \*RST:        OFF

**Manual operation:**    See ["High Ref."](#) on page 78  
                                 See ["High Reference Level"](#) on page 80

**DISPlay[:WINDow<Window>]:TRACe:MEASurement:POWer:PULSe:  
LREFerence[:STATe] <value>**

Enables or disables the display of the rising edge start and the falling edge end of the pulse.

**Suffix:**

<Window>                      1 to 4  
   Measurement channel

**Parameters:**

<value>                      \*RST:        OFF

**Manual operation:**    See ["Low Ref."](#) on page 78  
                                 See ["Low Reference Level"](#) on page 80

**DISPlay[:WINDow<Window>]:TRACe:MEASurement:POWer:PULSe:TOP[:STATe]  
<value>**

Enables or disables the display of the pulse top power.

**Suffix:**

<Window>                      1 to 4  
   Measurement channel

**Parameters:**

<value>                      \*RST:        OFF

**Manual operation:**    See ["Pulse Top"](#) on page 77

---

**DISPlay[:WINDow<Window>]:TRACe:MEASurement:PULSe:DCYClE[:STATe]**  
 <value>

Enables or disables the display of the duty cycle of the measured power.

**Suffix:**

<Window>                      1 to 4  
    Measurement channel

**Parameters:**

<value>                      \*RST:        OFF

**Manual operation:**    See "Duty Cycle" on page 76

---

**DISPlay[:WINDow<Window>]:TRACe:MEASurement:PULSe:DURation[:STATe]**  
 <value>

Enables or disables the display of the puls duration.

**Suffix:**

<Window>                      1 to 4  
    Measurement channel

**Parameters:**

<value>                      \*RST:        OFF

**Manual operation:**    See "Pulse Width" on page 75

---

**DISPlay[:WINDow<Window>]:TRACe:MEASurement:PULSe:PERiod[:STATe]**  
 <value>

Enables or disables the display of the time that the pulse signal needs to complete one cycle.

**Suffix:**

<Window>                      1 to 4  
    Measurement channel

**Parameters:**

<value>                      \*RST:        OFF

**Manual operation:**    See "Pulse Period" on page 75

---

**DISPlay[:WINDow<Window>]:TRACe:MEASurement:PULSe:RESolution[:STATe]**  
 <value>

Displays the number of samples per second.

**Suffix:**

<Window>                      1 to 4  
    Measurement channel

**Parameters:**

<value>                      \*RST:        OFF

**Manual operation:** See ["Sampling Rate"](#) on page 77

---

**DISPlay[:WINDow<Window>]:TRACe:MEASurement:PULSe:SEParation[:STATe]  
<value>**

Enables or disables the display of the gap between two pulses.

**Suffix:**

<Window>                      1 to 4  
Measurement channel

**Parameters:**

<value>                      \*RST:        OFF

**Manual operation:** See ["Pulse Off Time"](#) on page 76

---

**DISPlay[:WINDow<Window>]:TRACe:MEASurement:RRElation <refRelation>**

Selects how the threshold parameters are to be interpreted, either voltage related or power related.

**Suffix:**

<Window>                      1 to 4  
Measurement channel

**Parameters:**

<refRelation>                POWer | VOLTage  
\*RST:                POWer

**Manual operation:** See ["Reference Levels relate to"](#) on page 79

---

**DISPlay[:WINDow<Window>]:TRACe:MEASurement:SELection <traceNo>**

Selects the displayed trace.

**Suffix:**

<Window>                      1 to 4  
Measurement channel

**Parameters:**

<traceNo>                      Range:        1 to 100  
\*RST:                1

---

**DISPlay[:WINDow<Window>]:TRACe:MEASurement:TRANSition:NEGative:  
DURation[:STATe] <value>**

Enables or disables the display of the fall time of the first detected pulse. The fall time is the time the signal requires to change from high to low level.

**Suffix:**

<Window>                      1 to 4  
Measurement channel

**Parameters:**

<value>                      \*RST:        OFF

**Manual operation:**    See "[Fall Time](#)" on page 76

**DISPlay[:WINDow<Window>]:TRACe:MEASurement:TRANSition:NEGative:  
OCCurrence[:STATe] <value>**

Enables or disables the display of the current pulse stop point, that is the time when the signal passes through the medial reference level with falling edge.

**Suffix:**

<Window>                      1 to 4  
   Measurement channel

**Parameters:**

<value>                      \*RST:        OFF

**Manual operation:**    See "[Stop Time](#)" on page 76

**DISPlay[:WINDow<Window>]:TRACe:MEASurement:TRANSition:NEGative:  
OVERshoot[:STATe] <value>**

Enables or disables the display of the relative amount of negative overshoot.

**Suffix:**

<Window>                      1 to 4  
   Measurement channel

**Parameters:**

<value>                      \*RST:        OFF

**Manual operation:**    See "[Neg. Overshoot](#)" on page 77

**DISPlay[:WINDow<Window>]:TRACe:MEASurement:TRANSition:POSitive:  
DURation[:STATe] <value>**

Enables or disables the display of the rise time of the first detected pulse. The rise time is the time the signal requires to change from low to high level.

**Suffix:**

<Window>                      1 to 4  
   Measurement channel

**Parameters:**

<value>                      \*RST:        OFF

**Manual operation:**    See "[Rise Time](#)" on page 76

---

**DISPlay[:WINDow<Window>]:TRACe:MEASurement:TRANSition:POSitive:  
OCCurrence[:STATe] <value>**

Enables or disables the display of the current pulse start point, that is the time when the signal passes through the medial reference level with rising edge.

**Suffix:**

<Window>                      1 to 4  
Measurement channel

**Parameters:**

<value>                      \*RST:        OFF

**Manual operation:**    See ["Start Time"](#) on page 76

---

**DISPlay[:WINDow<Window>]:TRACe:MEASurement:TRANSition:POSitive:  
OVERshoot[:STATe] <value>**

Enables or disables the display of the relative amount of positive overshoot.

**Suffix:**

<Window>                      1 to 4  
Measurement channel

**Parameters:**

<value>                      \*RST:        OFF

**Manual operation:**    See ["Pos. Overshoot"](#) on page 78

#### 14.4.8 Time Gate

Further information:

- [Chapter 8.5, "Time Gate"](#), on page 80

<a href="#">CALCulate&lt;Measurement&gt;[:POWER]:TGATe&lt;Gate&gt;[:AVG]:OFFSet[:TIME]</a> .....	245
<a href="#">CALCulate&lt;Measurement&gt;[:POWER]:TGATe&lt;Gate&gt;[:AVG]:TIME</a> .....	246
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<a href="#">CALCulate&lt;Measurement&gt;[:POWER]:TGATe&lt;Undef&gt;[:AVG]:SELection</a> .....	247

---

**CALCulate<Measurement>[:POWER]:TGATe<Gate>[:AVG]:OFFSet[:TIME] <value>**

Sets the length of the gate.

**Suffix:**

<Measurement>                1 to 4  
Measurement channel

<Gate>                        1 to 4  
Time gate

**Parameters:**

<value>                      Range:        0.0 to 15.0  
                                  \*RST:        0.0  
                                  Default unit: s

**Manual operation:**    See "[Length of Gate](#)" on page 85

**CALCulate<Measurement>[:POWER]:TGATe<Gate>[:AVG]:TIME <value>**

Sets the start time of the gate.

**Suffix:**

<Measurement>            1 to 4  
                                  Measurement channel

<Gate>                      1 to 4  
                                  Time gate

**Parameters:**

<value>                      Range:        50.0e-9 to 0.1  
                                  \*RST:        1.0e-3  
                                  Default unit: s

**Manual operation:**    See "[Start of Gate](#)" on page 85

**CALCulate<Measurement>[:POWER]:TGATe<Gate>[:AVG][:EXCLude]:MID:  
 OFFSet[:TIME] <value>**

Sets length of the fence.

**Suffix:**

<Measurement>            1 to 4  
                                  Measurement channel

<Gate>                      1 to 4  
                                  Time gate

**Parameters:**

<value>                      Range:        0.0 to 0.1  
                                  \*RST:        0.0  
                                  Default unit: s

**Manual operation:**    See "[Length of Fence](#)" on page 85

**CALCulate<Measurement>[:POWER]:TGATe<Gate>[:AVG][:EXCLude]:MID:TIME  
 <value>**

Sets the start time of the fence.

**Suffix:**

<Measurement>            1 to 4  
                                  Measurement channel

<Gate> 1 to 4  
Time gate

**Parameters:**

<value> Range: 0.0 to 0.1  
\*RST: 0.0  
Default unit: s

**Manual operation:** See ["Start of Fence"](#) on page 85

**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.

**Suffix:**

<Measurement> 1 to 4  
Measurement channel

<Gate> 1 to 4  
Time gate

**Parameters:**

<value> \*RST: OFF

**Manual operation:** See ["Fence"](#) on page 85

**CALCulate<Measurement>[:POWER]:TGATe<Undef>[:AVG]:SELection** <value>

Selects the gate to be configured.

**Suffix:**

<Measurement> 1 to 4  
Measurement channel

<Undef> 1 to n  
No suffix required.

**Parameters:**

<value> Range: 1 to 4  
\*RST: 1

**Manual operation:** See ["G1 / G2 / G3 / G4"](#) on page 83

#### 14.4.9 Timeslot

Further information:

- [Chapter 8.6, "Timeslot"](#), on page 85

CALCulate<Measurement>:TSLot:TIMing:EXCLude:START.....	248
CALCulate<Measurement>:TSLot:TIMing:EXCLude:STOP.....	248
CALCulate<Measurement>[:POWER]:TSLot[:AVG]:COUNT.....	248
CALCulate<Measurement>[:POWER]:TSLot[:AVG]:SELECTION.....	249
CALCulate<Measurement>[:POWER]:TSLot[:AVG]:WIDTH.....	249
CALCulate<Measurement>[:POWER]:TSLot[:AVG]:EXCLude:MID:OFFSet[:TIME].....	249
CALCulate<Measurement>[:POWER]:TSLot[:AVG]:EXCLude:MID:TIME.....	249
CALCulate<Measurement>[:POWER]:TSLot[:AVG]:EXCLude:MID:STATe.....	250

---

#### **CALCulate<Measurement>:TSLot:TIMing:EXCLude:START <value>**

Sets the time that is excluded at the beginning of the integration period.

##### **Suffix:**

<Measurement>      1 to 4  
Measurement channel

##### **Parameters:**

<value>              Range:      0.0 to 15.0  
                         \*RST:      0.0  
                         Default unit: s

**Manual operation:**    See ["Exclude from Start"](#) on page 90

---

#### **CALCulate<Measurement>:TSLot:TIMing:EXCLude:STOP <value>**

Sets the time that is excluded at the end of the integration period.

##### **Suffix:**

<Measurement>      1 to 4  
Measurement channel

##### **Parameters:**

<value>              Range:      0.0 to 15.0  
                         \*RST:      0.0  
                         Default unit: s

**Manual operation:**    See ["Exclude from End"](#) on page 90

---

#### **CALCulate<Measurement>[:POWER]:TSLot[:AVG]:COUNT <value>**

Sets the number of simultaneously measured timeslots.

##### **Suffix:**

<Measurement>      1 to 4  
Measurement channel

##### **Parameters:**

<value>              Range:      1 to 128  
                         \*RST:      8

**Manual operation:**    See ["Slots"](#) on page 90



---

**CALCulate<Measurement>[:POWER]:TSLot[:AVG]:SELECTION <value>**

Selects the timeslot to be modified.

**Suffix:**

<Measurement>      1 to 4  
Measurement channel

**Parameters:**

<value>              Range:      1 to 128  
                      \*RST:      1

**Manual operation:**    See ["Timeslot"](#) on page 88

---

**CALCulate<Measurement>[:POWER]:TSLot[:AVG]:WIDTH <value>**

Sets the length of the timeslot.

**Suffix:**

<Measurement>      1 to 4  
Measurement channel

**Parameters:**

<value>              Range:      50.0e-9 to 0.1  
                      \*RST:      1.0e-3  
                      Default unit: s

**Manual operation:**    See ["Nominal Width"](#) on page 90

---

**CALCulate<Measurement>[:POWER]:TSLot[:AVG][:EXCLUDE]:MID:OFFSET[:TIME] <value>**

Determines the distance from the start of the timeslots to the start of the interval to be blanked out.

**Suffix:**

<Measurement>      1 to 4  
Measurement channel

**Parameters:**

<value>              Range:      0.0 to 0.1  
                      \*RST:      0.0  
                      Default unit: s

**Manual operation:**    See ["Length of Fence"](#) on page 91

---

**CALCulate<Measurement>[:POWER]:TSLot[:AVG][:EXCLUDE]:MID:TIME <value>**

Sets the length of the time interval in the timeslots to be excluded from the measurement. The parameter applies to each individual timeslot.

**Note:** Even if the exclusion interval exceeds the timeslot because, for example, its right limit is outside the timeslot, correct results are obtained. In the extreme case, where the interval length has been set to a value greater than the timeslot length, 0 W is output as the measured power. No error message is output.

**Suffix:**

<Measurement>	1 to 4
	Measurement channel

### Parameters:

```
<value>      Range:      0.0 to 0.1
               *RST:      0.0
               Default unit: s
```

**Manual operation:** See "Start of Fence" on page 91

**CALCulate**<Measurement>[:POWer]:TSLot[:AVG][:EXCLude]:MID[:STATe]  
<value>

Enables or disables the blanking out of time intervals in the timeslots.

**Suffix:**

<Measurement>	1 to 4
	Measurement channel

### Parameters:

<value>                    \*RST:       OFF

**Manual operation:** See "Fence" on page 91

### 14.4.10 Statistics

Further information:

- Chapter 8.7, "Statistics", on page 91

#### 14.4.10.1 Statistics Measurement Settings

In a statistics measurement, you can use commands that combine several setting commands. They are described in [Chapter 14.4.10.2, "Combining Statistics Commands"](#), on page 253.

The same principle is used for the calculation functions, see [Chapter 14.5.2, "Using a Calculation Function"](#), on page 272.

For time gate settings, see also [Chapter 14.4.8, "Time Gate"](#), on page 245.

[SENSe<Sensor>:]STATistics:AVERage?	251
[SENSe<Sensor>:]STATistics:OFFSet[:TIME]	251
[SENSe<Sensor>:]STATistics:PEAK?	251
CALCulate<Measurement>:STATistics:POWer:AVG:DATA?	251
CALCulate<Measurement>:STATistics:APERture	252

CALCulate<Measurement>:STATistics:AWGN[:STATE].....	252
CALCulate<Measurement>:STATistics:SAMPLEs[:MINimum].....	252
CALCulate<Measurement>:STATistics:TGate:SELection.....	253

---

#### [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 time interval relative to the (possibly delayed) trigger time.

Determines, together with CALCulate<Measurement>[:POWer]:TGATe<Gate>[:AVG]:TIME or CALCulate<Measurement>:STATistics:APERture, the time interval in which the power for the statistical evaluation is measured.

##### 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 to 10.0  
                              \*RST:        0.0  
                              Default unit: s

---

#### [SENSe<Sensor>]:STATistics:PEAK?

Queries the peak power value calculated during a statistics measurement (CCDF or PDF).

##### 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?

Queries the average power value of the power in the time-defined 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 using SYSTem:LANGuage "NRP2".

**Suffix:**  
 <Measurement> 1 to 4  
 Measurement channel

**Usage:** Query only

#### **CALCulate<Measurement>:STATistics:APERture <value>**

Defines the aperture time, i.e. the size of the acquisition interval.

**Suffix:**  
 <Measurement> 1 to 4  
 Measurement channel

**Parameters:**  
 <value> Range: 10e-6 to 10.0  
 \*RST: 0.01  
 Default unit: s

**Manual operation:** See ["Aperture"](#) on page 106

#### **CALCulate<Measurement>:STATistics:AWGN[:STATe] <value>**

Enables or disables the internal, additional white Gaussian noise (AWGN) source. If enabled, you cannot measure with a second power sensor.

**Suffix:**  
 <Measurement> 1 to 4  
 Measurement channel

**Parameters:**  
 <value> \*RST: OFF

**Manual operation:** See ["AWGN"](#) on page 95

#### **CALCulate<Measurement>:STATistics:SAMPles[:MINimum] <value>**

Determines the minimum number of samples to be included in the statistics. For this purpose, the filter length (which can only be set in powers of 2) is set such that the following inequality applies:

$$N_{fil} \geq (N_{MinSamples} * mpw) / dt$$

In this inequality,  $N_{fil}$  is the filter length,  $mpw$  the time width of a sample and  $dt$  the length of the window in which the measurement is performed.

**Suffix:**  
 <Measurement> 1 to 4  
 Measurement channel

**Parameters:**  
 <value> Range: 1 to 2147483647  
 \*RST: 1000000

**Manual operation:** See ["Minimum Samples"](#) on page 95

---

#### **CALCulate<Measurement>:STATistics:TGATe:SElection <value>**

Selects the gate that you want to be modify.

##### **Suffix:**

<Measurement>      1 to 4  
Measurement channel

##### **Parameters:**

<value>              Gate number  
Range:              0 to 4  
\*RST:                1

**Manual operation:** See ["Evaluate"](#) on page 97

### **14.4.10.2 Combining Statistics Commands**

#### **Parameter list**

For the calculation functions of the statistics measurement, the following parameters are used.

- <statistics\_size>  
Mandatory. Number of test points on the time axis.  
Corresponds to [\[SENSe<Sensor>:\]STATistics:SCALE:X:POINTS](#) on page 402.
- <capture\_time>  
Mandatory. Time interval during which the power for the statistical evaluation is measured.  
Corresponds to [\[SENSe<Sensor>:\]STATistics:TIME](#) on page 403
- <source\_list>  
Mandatory. Defines the 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).

The used parameters are described in "[Parameter list](#)" on page 253.

**Suffix:**

<Measurement>      1 to 4  
Measurement channel

**Query parameters:**

<statistics\_size>    <expr>  
<capture\_time>      Default unit: s  
<source\_list>        <expr>

**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).

The used parameters are described in "[Parameter list](#)" on page 253.

**Suffix:**

<Measurement>      1 to 4  
Measurement channel

**Query parameters:**

<statistics\_size>    <expr>  
<capture\_time>      Default unit: s  
<source\_list>        <expr>

**Usage:**              Query only

#### 14.4.10.3 Scaling

[SENSe<Sensor>]:STATistics:SCALE:X:MPWidth?	255
CALCulate<Measurement>:STATistics:PDF[:SCALE]:Y:PDIVision	255
CALCulate<Measurement>:STATistics:PDF[:SCALE]:Y:TOP	255
CALCulate<Measurement>:STATistics[:CDF][:SCALE]:Y[:LINear]:PDIVision	255
CALCulate<Measurement>:STATistics[:CDF][:SCALE]:Y[:LINear]:TOP	256
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CALCulate<Measurement>:STATistics[:SCALE]:X:RLEVel[:ABSolute]	257
CALCulate<Measurement>:STATistics[:SCALE]:Y:SPACing	258

**[SENSe<Sensor>:]STATistics:SCALE:X:MPWidth?**

Returns the minimum width of a sample on the power axis.

**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>**

Sets the scaling of the y-axis if PDF is selected as statistics function.

**Suffix:**

<Measurement> 1 to 4  
Measurement channel

**Parameters:**

<value> Range: 0.01 to 1000.0  
\*RST: 0.2  
Default unit: -

**Manual operation:** See "[Y / div](#)" on page 96

**CALCulate<Measurement>:STATistics:PDF[:SCALE]:Y:TOP <value>**

Sets the maximum value of the y-axis if PDF is selected as statistics function.

**Suffix:**

<Measurement> 1 to 4  
Measurement channel

**Parameters:**

<value> Range: 0.0 to 10000.0  
\*RST: 1.0  
Default unit: -

**Manual operation:** See "[Y Maximum](#)" on page 96

**CALCulate<Measurement>:STATistics[:CDF][:SCALE]:Y[:LINear]:PDIVision <value>**

Sets the scaling of the y-axis if CDF is selected as statistics function.

**Suffix:**

<Measurement> 1 to 4  
Measurement channel

**Parameters:**

<value> Range: 0.001 to 20.0  
\*RST: 20.0  
Default unit: pct

**Manual operation:** See "[Y / div](#)" on page 96

---

**CALCulate<Measurement>:STATistics[:CDF][:SCALE]:Y[:LINear]:TOP <value>**

Sets the maximum value of the y-axis if CDF is selected as statistics function.

**Suffix:**

<Measurement>      1 to 4  
Measurement channel

**Parameters:**

<value>              Range:      0.0 to 100.0  
                      \*RST:      100.0  
                      Default unit: pct

**Manual operation:** See "[Y Maximum](#)" on page 96

---

**CALCulate<Measurement>:STATistics[:SCALE]:X:MODE <value>**

Sets the measurement result scaling to absolute or relative values.

**Suffix:**

<Measurement>      1 to 4  
Measurement channel

**Parameters:**

<value>              ABSolute | RELative  
                      \*RST:      ABSolute

**Manual operation:** See "[Scaling of Power Axis](#)" on page 95

---

**CALCulate<Measurement>:STATistics[:SCALE]:X:POINTS <value>**

Sets the measurement result resolution. It specifies the number of pixels that are to be assigned to the logarithmic level range `CALCulate<Measurement>:STATistics[:SCALE]:X: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 value which can be read out with `[SENSe<Sensor>:]STATistics:SCALE:X:MPWidth?`.

**Suffix:**

<Measurement>      1 to 4  
Measurement channel

**Parameters:**

<value>              Range:      3 to 8191  
                      \*RST:      600

**Manual operation:** See "[Power / div](#)" on page 96



**CALCulate<Measurement>:STATistics[:SCALe]:X:RANGe <value>**

Defines, together with `CALCulate<Measurement>:STATistics[:SCALe]:X:RLEVel:RELative` or `CALCulate<Measurement>:STATistics[:SCALe]:X:RLEVel[:ABSolute]`, the range on the power axis if CCDF or PDF is selected as statistics function.

Specifies the width of the level range for the analysis result.

**Suffix:**

<Measurement>      1 to 4  
Measurement channel

**Parameters:**

<value>              Range:      0.01 to 100.0  
                      \*RST:      50.0  
                      Default unit: dB

**Manual operation:**    See "[Power / div](#)" on page 96

**CALCulate<Measurement>:STATistics[:SCALe]:X:RLEVel:RELative <value>**

Defines the lower limit of the level range for the analysis result in a power relative display. This level can be 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 4  
Measurement channel

**Parameters:**

<value>              Range:      -400.0 to 400.0  
                      \*RST:      -25.0  
                      Default unit: dB

**Manual operation:**    See "[Minimum Power](#)" on page 96

**CALCulate<Measurement>:STATistics[:SCALe]:X:RLEVel[:ABSolute] <value>**

Defines the lower limit of the level range for the analysis result in a power absolute display. This level can be 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 4  
Measurement channel

**Parameters:**

<value>              Range:      -400.0 to 400.0  
                      \*RST:      -30.0  
                      Default unit: dBm

**Manual operation:**    See "[Minimum Power](#)" on page 96

**CALCulate<Measurement>:STATistics[:SCALe]:Y:SPACing <value>**

Sets linear or logarithmic scaling for the y-axis.

**Suffix:**

<Measurement>      1 to 4  
Measurement channel

**Parameters:**

<value>              LINear | LOGarithmic  
\*RST:                LOGarithmic

**Manual operation:** See "Scaling of Y Axis" on page 96

**14.4.10.4 Using Markers**

CALCulate<Measurement>:STATistics[:CDF]:MARKer:Y:POSition.....	258
CALCulate<Measurement>:STATistics:MARKer:HORizontal:DATA?.....	258
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CALCulate<Measurement>:STATistics:MARKer:X:POSition:RELative.....	259
CALCulate<Measurement>:STATistics:PDF:MARKer:Y:POSition.....	259

**CALCulate<Measurement>:STATistics[:CDF]:MARKer:Y:POSition <value>**

Sets the CDF marker.

**Suffix:**

<Measurement>      1 to 4  
Measurement channel

**Parameters:**

<value>              Range:      0.0 to 100.0  
\*RST:                50.0  
Default unit: pct

**Manual operation:** See "[%] marker" on page 93

**CALCulate<Measurement>:STATistics:MARKer:HORizontal:DATA?**

Queries the value of the statistics function at the marker position if the value is valid.

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 using `SYSTem:LANGuage "NRP2"`.

**Suffix:**

<Measurement>      1 to 4  
Measurement channel

**Usage:**              Query only

**CALCulate<Measurement>:STATistics:MARKer:X:POSition[:ABSolute] <value>**

Sets the absolute position of the power marker.

**Suffix:**

<Measurement>      1 to 4  
Measurement channel

**Parameters:**

<value>              Range:      -200.0 to 200.0  
                         \*RST:      0.0  
                         Default unit: dBm

**Manual operation:**    See "[dBm] / [dB] marker" on page 93

**CALCulate<Measurement>:STATistics:MARKer:X:POSition:RELative <value>**

Sets the relative position of the power marker.

**Suffix:**

<Measurement>      1 to 4  
Measurement channel

**Parameters:**

<value>              Range:      -200.0 to 200.0  
                         \*RST:      0.0  
                         Default unit: dB

**Manual operation:**    See "[dBm] / [dB] marker" on page 93

**CALCulate<Measurement>:STATistics:PDF:MARKer:Y:POSition <value>**

Sets the PDF marker.

**Suffix:**

<Measurement>      1 to 4  
Measurement channel

**Parameters:**

<value>              Range:      0.0 to 10000.0  
                         \*RST:      0.0  
                         Default unit: -

**Manual operation:**    See "[%] marker" on page 93

**14.4.11 NRT**

Further information:

- [Chapter 8.8, "NRT"](#), on page 98

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---

#### **CALCulate<Measurement>:RELative<DirectionalChannel>:CCDF <value>**

Relative limit value for CCDF.

##### **Suffix:**

<Measurement>      1 to 4  
Measurement channel

<DirectionalChannel> 1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

##### **Parameters:**

<value>      Range:      0.0 to 100.0  
                 \*RST:      50.0  
                 Default unit: pct

---

#### **CALCulate<Measurement>:RELative<DirectionalChannel>:POWer[:MAGNitude] <value>**

Reference value for NRT measurements.

If you enter a value without unit, the unit is defined by `UNIT<Measurement>:POWer[:VALue]`. For further information, see [Chapter 14.4.1.3, "Units"](#), on page 188.

##### **Suffix:**

<Measurement>      1 to 4  
Measurement channel

<DirectionalChannel> 1 to 2  
1 to 2

**Parameters:**

<value>                      Range:        -120.0 to +150.0  
                                 \*RST:        +0.0  
                                 Default unit: dBm

**Manual operation:**    See ["Reference Value"](#) on page 64

**CALCulate<Measurement>:RELative<DirectionalChannel>:RATio:RCOefficient**  
                                 <value>

Relative value for reflection coefficient.

**Suffix:**

<Measurement>            1 to 4  
                                 Measurement channel

<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: -

**CALCulate<Measurement>:RELative<DirectionalChannel>:RATio:RFRatio**  
                                 <value>

Relative value for power ratio.

**Suffix:**

<Measurement>            1 to 4  
                                 Measurement channel

<DirectionalChannel> 1 to 2  
                                 1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 =  
                                 reflection (reverse)

**Parameters:**

<value>                      Range:        0.0 to 100.0  
                                 \*RST:        50.0  
                                 Default unit: pct

**CALCulate<Measurement>:RELative<DirectionalChannel>:RATio:RLOSs <value>**

Relative value for return loss.

**Suffix:**

<Measurement>            1 to 4  
                                 Measurement channel

<DirectionalChannel> 1 to 2

1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value>                      Range:        -200.0 to 200.0  
                                  \*RST:        0.0  
                                  Default unit: dB

**CALCulate<Measurement>:RELative<DirectionalChannel>:RATio:SWR** <value>

Relative value for SWR.

**Suffix:**

<Measurement>            1 to 4  
                                  Measurement channel

<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: -

**CALCulate<Measurement>:RELative<DirectionalChannel>:RATio[:MAGNitude]**  
                                  <value>

Reference value for NRT measurements.

**Suffix:**

<Measurement>            1 to 4  
                                  Measurement channel

<DirectionalChannel> 1 to 2  
                                  1 to 2

**Parameters:**

<value>                      Default unit: pct

**Manual operation:**    See ["Reference Value"](#) on page 64

**CALCulate<Measurement>:RELative<DirectionalChannel>[:MAGNitude]** <value>

Effective for all enabled relative measurements ([CALCulate<Measurement>:RELative<DirectionalChannel>\[:STATe\]](#) ON). Sets a value that is used as a divisor (logarithmic subtraction) for all measured values.

**Suffix:**

<Measurement>            1 to 4  
                                  Measurement channel

<DirectionalChannel> 1 to 2  
1 = forward, 2 = reflection (reverse)

**Parameters:**

<value>

**CALCulate<Measurement>:RELative<DirectionalChannel>[:MAGNitude]:AUTO**  
<state>

Sets the current measured value as reference value.

**Suffix:**

<Measurement> 1 to 4  
Measurement channel

<DirectionalChannel> 1 to 2  
1 = forward, 2 = reflection (reverse)

**Parameters:**

<state> OFF | ONCE  
\*RST: OFF

**CALCulate<Measurement>:RELative<DirectionalChannel>[:STATe] <state>**

Enables or disables the relative measurement.

**Suffix:**

<Measurement> 1 to 4  
Measurement channel

<DirectionalChannel> 1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<state> OFF | ON | SET  
**SET**  
Uses the current measurement value as reference value and enables the relative measurement.  
\*RST: OFF

**Manual operation:** See ["Relative Measurements"](#) on page 64

**[SENSe<Sensor>:]FUNCTION:CONCurrent <concurrent>**

Requires the sensor interface for R&S NRT (R&S NRX-B9).

Enables or disables the usage of several measurement functions simultaneously.

**Suffix:**

&lt;Sensor&gt; 101

**Parameters:**

&lt;concurrent&gt;

**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 sensor interface for R&amp;S NRT (R&amp;S NRX-B9).

Disables all measurement functions for the specified channel.

**Suffix:**

&lt;Sensor&gt; 101

&lt;Channel&gt;

1 to 2

1 = forward, 2 = reflection (reverse)

**Usage:**

Event

**[SENSe<Sensor>:]FUNCTION:OFF[:FUNC] <function>**

Requires the sensor interface for R&amp;S NRT (R&amp;S NRX-B9).

Disables the specified measurement function.

The query returns all disabled measurement functions.

**Suffix:**

&lt;Sensor&gt; 101

**Setting parameters:**

&lt;function&gt;

See [CALCulate<Measurement>\[:CHANnel<Channel>\]:FEED<Channel>](#) on page 215.**Usage:**

Setting only

**[SENSe<Sensor>:]FUNCTION:STATE? <function>**

Requires the sensor interface for R&amp;S NRT (R&amp;S NRX-B9).

Queries the measurement function is enabled or disabled.

**Suffix:**

&lt;Sensor&gt; 101



**Query parameters:**

<function> For the description of the string, see  
[CALCulate<Measurement>\[:CHANnel<Channel>\]:](#)  
[FEED<Channel>](#) on page 215.

**Usage:** Query only

---

**[SENSe<Sensor>:]POWer:REFLection:RANGe:AUTO <state>**

Enables or disables the automatic adaptation of the bargraph scaling for the reflection indication. If enabled, the scale limits of the bargraphs are automatically adapted to the current 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:**

<state> ON | OFF  
**ON**  
 The scale limits of the bargraphs are automatically adapted to the current measured value.  
**OFF**  
 The scale limits remain fixed.  
 \*RST: 1

---

**[SENSe<Sensor>:]POWer:REFLection:RANGe:LIMit:DETECT <value>**

Effective if the Out 1 / Trig Out connector is configured as monitoring output for the reflection indication, for example using [\[SENSe<Sensor>:\]POWer:REFLection: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

---

**[SENSe<Sensor>:]POWer:REFLection:RANGe:LIMit[:STATe] <state>**

Enables or disables the Out 1 / Trig Out connector as a monitoring output for the reflection indication.

If enabled, you cannot use the connector for another purpose described in [Chapter 3.2.1, "Trig In / Out 2 and Out 1 / Trig Out Connectors"](#), on page 19.

**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:REFLection:RANGe:LOWer <lower>**

Effective if [\[SENSe<Sensor>:\]POWer:REFLection:RANGe:AUTO](#) is disabled.

Sets the lower scale limit for the reflection indication.

Since the entry has no unit, the meaning of the entered numeric value depends on the selected display mode. For SWR, the value 1.0 means matching, whereas for the reflection coefficient, the same value means total mismatch. When you change the display mode, 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

---

**[SENSe<Sensor>:]POWer:REFLection:RANGe[:UPPer] <upper>**

Effective if [\[SENSe<Sensor>:\]POWer:REFLection:RANGe:AUTO](#) is disabled.

Sets the lower scale limit for the reflection indication. For further details, see [\[SENSe<Sensor>:\]POWer:REFLection:RANGe:LOWer](#) on page 266.

**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

**[SENSe<Sensor>:]POWer[:POWer]:RANGe:AUTO <state>**

Enables or disables the automatic adaptation of the bargraph scaling for the power indication. If enabled, the scale limits of the bargraphs are automatically adapted to the current measured value.

**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;

ON | OFF

**ON**

The scale limits of the bargraphs are automatically adapted to the current measured value.

**OFF**

The scale limits remain fixed.

\*RST: 1

**[SENSe<Sensor>:]POWer[:POWer]:RANGe:LIMit:DETEct <value>**

Effective if the Out 1 / Trig Out connector is configured as 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:**

&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;value&gt;

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

**[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 another purpose described in [Chapter 3.2.1, "Trig In / Out 2 and Out 1 / Trig Out Connectors"](#), on page 19.

**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>:]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 selected output unit. If you change the unit, the entered value remains the same.

**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;lower&gt;

Range: -1999.0 to 1999.0

\*RST: 0.0

**[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 268.

**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;upper&gt;

Range: -1999.0 to 1999.0

\*RST: 1.0

**[SENSe<Sensor>:]RRESolution <rres>**

Requires the sensor interface for R&S NRT (R&S NRX-B9).

Sets the measurement resolution, thus effecting the accuracy of the measurement, the measurement duration, and the number of digits indicated on the display.

**Suffix:**

&lt;Sensor&gt;

101

**Parameters:**

&lt;rres&gt;

LOW | HIGH

**HIGH**

Equals `CALCulate<Measurement>:RESolution` 0001.

**LOW**

All other settings.

\*RST:        LOW

## 14.4.12 Querying Measurement Results

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<code>CALCulate&lt;Measurement&gt;:PTPeak:DATA?</code> .....	270
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---

### **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 4  
                             Measurement channel

**Usage:**                Query only

---

### **CALCulate<Measurement>:DATA?**

Queries the measurement result.

**Suffix:**

<Measurement>        1 to 4  
                             Measurement channel

**Usage:**                Query only

---

### **CALCulate<Measurement>:MAXimum:DATA?**

### **CALCulate<Measurement>:MINimum:DATA?**

Queries the maximum/minimum of all measured values.

The limit value is set to the current measured value if:

- Device is switched on.
- Reset is performed (\*RST).
- `CALCulate<Measurement>:EXTRemes:RESet` is executed.

**Suffix:**

<Measurement>        1 to 4  
                             Measurement channel

**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 4  
Measurement channel

**Usage:** Query only

---

#### **CALCulate<Measurement>:PTPeak:DATA?**

Queries the peak-to-peak distance (maximum to minimum) of the measured values.

**Suffix:**

<Measurement> 1 to 4  
Measurement channel

**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 4  
Measurement channel

**Usage:** Query only

## 14.5 Calculation Functions

Further information:

- ["Channel Calculation Function"](#) on page 61

### 14.5.1 Selecting a Calculation Function

---

#### **CALCulate<Measurement>:MATH[:EXPRession] <expression>**

Selects a measurement function that processes the results of one or two power sensors. The result of this calculation is made available as a measured value.

Table 14-1: &lt;expression&gt; parameter

<expression>	Description
"(SENS1) "	Measured value of sensor A
"(SENS2) "	Measured value of sensor B
"(SENS3) "	Measured value of sensor C
"(SENS4) "	Measured value of sensor D
"(SENSn-SENSm) "	Difference between the measured values of sensor n and sensor m
"(SENSn+SENSm) "	Sum of the values measured by sensor n and sensor m
"(SENSn / SENSm) "	Quotient of the values measured by sensor n and m
"SWR (SENSn, SENSm) "	<p>Standing wave ratio. The output unit is set to percent (UNIT:RAT PCT).</p> $\frac{1 + \sqrt{SENSm / SENSn}}{1 - \sqrt{SENSm / SENSn}}$ <p>Sensor n measures the forward power of a wave, sensor m measures the reflected power.</p>
"REFL (SENSn, SENSm) "	<p>Reflection coefficient/transmission factor of a DUT. The output unit is set to percent (UNIT:RAT PCT).</p> $\sqrt{SENSm / SENSn}$ <p>Sensor n measures the forward power of a wave, sensor m measures the reflected/transmitted power.</p>
"RLOS (SENSn, SENSm) "	<p>Return loss/transmission loss of a DUT. The output unit is set to dB (UNIT:RAT DB).</p> <p>This function principally supplies the same result as "SENSn/SENSm". The difference is that the output unit is automatically set to dB.</p> $-20 \log_{10} \sqrt{SENSm / SENSn}$ <p>Sensor n measures the forward power of a wave, sensor m measures the reflected/transmitted power.</p>
With n and m = 1, 2, 3 or 4	

**Suffix:**

<Measurement>      1 to 4  
Measurement channel

**Parameters:**

<expression>      See Table 14-1. The unit is set by UNIT<Measurement>: POWER[:VALUE] or UNIT<Measurement>: POWER:RATio.  
\*RST:                  Depends on the selected channel.  
Default unit: Depends on <expression> and the set unit.

**Manual operation:**      See "Channel Calculation Function" on page 61

**CALCulate<Measurement>:MATH[:EXPReSSion]:CATalog? [<expressions>]**

Lists all supported calculation functions. All functions are sent in the form of strings which are allowed as parameters for the `CALCulate<Measurement>:MATH:EXPReSSion` command.

**Suffix:**

<Measurement>      1 to 4  
Measurement channel

**Query parameters:**

<expressions>

**Usage:**                      Query only

**Manual operation:**    See ["Channel Calculation Function"](#) on page 61

## 14.5.2 Using a Calculation Function

The following commands combine several setting commands and thus simplify programming of the R&S NRX. They use parameter lists that differ for each measurement type.

- **CONFigure**  
Configures according to the parameter list, but does not start a measurement. The query without parameters, for example `CONF?`, returns the parameters transferred the last time. Since the instrument settings can be changed after sensing a `CONFigure` command, the query does not return the current instrument setup.
- **READ**  
Compares the parameter list to the current settings, starts a measurement and returns the result. If the parameter list does not match, a SCPI error is returned, and the command is aborted.
- **MEASure**  
Configures according to the parameter list, starts a measurement and returns the result. Thus, this command combines the `CONFigure` and `READ` commands. The query without parameters, for example `MEAS?`, returns the parameters transferred the last time.
- **FETCh**  
Returns the last valid measurement result.

### 14.5.2.1 Continuous Average Calculation Functions

**Parameter list**

For the calculation functions of the continuous average measurement, the following parameters are used.

- <expected\_value>  
Optional. Value that is expected for the measurement.
- <resolution>



Optional. Limit up to which the measurement result should be free of noise.

Corresponds to `[SENSe<Sensor>:]AVERage:COUNT:AUTO:RESolution`.

- `<source_list>`  
Optional. 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>[: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>...]`

Used for `CALCulate<Measurement>:MATH[:EXPRession] " (SENS1) " to`

`" (SENS4) "`.

Measured average power measured by one power sensor. The used parameters are described in "[Parameter list](#)" on page 272.

#### **Suffix:**

`<Measurement>`      1 to 4  
Measurement channel

#### **Query parameters:**

`<expected_value_or_source_list>`

`<resolution_or_source_list>`

`<source_list>`      `<expr>`

**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>...]`

Used for `CALCulate<Measurement>:MATH[:EXPRession]`.

Relative power measured by one power sensor. The used parameters are described in "[Parameter list](#)" on page 272.

#### **Suffix:**

`<Measurement>`      1 to 4  
Measurement channel

**Query parameters:**

&lt;expected\_value\_or\_source\_list&gt;

&lt;resolution\_or\_source\_list&gt;

&lt;source\_list&gt;                      &lt;expr&gt;

**Usage:**                      Query only**CONFigure<Measurement>[:SCALar][:POWer][:AVG]:DIFFerence?**

[&lt;expected\_value\_or\_source\_list&gt;, &lt;resolution\_or\_source\_list&gt;, &lt;source\_list&gt;...]

**FETCh<Measurement>[:SCALar][:POWer][:AVG]:DIFFerence?**

[&lt;expected\_value\_or\_source\_list&gt;, &lt;resolution\_or\_source\_list&gt;, &lt;source\_list&gt;...]

**READ<Measurement>[:SCALar][:POWer][:AVG]:DIFFerence?**

[&lt;expected\_value\_or\_source\_list&gt;, &lt;resolution\_or\_source\_list&gt;, &lt;source\_list&gt;...]

**MEASure<Measurement>[:SCALar][:POWer][:AVG]:DIFFerence?**

[&lt;expected\_value\_or\_source\_list&gt;, &lt;resolution\_or\_source\_list&gt;, &lt;source\_list&gt;...]

Used for **CALCulate<Measurement>:MATH[:EXPRession]** " (SENSn-SENSm) ".

Difference measured by two power sensors. The used parameters are described in "Parameter list" on page 272.

**Suffix:**

<Measurement>                      1 to 4  
    Measurement channel

**Query parameters:**

&lt;expected\_value\_or\_source\_list&gt;

&lt;resolution\_or\_source\_list&gt;

&lt;source\_list&gt;                      &lt;expr&gt;

**Usage:**                      Query only**CONFigure<Measurement>[:SCALar][:POWer][:AVG]:DIFFerence:RELative?**

[&lt;expected\_value\_or\_source\_list&gt;, &lt;resolution\_or\_source\_list&gt;, &lt;source\_list&gt;...]

**FETCh<Measurement>[:SCALar][:POWer][:AVG]:DIFFerence:RELative?**

[&lt;expected\_value\_or\_source\_list&gt;, &lt;resolution\_or\_source\_list&gt;, &lt;source\_list&gt;...]

**READ<Measurement>[:SCALar][:POWer][:AVG]:DIFFerence:RELative?**

[&lt;expected\_value\_or\_source\_list&gt;, &lt;resolution\_or\_source\_list&gt;, &lt;source\_list&gt;...]

**MEASure<Measurement>[:SCALar][:POWer][:AVG]:DIFFerence:RELative?**

[&lt;expected\_value\_or\_source\_list&gt;, &lt;resolution\_or\_source\_list&gt;, &lt;source\_list&gt;...]

Used for **CALCulate<Measurement>:MATH[:EXPRession]**.

Relative difference measured by two power sensors. The used parameters are described in "Parameter list" on page 272.

**Suffix:**

<Measurement>                      1 to 4  
    Measurement channel

**Query parameters:**

&lt;expected\_value\_or\_source\_list&gt;

&lt;resolution\_or\_source\_list&gt;

&lt;source\_list&gt;                      &lt;expr&gt;

**Usage:**                      Query only**CONFigure<Measurement>[:SCALar][:POWer][:AVG]:SUM?**

[&lt;expected\_value\_or\_source\_list&gt;, &lt;resolution\_or\_source\_list&gt;, &lt;source\_list&gt;...]

**FETCh<Measurement>[:SCALar][:POWer][:AVG]:SUM?**

[&lt;expected\_value\_or\_source\_list&gt;, &lt;resolution\_or\_source\_list&gt;, &lt;source\_list&gt;...]

**READ<Measurement>[:SCALar][:POWer][:AVG]:SUM?**

[&lt;expected\_value\_or\_source\_list&gt;, &lt;resolution\_or\_source\_list&gt;, &lt;source\_list&gt;...]

**MEASure<Measurement>[:SCALar][:POWer][:AVG]:SUM?**

[&lt;expected\_value\_or\_source\_list&gt;, &lt;resolution\_or\_source\_list&gt;, &lt;source\_list&gt;...]

Used for **CALCulate<Measurement>:MATH[:EXPRession]** " (SENSn+SENSm) ".

Sum of the values measured by two power sensors. The used parameters are described in "[Parameter list](#)" on page 272.

**Suffix:**

<Measurement>                      1 to 4  
    Measurement channel

**Query parameters:**

&lt;expected\_value\_or\_source\_list&gt;

&lt;resolution\_or\_source\_list&gt;

&lt;source\_list&gt;                      &lt;expr&gt;

**Usage:**                      Query only**CONFigure<Measurement>[:SCALar][:POWer][:AVG]:SUM:RELative?**

[&lt;expected\_value\_or\_source\_list&gt;, &lt;resolution\_or\_source\_list&gt;, &lt;source\_list&gt;...]

**FETCh<Measurement>[:SCALar][:POWer][:AVG]:SUM:RELative?**

[&lt;expected\_value\_or\_source\_list&gt;, &lt;resolution\_or\_source\_list&gt;, &lt;source\_list&gt;...]

**READ<Measurement>[:SCALar][:POWer][:AVG]:SUM:RELative?**

[&lt;expected\_value\_or\_source\_list&gt;, &lt;resolution\_or\_source\_list&gt;, &lt;source\_list&gt;...]

**MEASure<Measurement>[:SCALar][:POWer][:AVG]:SUM:RELative?**

[&lt;expected\_value\_or\_source\_list&gt;, &lt;resolution\_or\_source\_list&gt;, &lt;source\_list&gt;...]

Used for **CALCulate<Measurement>:MATH[:EXPRession]**.

Relative sum measured by two power sensors. The used parameters are described in "[Parameter list](#)" on page 272.

**Suffix:**

<Measurement>                      1 to 4  
    Measurement channel

**Query parameters:**

&lt;expected\_value\_or\_source\_list&gt;

&lt;resolution\_or\_source\_list&gt;

&lt;source\_list&gt;                      &lt;expr&gt;

**Usage:**                      Query only**CONFigure<Measurement>[:SCALar][:POWer][:AVG]:RATio?**

[&lt;expected\_value\_or\_source\_list&gt;, &lt;resolution\_or\_source\_list&gt;, &lt;source\_list&gt;...]

**FETCh<Measurement>[:SCALar][:POWer][:AVG]:RATio?**

[&lt;expected\_value\_or\_source\_list&gt;, &lt;resolution\_or\_source\_list&gt;, &lt;source\_list&gt;...]

**READ<Measurement>[:SCALar][:POWer][:AVG]:RATio?**

[&lt;expected\_value\_or\_source\_list&gt;, &lt;resolution\_or\_source\_list&gt;, &lt;source\_list&gt;...]

**MEASure<Measurement>[:SCALar][:POWer][:AVG]:RATio?**

[&lt;expected\_value\_or\_source\_list&gt;, &lt;resolution\_or\_source\_list&gt;, &lt;source\_list&gt;...]

Used for `CALCulate<Measurement>:MATH[:EXPRession]"(SENSn / SENSm)"`.Ratio measured by two power sensors. The used parameters are described in "[Parameter list](#)" on page 272.**Suffix:**<Measurement>                      1 to 4  
Measurement channel**Query parameters:**

&lt;expected\_value\_or\_source\_list&gt;

&lt;resolution\_or\_source\_list&gt;

&lt;source\_list&gt;                      &lt;expr&gt;

**Usage:**                      Query only**CONFigure<Measurement>[:SCALar][:POWer][:AVG]:RATio:RELative?**

[&lt;expected\_value\_or\_source\_list&gt;, &lt;resolution\_or\_source\_list&gt;, &lt;source\_list&gt;...]

**FETCh<Measurement>[:SCALar][:POWer][:AVG]:RATio:RELative?**

[&lt;expected\_value\_or\_source\_list&gt;, &lt;resolution\_or\_source\_list&gt;, &lt;source\_list&gt;...]

**READ<Measurement>[:SCALar][:POWer][:AVG]:RATio:RELative?**

[&lt;expected\_value\_or\_source\_list&gt;, &lt;resolution\_or\_source\_list&gt;, &lt;source\_list&gt;...]

**MEASure<Measurement>[:SCALar][:POWer][:AVG]:RATio:RELative?**

[&lt;expected\_value\_or\_source\_list&gt;, &lt;resolution\_or\_source\_list&gt;, &lt;source\_list&gt;...]

Used for `CALCulate<Measurement>:MATH[:EXPRession]`.Relative ratio measured by two power sensor. The used parameters are described in "[Parameter list](#)" on page 272.**Suffix:**<Measurement>                      1 to 4  
Measurement channel

**Query parameters:**

&lt;expected\_value\_or\_source\_list&gt;

&lt;resolution\_or\_source\_list&gt;

&lt;source\_list&gt;                      &lt;expr&gt;

**Usage:**                      Query only**CONFigure<Measurement>[:SCALar][:POWer][:AVG]:SWR?**

[&lt;expected\_value\_or\_source\_list&gt;, &lt;resolution\_or\_source\_list&gt;, &lt;source\_list&gt;...]

**FETCh<Measurement>[:SCALar][:POWer][:AVG]:SWR?**

[&lt;expected\_value\_or\_source\_list&gt;, &lt;resolution\_or\_source\_list&gt;, &lt;source\_list&gt;...]

**READ<Measurement>[:SCALar][:POWer][:AVG]:SWR?**

[&lt;expected\_value\_or\_source\_list&gt;, &lt;resolution\_or\_source\_list&gt;, &lt;source\_list&gt;...]

**MEASure<Measurement>[:SCALar][:POWer][:AVG]:SWR?**

[&lt;expected\_value\_or\_source\_list&gt;, &lt;resolution\_or\_source\_list&gt;, &lt;source\_list&gt;...]

Used for **CALCulate<Measurement>:MATH[:EXPRession]**

"SWR (SENSn, SENSm) ".

Standing wave ratio measurement of two power sensors. The used parameters are described in "[Parameter list](#)" on page 272.

**Suffix:**

<Measurement>                      1 to 4  
    Measurement channel

**Query parameters:**

&lt;expected\_value\_or\_source\_list&gt;

&lt;resolution\_or\_source\_list&gt;

&lt;source\_list&gt;                      &lt;expr&gt;

**Usage:**                      Query only**CONFigure<Measurement>[:SCALar][:POWer][:AVG]:REFlection?**

[&lt;expected\_value\_or\_source\_list&gt;, &lt;resolution\_or\_source\_list&gt;, &lt;source\_list&gt;...]

**FETCh<Measurement>[:SCALar][:POWer][:AVG]:REFlection?**

[&lt;expected\_value\_or\_source\_list&gt;, &lt;resolution\_or\_source\_list&gt;, &lt;source\_list&gt;...]

**READ<Measurement>[:SCALar][:POWer][:AVG]:REFlection?**

[&lt;expected\_value\_or\_source\_list&gt;, &lt;resolution\_or\_source\_list&gt;, &lt;source\_list&gt;...]

**MEASure<Measurement>[:SCALar][:POWer][:AVG]:REFlection?**

[&lt;expected\_value\_or\_source\_list&gt;, &lt;resolution\_or\_source\_list&gt;, &lt;source\_list&gt;...]

Used for **CALCulate<Measurement>:MATH[:EXPRession]**

"REFL (SENSn, SENSm) ".

Reflection coefficient/transmission factor of a DUT, measured by two power sensors. The used parameters are described in "[Parameter list](#)" on page 272.

**Suffix:**

<Measurement>                      1 to 4  
    Measurement channel

**Query parameters:**

&lt;expected\_value\_or\_source\_list&gt;

&lt;resolution\_or\_source\_list&gt;

&lt;source\_list&gt;                      &lt;expr&gt;

**Usage:**                      Query only**CONFigure<Measurement>[:SCALar][:POWer][:AVG]:RLOSs?**

[&lt;expected\_value\_or\_source\_list&gt;, &lt;resolution\_or\_source\_list&gt;, &lt;source\_list&gt;...]

**FETCh<Measurement>[:SCALar][:POWer][:AVG]:RLOSs?**

[&lt;expected\_value\_or\_source\_list&gt;, &lt;resolution\_or\_source\_list&gt;, &lt;source\_list&gt;...]

**READ<Measurement>[:SCALar][:POWer][:AVG]:RLOSs?**

[&lt;expected\_value\_or\_source\_list&gt;, &lt;resolution\_or\_source\_list&gt;, &lt;source\_list&gt;...]

**MEASure<Measurement>[:SCALar][:POWer][:AVG]:RLOSs?**

[&lt;expected\_value\_or\_source\_list&gt;, &lt;resolution\_or\_source\_list&gt;, &lt;source\_list&gt;...]

Used for **CALCulate<Measurement>:MATH[:EXPRession]**

"RLOS (SENSn, SENSm) ".

Return loss/transmission loss of a DUT, measured by two power sensors. The used parameters are described in "[Parameter list](#)" on page 272.

**Suffix:**

<Measurement>                      1 to 4  
    Measurement channel

**Query parameters:**

&lt;expected\_value\_or\_source\_list&gt;

&lt;resolution\_or\_source\_list&gt;

&lt;source\_list&gt;                      &lt;expr&gt;

**Usage:**                      Query only**14.5.2.2 Continuous Average Calculation Functions with Buffering****Parameter list**

The following parameters are used.

- <buffered\_size>  
Mandatory. Number of requested measured values.  
Corresponds to **[SENSe<Sensor>:] [POWer:] [AVG:] BUFFer:SIZE**.
- <expected\_value>  
Optional. Value that is expected for the measurement.
- <resolution>  
Optional. Limit up to which the measurement result should be free of noise.  
Corresponds to **[SENSe<Sensor>:] AVERage:COUNT:AUTO:RESolution**.
- <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>:ARRay[:POWer][:AVG]? <buffered_size>[,
    <expected_value_or_source_list>, <resolution_or_source_list>, <source_list>...]
FEtCh<Measurement>:ARRay[:POWer][:AVG]? <buffered_size>[,
    <expected_value_or_source_list>, <resolution_or_source_list>, <source_list>...]
READ<Measurement>:ARRay[:POWer][:AVG]? <buffered_size>[,
    <expected_value_or_source_list>, <resolution_or_source_list>, <source_list>...]
MEASure<Measurement>:ARRay[:POWer][:AVG]? <buffered_size>[,
    <expected_value_or_source_list>, <resolution_or_source_list>, <source_list>...]
```

Used for `CALCulate<Measurement>:MATH[:EXPRession] "(SENS1) " to  
" (SENS4) "`.

Measured average power measured by one power sensor with buffering. The used parameters are described in "[Parameter list](#)" on page 278.

**Suffix:**

<Measurement>      1 to 4  
                         Measurement channel

**Query parameters:**

<buffered\_size>      <expr>  
  
<expected\_value\_or\_source\_list>  
  
<resolution\_or\_source\_list>  
  
<source\_list>      <expr>

**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>...]
```

Used for `CALCulate<Measurement>:MATH[:EXPRession] "(SENSn-SENSm) "`.

Difference measured by two power sensors with buffering. The used parameters are described in "[Parameter list](#)" on page 278.

**Suffix:**

<Measurement>      1 to 4  
                         Measurement channel

**Query parameters:**

<buffered\_size>      <expr>

<expected\_value\_or\_source\_list>

<resolution\_or\_source\_list>

<source\_list>            <expr>

**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>...]

Used for `CALCulate<Measurement>:MATH[:EXPRession]`.

Relative difference measured by two power sensors with buffering. The used parameters are described in "Parameter list" on page 278.

**Suffix:**

<Measurement>            1 to 4  
                              Measurement channel

**Query parameters:**

<buffered\_size>            <expr>

<expected\_value\_or\_source\_list>

<resolution\_or\_source\_list>

<source\_list>              <expr>

**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>...]

Used for `CALCulate<Measurement>:MATH[:EXPRession]"(SENSn / SENSm)"`.

Ratio measured by two power sensors with buffering. The used parameters are described in "Parameter list" on page 278.



**Suffix:**

<Measurement>      1 to 4  
Measurement channel

**Query parameters:**

<buffered\_size>      <expr>  
  
<expected\_value\_or\_source\_list>  
  
<resolution\_or\_source\_list>  
  
<source\_list>      <expr>

**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>...]

Used for `CALCulate<Measurement>:MATH[:EXPRession]`.

Relative ratio measured by two power sensor with buffering. The used parameters are described in "Parameter list" on page 278.

**Suffix:**

<Measurement>      1 to 4  
Measurement channel

**Query parameters:**

<buffered\_size>      <expr>  
  
<expected\_value\_or\_source\_list>  
  
<resolution\_or\_source\_list>  
  
<source\_list>      <expr>

**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>...]

Used for [CALCulate<Measurement>:MATH\[:EXPRession\]](#)

"REFL (SENSn, SENSm) ".

Reflection coefficient/transmission factor of a DUT, measured by two power sensors with buffering. The used parameters are described in ["Parameter list"](#) on page 278.

**Suffix:**

<Measurement>      1 to 4  
                          Measurement channel

**Query parameters:**

<buffered\_size>      <expr>  
 <expected\_value\_or\_source\_list>  
 <resolution\_or\_source\_list>  
 <source\_list>        <expr>

**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>...]

Used for [CALCulate<Measurement>:MATH\[:EXPRession\]](#).

Relative power measured by one power sensor with buffering. The used parameters are described in ["Parameter list"](#) on page 278.

**Suffix:**

<Measurement>      1 to 4  
                          Measurement channel

**Query parameters:**

<buffered\_size>      <expr>  
 <expected\_value\_or\_source\_list>  
 <resolution\_or\_source\_list>  
 <source\_list>        <expr>

**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>...]
REAde<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>...]

```

Used for `CALCulate<Measurement>:MATH[:EXPRession]`

"RLOS (SENSn, SENSm) ".

Return loss/transmission loss of a DUT, measured by two power sensors with buffering. The used parameters are described in "Parameter list" on page 278.

**Suffix:**

<Measurement>      1 to 4  
Measurement channel

**Query parameters:**

<buffered\_size>      <expr>  
  
<expected\_value\_or\_source\_list>  
  
<resolution\_or\_source\_list>  
  
<source\_list>      <expr>

**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>...]
REAde<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>...]

```

Used for `CALCulate<Measurement>:MATH[:EXPRession]` "(SENSn+SENSm) ".

Sum of the values measured by two power sensors with buffering. The used parameters are described in "Parameter list" on page 278.

**Suffix:**

<Measurement>      1 to 4  
Measurement channel

**Query parameters:**

<buffered\_size>      <expr>  
  
<expected\_value\_or\_source\_list>  
  
<resolution\_or\_source\_list>  
  
<source\_list>      <expr>

**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>...]

Used for `CALCulate<Measurement>:MATH[:EXPRession]`.

Relative sum measured by two power sensors with buffering. The used parameters are described in "[Parameter list](#)" on page 278.

**Suffix:**

<Measurement>      1 to 4  
Measurement channel

**Query parameters:**

<buffered\_size>      <expr>

<expected\_value\_or\_source\_list>

<resolution\_or\_source\_list>

<source\_list>      <expr>

**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>...]

Used for `CALCulate<Measurement>:MATH[:EXPRession]`

"SWR (SENSn, SENSm) ".

Standing wave ratio measurement of two power sensors with buffering. The used parameters are described in "[Parameter list](#)" on page 278.

**Suffix:**

<Measurement>      1 to 4  
Measurement channel

**Query parameters:**

<buffered\_size>      <expr>

<expected value or source list>

<resolution or source list>

```
<source list>      <expr>
```

**Usage:** Query only

### 14.5.2.3 Burst Average Calculation Functions

### Parameter list

For the calculation functions of the burst average measurement, the following parameters are used.

- **<dtolerance>**  
Mandatory. Length of a time interval during that the power level can drop below the trigger level without being interpreted as end of the power pulse.  
Corresponds to `[SENSe<Sensor>:] [POWer:] BURSt:DTOLerance`.
- **<start\_exclude>**  
Mandatory. Amount of time at the beginning of a timeslot or integration period that is not evaluated.  
Corresponds to `[SENSe<Sensor>:] TIMing:EXCLude:START`.
- **<end\_exclude>**  
Mandatory. Amount of time at the end of a timeslot or integration period that is not evaluated.  
Corresponds to `[SENSe<Sensor>:] TIMing:EXCLude:STOP`.
- **<expected\_value>**  
Optional. Value that is expected for the measurement.
- **<resolution>**  
Optional. Limit up to which the measurement result should be free of noise.  
Corresponds to `[SENSe<Sensor>:] AVERage:COUNT:AUtO:RESolution`.
- **<source\_list>**  
Optional. 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>[:SCALar][:POWER]:BURSt?** <dtolerance>,  
<start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>,  
<resolution or source list>, <source list>...]

**FETCh<Measurement>[:SCALar][:POWer]:BURSt?** <tolerance>, <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>...]

Used for `CALCulate<Measurement>:MATH[:EXPRession]` "(SENS1)" to "(SENS4)".

Power measured by one power sensor. The used parameters are described in "[Parameter list](#)" on page 285.

**Suffix:**

<Measurement>      1 to 4  
Measurement channel

**Query parameters:**

<dtolerance>      Default unit: s  
<start\_exclude>      Default unit: s  
<end\_exclude>      Default unit: s  
<expected\_value\_or\_source\_list>  
<resolution\_or\_source\_list>  
<source\_list>      <expr>

**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>...]

Used for `CALCulate<Measurement>:MATH[:EXPRession]`.

Relative power measured by one power sensors. The used parameters are described in "[Parameter list](#)" on page 285.

**Suffix:**

<Measurement>      1 to 4  
Measurement channel

**Query parameters:**

<dtolerance>      Default unit: s

<start\_exclude>      Default unit: s  
 <end\_exclude>        Default unit: s  
 <expected\_value\_or\_source\_list>  
 <resolution\_or\_source\_list>  
 <source\_list>        <expr>  
**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>...]  
 Used for **CALCulate<Measurement>:MATH[:EXPRession]** " (SENSn-SENSm) ".  
 Difference measured by two power sensors. The used parameters are described in  
 "Parameter list" on page 285.

**Suffix:**  
 <Measurement>      1 to 4  
                          Measurement channel

**Query parameters:**  
 <dtolerance>        Default unit: s  
 <start\_exclude>      Default unit: s  
 <end\_exclude>        Default unit: s  
 <expected\_value\_or\_source\_list>  
 <resolution\_or\_source\_list>  
 <source\_list>        <expr>  
**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>...]

Used for `CALCulate<Measurement>:MATH[:EXPRession]`.

Relative difference measured by two power sensors. The used parameters are described in "[Parameter list](#)" on page 285.

**Suffix:**

<Measurement>      1 to 4  
Measurement channel

**Query parameters:**

<dtolerance>      Default unit: s  
<start\_exclude>      Default unit: s  
<end\_exclude>      Default unit: s  
<expected\_value\_or\_source\_list>  
<resolution\_or\_source\_list>  
<source\_list>      <expr>

**Usage:**      Query only

**CONFigure<Measurement>[:SCALar][:POWer]:BURSt:SUM? <dtolerance>,  
<start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>,  
<resolution\_or\_source\_list>, <source\_list>...]**

**FETCh<Measurement>[:SCALar][:POWer]:BURSt:SUM? <dtolerance>,  
<start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>,  
<resolution\_or\_source\_list>, <source\_list>...]**

**READ<Measurement>[:SCALar][:POWer]:BURSt:SUM? <dtolerance>,  
<start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>,  
<resolution\_or\_source\_list>, <source\_list>...]**

**MEASure<Measurement>[:SCALar][:POWer]:BURSt:SUM? <dtolerance>,  
<start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>,  
<resolution\_or\_source\_list>, <source\_list>...]**

Used for `CALCulate<Measurement>:MATH[:EXPRession]"(SENSn+SENSm)"`.

Sum measured by two power sensors. The used parameters are described in "[Parameter list](#)" on page 285.

**Suffix:**

<Measurement>      1 to 4  
Measurement channel

**Query parameters:**

<dtolerance>      Default unit: s  
<start\_exclude>      Default unit: s



<end\_exclude>      Default unit: s

<expected\_value\_or\_source\_list>

<resolution\_or\_source\_list>

<source\_list>      <expr>

**Usage:**      Query only

**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>...]

Used for **CALCulate<Measurement>:MATH[:EXPRession]**.

Sum measured by two power sensors. The used parameters are described in "[Parameter list](#)" on page 285.

**Suffix:**

<Measurement>      1 to 4  
Measurement channel

**Query parameters:**

<dtolerance>      Default unit: s

<start\_exclude>      Default unit: s

<end\_exclude>      Default unit: s

<expected\_value\_or\_source\_list>

<resolution\_or\_source\_list>

<source\_list>      <expr>

**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>...]

Used for `CALCulate<Measurement>:MATH[:EXPRession]"(SENSn /SENSm)"`.

Ratio measured by two power sensors. The used parameters are described in "[Parameter list](#)" on page 285.

**Suffix:**

<Measurement>      1 to 4  
 Measurement channel

**Query parameters:**

<dtolerance>      Default unit: s  
 <start\_exclude>      Default unit: s  
 <end\_exclude>      Default unit: s  
 <expected\_value\_or\_source\_list>  
 <resolution\_or\_source\_list>  
 <source\_list>      <expr>

**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>...]

Used for `CALCulate<Measurement>:MATH[:EXPRession]`.

Relative ratio measured by two power sensors. The used parameters are described in "[Parameter list](#)" on page 285.

**Suffix:**

<Measurement>      1 to 4  
 Measurement channel

**Query parameters:**

<dtolerance>      Default unit: s  
 <start\_exclude>      Default unit: s

<end\_exclude>      Default unit: s

<expected\_value\_or\_source\_list>

<resolution\_or\_source\_list>

<source\_list>      <expr>

**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>...]

Used for **CALCulate<Measurement>:MATH[:EXPRession]**

"SWR (SENSn, SENSm) ".

Standing wave ratio, measured by two power sensors. The used parameters are described in "[Parameter list](#)" on page 285.

**Suffix:**

<Measurement>      1 to 4  
                          Measurement channel

**Query parameters:**

<dtolerance>      Default unit: s

<start\_exclude>      Default unit: s

<end\_exclude>      Default unit: s

<expected\_value\_or\_source\_list>

<resolution\_or\_source\_list>

<source\_list>      <expr>

**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>...]

Used for **CALCulate<Measurement>:MATH[:EXPRession]**  
 "REFL (SENSn, SENSsm) ".

Reflection coefficient/transmission factor of a DUT, measured by two power sensors.  
 The used parameters are described in "[Parameter list](#)" on page 285.

**Suffix:**

<Measurement>            1 to 4  
                                  Measurement channel

**Query parameters:**

<dtolerance>            Default unit: s  
 <start\_exclude>        Default unit: s  
 <end\_exclude>         Default unit: s  
 <expected\_value\_or\_source\_list>  
 <resolution\_or\_source\_list>  
 <source\_list>           <expr>

**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>...]

Used for **CALCulate<Measurement>:MATH[:EXPRession]**  
 "RLOS (SENSn, SENSsm) ".

Return loss/transmission loss of a DUT, measured by two power sensors. The used  
 parameters are described in "[Parameter list](#)" on page 285.

**Suffix:**

<Measurement>            1 to 4  
                                  Measurement channel

**Query parameters:**

<dtolerance>	Default unit: s
<start_exclude>	Default unit: s
<end_exclude>	Default unit: s
<expected_value_or_source_list>	
<resolution_or_source_list>	
<source_list>	<expr>

**Usage:** Query only

#### 14.5.2.4 Timeslot Calculation Functions

**Parameter list**

For the calculation functions of the timeslot measurement, the following parameters are used.

- <tslot\_width>  
Mandatory. Width of a timeslot.  
Corresponds to `[SENSe<Sensor>:] [POWer:] TSLot[:AVG]:WIDTh` on page 398.
- <no\_slots>  
Mandatory. Number of timeslots to be measured.  
Corresponds to `[SENSe<Sensor>:] [POWer:] TSLot[:AVG]:COUNT` on page 397.
- <start\_exclude>  
Mandatory. Amount of time at the beginning of a timeslot or integration period that is not evaluated.  
Corresponds to `[SENSe<Sensor>:] TIMing:EXCLude:START`.
- <end\_exclude>  
Mandatory. Amount of time at the end of a timeslot or integration period that is not evaluated.  
Corresponds to `[SENSe<Sensor>:] TIMing:EXCLude:STOP`.
- <expected\_value>  
Optional. Value that is expected for the measurement.
- <resolution>  
Optional. Limit up to which the measurement result should be free of noise.  
Corresponds to `[SENSe<Sensor>:] AVERage:COUNT:AUTO:RESolution`.
- <source\_list>  
Optional. 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>[: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>...]

Used for `CALCulate<Measurement>:MATH[:EXPRession]` "(SENS1)" to "(SENS4)".

Power measured by one power sensor. The used parameters are described in "[Parameter list](#)" on page 293.

**Suffix:**

<Measurement>      1 to 4  
Measurement channel

**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>

<resolution\_or\_source\_list>

<source\_list>      <expr>

**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>...]

Used for `CALCulate<Measurement>:MATH[:EXPRession]`.

Relative power measured by one power sensor. The used parameters are described in ["Parameter list"](#) on page 293.

**Suffix:**

<Measurement>      1 to 4  
Measurement channel

**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>  
<resolution\_or\_source\_list>  
<source\_list>      <expr>

**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>...]

Used for **CALCulate**<Measurement>:MATH[:EXPReSSion] "(SENSn-SENSm)".

Power measured by two power sensors. The used parameters are described in ["Parameter list"](#) on page 293.

**Suffix:**

<Measurement>      1 to 4  
Measurement channel

**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>  
<resolution\_or\_source\_list>

<source\_list>                      <expr>

**Usage:**                              Query only

---

**CONFigure<Measurement>[:SCALar][:POWer]:TSLot:DIFFerence: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:DIFFerence: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:DIFFerence: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:DIFFerence:RELative?**

<tslot\_width>, <no\_slots>, <start\_exclude>, <end\_exclude>[,  
<expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

Used for **CALCulate<Measurement>:MATH[:EXPReSSion]**.

Relative difference measured by two power sensors. The used parameters are described in "[Parameter list](#)" on page 293.

**Suffix:**

<Measurement>                      1 to 4  
Measurement channel

**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>

<resolution\_or\_source\_list>

<source\_list>                      <expr>

**Usage:**                              Query only

---

**CONFigure<Measurement>[:SCALar][:POWer]:TSLot:SUM? <tslot\_width>,<br>**

<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>,<br>**

<no\_slots>,<br><start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>,<br><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>...]

Used for **CALCulate<Measurement>:MATH[:EXPRession]** " (SENSn+SENSm) ".

Sum measured by two power sensors. The used parameters are described in "[Parameter list](#)" on page 293.

**Suffix:**

<Measurement>      1 to 4  
                          Measurement channel

**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>  
 <resolution\_or\_source\_list>  
 <source\_list>      <expr>

**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>...]

Used for **CALCulate<Measurement>:MATH[:EXPRession]**.

Relative sum measured by two power sensors. The used parameters are described in "[Parameter list](#)" on page 293.

**Suffix:**

<Measurement>      1 to 4  
                          Measurement channel

**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>  
 <resolution\_or\_source\_list>  
 <source\_list>           <expr>  
**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>...]  
 Used for **CALCulate<Measurement>:MATH[:EXPRession]** "(SENSn /SENSm)".

Ratio measured by two power sensors. The used parameters are described in "[Parameter list](#)" on page 293.

**Suffix:**

<Measurement>        1 to 4  
                          Measurement channel

**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>  
 <resolution\_or\_source\_list>  
 <source\_list>           <expr>  
**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>...]

Used for [CALCulate<Measurement>:MATH\[:EXPRession\]](#).

Relative ratio measured by two power sensors. The used parameters are described in "[Parameter list](#)" on page 293.

**Suffix:**

<Measurement>      1 to 4  
Measurement channel

**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>

<resolution\_or\_source\_list>

<source\_list>      <expr>

**Usage:**      Query only

**CONFigure<Measurement>[:SCALar][:POWer]:TSLot:SWR?** <tslot\_width>[,

<no\_slots>, <start\_exclude>, <end\_exclude>[,  
<expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

**FETCh<Measurement>[:SCALar][:POWer]:TSLot:SWR?** <tslot\_width>, <no\_slots>[,

<start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>[,  
<resolution\_or\_source\_list>, <source\_list>...]

**READ<Measurement>[:SCALar][:POWer]:TSLot:SWR?** <tslot\_width>, <no\_slots>[,

<start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>[,  
<resolution\_or\_source\_list>, <source\_list>...]

**MEASure<Measurement>[:SCALar][:POWer]:TSLot:SWR?** <tslot\_width>[,

<no\_slots>, <start\_exclude>, <end\_exclude>[,  
<expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

Used for [CALCulate<Measurement>:MATH\[:EXPRession\]](#)

"SWR (SENSn, SENSm)".

Standing wave ratio measured by two power sensors. The used parameters are described in "[Parameter list](#)" on page 293.

**Suffix:**

<Measurement>      1 to 4  
Measurement channel

**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>  
<resolution\_or\_source\_list>  
<source\_list>      <expr>

**Usage:**      Query only

---

```

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>...]
  
```

Used for `CALCulate<Measurement>:MATH[:EXPRession]`

"REFL (SENSn, SENSm)".

Reflection coefficient/transmission factor of a DUT, measured by two power sensors. The used parameters are described in "[Parameter list](#)" on page 293.

**Suffix:**

<Measurement>      1 to 4  
Measurement channel

**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>

<resolution\_or\_source\_list>

<source\_list>            <expr>

**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>...]

Used for [CALCulate<Measurement>:MATH\[:EXPRession\]](#)

"RLOS (SENSn, SENSm) ".

Return loss/transmission loss of a DUT, measured by two power sensors. The used parameters are described in "[Parameter list](#)" on page 293.

**Suffix:**

<Measurement>            1 to 4  
Measurement channel

**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>

<resolution\_or\_source\_list>

<source\_list>            <expr>

**Usage:**                    Query only

## 14.6 Configuring Sensors

- [Setting the Frequency](#)..... 302
- [Sensor Ports](#)..... 303
- [Sensor Modes](#)..... 304
- [Sensor Corrections](#)..... 308
- [Sensor Filters](#)..... 312

- [Sensor Ranges](#)..... 320
- [LAN Power Sensors](#).....323
- [For NRT Measurement Type](#).....326

### 14.6.1 Setting the 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:        0.0 to 110.0e9  
    \*RST:        1.0e9  
    Default unit: Hz

**Manual operation:**    See "[Freq]" on page 17

---

#### **[SENSe<Sensor>:]FREQuency:FIXed <frequency>**

See [\[SENSe<Sensor>:\]FREQuency\[:CW\]](#) on page 302.

**Suffix:**

<Sensor>                      1...128

**Parameters:**

<frequency>                      Range:        0.0 to 110.0e9  
    \*RST:        1.0e9  
    Default unit: Hz

---

#### **[SENSe<Sensor>:]FREQuency:TRACk <state>**

Enables or disables the frequency tracker of the power 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

## 14.6.2 Sensor Ports

Further information:

- [Chapter 14.6.8.2, "NRT Correction Settings"](#), on page 329

<a href="#">INPut&lt;Sensor&gt;:PORT:SOURce:AUTO</a> .....	303
<a href="#">INPut&lt;Sensor&gt;:PORT:SOURce[:VALue]</a> .....	303
<a href="#">INPut&lt;undef&gt;:TRIGger:IMPedance</a> .....	303

---

### 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

If the forward and reverse power are almost equal, the orientation of the power sensor is defined using [INPut<Sensor>:PORT:SOURce\[:VALue\]](#).

\*RST:                      0

**Example:**                      INP2:PORT:SOUR:AUTO OFF

---

### INPut<Sensor>:PORT:SOURce[:VALue] <val>

Effective if [INPut<Sensor>:PORT:SOURce:AUTO OFF](#) is set.

Defines the forward direction for the given input.

#### 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>                      Range:                      1 to 2  
\*RST:                      1

---

### INPut<undef>:TRIGger:IMPedance <impedance>

Sets termination resistance of the external trigger input. Choose the 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

### 14.6.3 Sensor Modes

CALCulate<Measurement>[:CHANnel<Channel>]:BURSt:TIMing:EXCLude:START.....	304
CALCulate<Measurement>[:CHANnel<Channel>]:BURSt:TIMing:EXCLude:STOP.....	304
CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:DCYCle:STATe.....	305
CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:DCYCle[:VALue].....	305
CALCulate<Measurement>[:CHANnel<Channel>]:TRACe:ESAMpling.....	306
CALCulate<Measurement>[:CHANnel<Channel>]:SAMPLing.....	306
CALCulate<Measurement>[:CHANnel<Channel>][:POWer]:BURSt:DTOLerance.....	306
CALCulate<Measurement>[:CHANnel<Channel>][:POWer][:AVG]:APERture[:VALue].....	307
CALCulate<Measurement>[:CHANnel<Channel>][:POWer][:AVG]:SMOothing[:STATe].....	307
CALCulate<Measurement>:TRACe:MEASurement:TRANSition:ESAMpling:AUTO[:STATe]....	308

---

**CALCulate<Measurement>[:CHANnel<Channel>]:BURSt:TIMing:EXCLude:START**  
 <value>

The start and end of bursts can be excluded from the measurement. This means that signal overshoots can be omitted from measurements, for example.

**Suffix:**  
 <Measurement> 1 to 4  
 Measurement channel

<Channel> 1 to 2  
 1 = primary sensor, 2 = secondary sensor

**Parameters:**  
 <value> Range: 0.0 to 15.0  
 \*RST: 0.0  
 Default unit: s

**Manual operation:** See "Exclude from Start, Exclude from End" on page 107

---

**CALCulate<Measurement>[:CHANnel<Channel>]:BURSt:TIMing:EXCLude:STOP**  
 <value>

See CALCulate<Measurement>[:CHANnel<Channel>]:BURSt:TIMing:EXCLude:START on page 304.

**Suffix:**  
 <Measurement> 1 to 4  
 Measurement channel



<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<value> Range: 0.0 to 15.0  
\*RST: 0.0  
Default unit: s

**Manual operation:** See ["Exclude from Start, Exclude from End"](#) on page 107

**CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:DCYCle:STATe**  
<state>

Effective for continuous average measurements.

Enables or disables the duty cycle correction.

**Suffix:**

<Measurement> 1 to 4  
Measurement channel

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<state> \*RST: OFF

**Manual operation:** See ["Duty Cycle State"](#) on page 105

**CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:DCYCle[:VALue]**  
<duty\_cycle>

Effective for continuous average measurements.

Using the duty cycle correction, the average power of RF bursts is calculated from the average power of the whole signal. Essentially, the average power of the whole signal is divided by the set duty cycle.

**Suffix:**

<Measurement> 1 to 4  
Measurement channel

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<duty\_cycle> Range: 0.001 to 100.0  
\*RST: 50.0  
Default unit: pct

**Manual operation:** See ["Duty Cycle"](#) on page 105

---

**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 4  
Measurement channel

<Channel>            1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<value>              \*RST:        ON

**Manual operation:** See ["Equivalent Time Sampling"](#) on page 106

---

**CALCulate<Measurement>[:CHANnel<Channel>]:SAMPling <value>**

Effective for continuous average measurements.

Sets the sampling rate.

With multipath power sensors, you can set the sampling rate to two different values to prevent aliasing effects for particular types of modulation signal. Aliasing can occur because the sampling frequency is located within the video bandwidth, which means that spectral components near the sampling frequency can cause beating effects. With changing the sampling rate, the beating effects usually disappear.

**Suffix:**

<Measurement>      1 to 4  
Measurement channel

<Channel>            1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<value>              FREQ1 | FREQ2  
\*RST:              FREQ1

**Manual operation:** See ["Sampling Rate"](#) on page 106

---

**CALCulate<Measurement>[:CHANnel<Channel>][:POWer]:BURSt:DTOLerance <value>**

Effective for burst average measurements.

Defines the end of the burst. If power keeps low for at least this time, the end of the burst is assumed. Modulation-specific power drops that are shorter than the set value are ignored.

See also [Chapter 8.2, "Burst Average"](#), on page 65.

**Suffix:**

<Measurement>      1 to 4  
Measurement channel

<Channel>            1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<value>              Range:      0.0 to 0.3  
                      \*RST:      0.0  
                      Default unit: s

**Manual operation:** See "[Dropout Tolerance](#)" on page 107

**CALCulate<Measurement>[:CHANnel<Channel>][:POWer][:AVG]:APERture[:  
VALue] <value>**

Effective for continuous average measurements.

Sets the duration of the sampling window. During this time interval, the average signal power is measured.

**Suffix:**

<Measurement>      1 to 4  
Measurement channel

<Channel>            1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<value>              Range:      8.3e-9 to 30.0  
                      \*RST:      0.01  
                      Default unit: s

**Manual operation:** See "[Aperture](#)" on page 106

**CALCulate<Measurement>[:CHANnel<Channel>][:POWer][:AVG]:SMOothing[:  
STATe] <value>**

Enables or disables digital lowpass filtering of the sampled video signal.

The problem of instable display values due to a modulation of a test signal described under [[SENSe<Sensor>: \]SAMPLing](#) can also be eliminated by lowpass filtering of the video signal. The lowpass filter eliminates the variations of the display even in case of unperiodic modulation and does not require any other setting.

If modulation is periodic, setting the aperture time is the better method, since it allows shorter measurement times.

**Suffix:**

<Measurement>      1 to 4  
Measurement channel

<Channel>            1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

&lt;value&gt;                    \*RST:        OFF

**Manual operation:**    See ["Smoothing"](#) on page 107**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 4  
Measurement channel**Parameters:**

&lt;value&gt;                    \*RST:        ON

**Manual operation:**    See ["Equivalent Time Sampling"](#) on page 106

## 14.6.4 Sensor Corrections

See also [Chapter 14.11, "Managing Setups and Correction Tables"](#), on page 346.

<a href="#">[SENSe&lt;Sensor&gt;:]CORRection:SPDevice:LIST?</a> .....	308
<a href="#">[SENSe&lt;Sensor&gt;:]CORRection:SPDevice:SElect</a> .....	309
<a href="#">[SENSe&lt;Sensor&gt;:]CORRection:SPDevice:STATe</a> .....	309
<a href="#">[SENSe&lt;Sensor&gt;:]RGAMma:PHASe</a> .....	309
<a href="#">[SENSe&lt;Sensor&gt;:]RGAMma[:MAGNitude]</a> .....	309
<a href="#">CALCulate&lt;Measurement&gt;[:CHANnel&lt;Channel&gt;]:CORRection:OFFSet:STATe</a> .....	310
<a href="#">CALCulate&lt;Measurement&gt;[:CHANnel&lt;Channel&gt;]:CORRection:OFFSet:TABLE:INDEX</a> .....	310
<a href="#">CALCulate&lt;Measurement&gt;[:CHANnel&lt;Channel&gt;]:CORRection:OFFSet:TABLE[:STATe]</a> .....	311
<a href="#">CALCulate&lt;Measurement&gt;[:CHANnel&lt;Channel&gt;]:CORRection:OFFSet[:MAGNitude]</a> .....	311
<a href="#">CALCulate&lt;Measurement&gt;[:CHANnel&lt;Channel&gt;]:SGAMma:CORRection:STATe</a> .....	311
<a href="#">CALCulate&lt;Measurement&gt;[:CHANnel&lt;Channel&gt;]:SGAMma:PHASe</a> .....	312
<a href="#">CALCulate&lt;Measurement&gt;[:CHANnel&lt;Channel&gt;]:SGAMma[:MAGNitude]</a> .....	312

**[SENSe<Sensor>:]CORRection:SPDevice:LIST?**

Queries the list of the S-parameter data sets that have been loaded to the power 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 110

**[SENSe<Sensor>:]CORRection:SPDevice:SElect <num>**

Selects a data set for S-parameter correction stored on the power 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 110

**[SENSe<Sensor>:]CORRection:SPDevice:STATE <state>**

Enables or disables the S-parameter correction. If enabled, the power sensor uses the S-parameter data set selected by [\[SENSe<Sensor>:\]CORRection:SPDevice:SElect](#).

**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 110

**[SENSe<Sensor>:]RGAMma:PHASe <phase\_angle>**

Effective if [\[SENSe<Sensor>:\]RGAMma\[:MAGNitude\]](#) is  $\neq 0$ .

Sets the phase angle of the complex reflection factor of the load at the signal output.

**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\_angle> Range: 0.0 to 360.0  
\*RST: 0.0  
Default unit: deg

**[SENSe<Sensor>:]RGAMma[:MAGNitude] <magnitude>**

Sets the magnitude of the reflection coefficient.

Together with `[SENSe<Sensor>:]RGAMma:PHASe`, compensates for the reflection of the load at the signal output. Such a compensation is necessary if the voltage standing wave ratio exceeds a value of 1.05.

**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> **0.0**  
Disables the compensation.  
Range: -200.0 to 200.0  
\*RST: 0.0  
Default unit: -

---

**CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:OFFSet:STATe**  
 <state>

Enables or disables the offset correction.

**Suffix:**

<Measurement> 1 to 4  
Measurement channel  
  
<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<state>

**Manual operation:** See ["Offset State"](#) on page 109

---

**CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:OFFSet:TABLE:INDEX <value>**

Selects one of the available offset tables.

**Suffix:**

<Measurement> 1 to 4  
Measurement channel  
  
<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 110

---

**CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:OFFSet:TABLE[:STATE] <state>**

Enables or disables the frequency-dependent offset correction specified in the selected table.

**Suffix:**

<Measurement>      1 to 4  
Measurement channel

<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 110

---

**CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:OFFSet[:MAGNitude] <value>**

Sets an offset correction value for the selected reference plane. This can correct the influence of cables etc. and does not influence measurement accuracy.

**Suffix:**

<Measurement>      1 to 4  
Measurement channel

<Channel>            1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value>              Range:        -200.0 to 200.0  
\*RST:            0.0  
Default unit: dB

**Manual operation:** See ["Offset"](#) on page 109

---

**CALCulate<Measurement>[:CHANnel<Channel>]:SGAMma:CORRection:STATE <value>**

Enables or disables gamma correction in order to achieve higher measurement accuracy.

**Suffix:**

<Measurement>      1 to 4  
Measurement channel

<Channel>            1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<value>                    \*RST:        OFF

**Manual operation:**    See ["Gamma Correction"](#) on page 111

**CALCulate<Measurement>[:CHANnel<Channel>]:SGAMma:PHASe <value>**

Available if [CALCulate<Measurement>\[:CHANnel<Channel>\]:SGAMma:CORRection:STATe](#) ON is set.

Sets the phase angle of the source reflection coefficient gamma in degrees.

**Suffix:**

<Measurement>        1 to 4  
Measurement channel

<Channel>                1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<value>                    Range:        -360.0 to 360.0  
                              \*RST:        0.0  
                              Default unit: deg

**Manual operation:**    See ["Gamma Phase"](#) on page 111

**CALCulate<Measurement>[:CHANnel<Channel>]:SGAMma:MAGNitude <value>**

Available if [CALCulate<Measurement>\[:CHANnel<Channel>\]:SGAMma:CORRection:STATe](#) ON is set.

Sets the magnitude of the source reflection coefficient gamma.

**Suffix:**

<Measurement>        1 to 4  
Measurement channel

<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 111

## 14.6.5 Sensor Filters

Further information:

- [Chapter 9.3, "Filter Settings"](#), on page 111



[SENSe<Sensor>:]AVERAge:COUNT:AUTO:RESolution.....	313
[SENSe<Sensor>:]AVERAge:RESet.....	313
CALCulate<Measurement>[:CHANnel<Channel>]:AVERAge:COUNT:AUTO:MTIME.....	314
CALCulate<Measurement>[:CHANnel<Channel>]:AVERAge:COUNT:AUTO:NSRatio.....	314
CALCulate<Measurement>[:CHANnel<Channel>]:AVERAge:COUNT:AUTO:SLOT.....	314
CALCulate<Measurement>[:CHANnel<Channel>]:AVERAge:COUNT:AUTO:TYPE.....	315
CALCulate<Measurement>[:CHANnel<Channel>]:AVERAge:COUNT:ENUM.....	315
CALCulate<Measurement>[:CHANnel<Channel>]:AVERAge:TCONtrol:AUTO.....	316
CALCulate<Measurement>[:CHANnel<Channel>]:AVERAge:TCONtrol[:ENUM].....	316
CALCulate<Measurement>[:CHANnel<Channel>]:AVERAge:TYPE.....	317
CALCulate<Measurement>[:CHANnel<Channel>]:AVERAge[:STATe].....	317
CALCulate<Measurement>[:CHANnel<Channel>]:TRACe:AVERAge:COUNT[:VALue].....	318
CALCulate<Measurement>[:CHANnel<Channel>]:TRACe:AVERAge:TCONtrol:AUTO.....	318
CALCulate<Measurement>[:CHANnel<Channel>]:TRACe:AVERAge:TCONtrol[:ENUM].....	318
CALCulate<Measurement>[:CHANnel<Channel>]:TRACe:AVERAge[:STATe].....	319
CALCulate<Measurement>[:CHANnel<Channel>][:POWER]:NCORrection[:STATe].....	319
CALCulate<Measurement>[:CHANnel<Channel>][:POWER]:VBWidth:ENUM.....	320

---

#### [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 which should be free of noise in the measurement result.

The setting is only taken into account, 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> Range: 1 to 4  
\*RST: 3

---

#### [SENSe<Sensor>:]AVERAge:RESet

Initializes the digital filter by deleting the stored measured values.

#### 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 113

---

**CALCulate<Measurement>[:CHANnel<Channel>]:AVERage:COUNT:AUTO:MTIME**  
 <value>

Sets an upper time limit (maximum time) that is never exceeded. If **CALCulate<Measurement>[:CHANnel<Channel>]:AVERage:COUNT:AUTO:TYPE** NSR is set, the R&S NRX has to determine the filter length automatically. The filter length can become large and thus also the measurement time. By setting an upper time limit, you can prevent undesired long measurement times.

**Suffix:**

<Measurement>      1 to 4  
                             Measurement channel

<Channel>            1 to 2  
                             1 = primary sensor, 2 = secondary sensor

**Parameters:**

<value>              Range:        0.1 to 1000.0  
                             \*RST:        1.0  
                             Default unit: s

**Manual operation:**    See "[Maximum Settling Time](#)" on page 113

---

**CALCulate<Measurement>[:CHANnel<Channel>]:AVERage:COUNT:AUTO:NSRatio** <value>

Effective if **CALCulate<Measurement>[:CHANnel<Channel>]:AVERage:COUNT:AUTO:TYPE** is set to NSR.

Sets the averaging number so that the intrinsic noise of the power sensor does not exceed the specified value.

**Suffix:**

<Measurement>      1 to 4  
                             Measurement channel

<Channel>            1 to 2  
                             1 = primary sensor, 2 = secondary sensor

**Parameters:**

<value>              Range:        100e-6 to 1.0  
                             \*RST:        1.0  
                             Default unit: dB

**Manual operation:**    See "[Noise Content](#)" on page 113

---

**CALCulate<Measurement>[:CHANnel<Channel>]:AVERage:COUNT:AUTO:SLOT**  
 <value>

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 4  
Measurement channel

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<value> Range: 1 to 128  
\*RST: 1

**Manual operation:** See "Timeslot" on page 114

**CALCulate<Measurement>[:CHANnel<Channel>]:AVERage:COUNT:TYPE**  
<value>

Sets the autofilter.

**Suffix:**

<Measurement> 1 to 4  
Measurement channel

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<value> RESolution | NSRatio

**RESolution**

Takes the setting of [SENSe<Sensor>]:AVERage:COUNT: AUTO:RESolution into account.

**NSRatio**

Takes the setting of CALCulate<Measurement>[:CHANnel<Channel>]:AVERage:COUNT: AUTO:NSRatio into account.

\*RST: RESolution

**Manual operation:** See "Fixed Noise Mode" on page 113

**CALCulate<Measurement>[:CHANnel<Channel>]:AVERage:COUNT:ENUM**  
<value>

Effective for continuous average, burst average, timeslot 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 4  
Measurement channel

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<value> E1 | E2 | E4 | E8 | E16 | E32 | E64 | E128 | E256  
 \*RST: E4

**Manual operation:** See ["Filter Length"](#) on page 113

**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 316.

**Suffix:**

<Measurement> 1 to 4  
 Measurement channel  
 <Channel> 1 to 2  
 1 = primary sensor, 2 = secondary sensor

**Parameters:**

<state> \*RST: ON

**Manual operation:** See ["Moving Average State"](#) on page 114

**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. This is called termination control.

**Suffix:**

<Measurement> 1 to 4  
 Measurement channel  
 <Channel> 1 to 2  
 1 = primary sensor, 2 = secondary sensor

**Parameters:**

<mode> MOVing | REPeat

**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 very long.

The average count is set using `CALCulate<Measurement>[:CHANnel<Channel>]:AVERage:COUNT[:VALue]` on page 332.

\*RST:       MOVing

**Manual operation:** See ["Moving Average"](#) on page 114

**CALCulate<Measurement>[:CHANnel<Channel>]:AVERage:TYPE <type>**

Effective for continuous average, trace measurements.

Sets the averaging domain.

**Suffix:**

<Measurement>       1 to 4  
Measurement channel

<Channel>            1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<type>               POWer | VIDeo | LINear  
\*RST:               POWer

**Manual operation:** See ["Averaging Domain"](#) on page 114

**CALCulate<Measurement>[:CHANnel<Channel>]:AVERage[:STATe] <value>**

Effective for continuous average, burst average, timeslot measurements.

Enables the filter function of a power sensor. If enabled, the number of measured values is averaged. This reduces the effect of noise so that more reliable results are obtained.

The number of measured values is set using `CALCulate<Measurement>[:CHANnel<Channel>]:AVERage:COUNT[:VALue]`.

**Suffix:**

<Measurement>       1 to 4  
Measurement channel

<Channel>            1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<value>               \*RST:       ON

**Manual operation:** See ["Filter State"](#) on page 112

---

**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 4  
                                  Measurement channel

<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 113

---

**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 318.

**Suffix:**

<Measurement>      1 to 4  
                                  Measurement channel

<Channel>            1 to 2  
                                  1 = primary sensor, 2 = secondary sensor

**Parameters:**

<state>                \*RST:            ON

**Manual operation:**    See ["Moving Average State"](#) on page 114

---

**CALCulate<Measurement>[:CHANnel<Channel>]:TRACe:AVERage:TCONtrol[:ENUM] <mode>**

Effective for trace measurements.

Defines how the measurement results are output. This is called termination control.

**Suffix:**

<Measurement>      1 to 4  
                                  Measurement channel

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<mode> MOVing | REPeat

**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 very long.

The average count is set using `CALCulate<Measurement>[:CHANnel<Channel>]:TRACe:AVERage:COUNT[:VALue]`.

\*RST: MOVing

**Manual operation:** See "Moving Average" on page 114

**CALCulate<Measurement>[:CHANnel<Channel>]:TRACe:AVERage[:STATe]**  
<value>

Effective for trace measurements.

Enables the filter function of a power sensor. If enabled, the number of measured values is averaged. This reduces the effect of noise so that more reliable results are obtained.

The number of measured values is set using `CALCulate<Measurement>[:CHANnel<Channel>]:TRACe:AVERage:COUNT[:VALue]`.

**Suffix:**

<Measurement> 1 to 4  
Measurement channel

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<value> \*RST: ON

**Manual operation:** See "Filter State" on page 112

**CALCulate<Measurement>[:CHANnel<Channel>][:POWER]:NCORrection[:STATe]**  
<state>

Enables or disables the noise cancellation.

**Suffix:**

<Measurement>      1 to 4  
Measurement channel

<Channel>            1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<state>                \*RST:        OFF

**CALCulate<Measurement>[:CHANnel<Channel>][:POWer]:VBWidth:ENUM**  
<value>

Effective for trace measurements.

Sets the video bandwidth.

**Suffix:**

<Measurement>      1 to 4  
Measurement channel

<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 115

### 14.6.6 Sensor Ranges

CALCulate<Measurement>[:CHANnel<Channel>]:INPut:ATTenuation:AUTO..... 320

CALCulate<Measurement>[:CHANnel<Channel>]:INPut:ATTenuation[:VALue]..... 321

CALCulate<Measurement>[:CHANnel<Channel>][:POWer][:AVG]:RANGe:AUTO..... 321

CALCulate<Measurement>[:CHANnel<Channel>][:POWer][:AVG]:RANGe:CLEVel:STATe.... 322

CALCulate<Measurement>[:CHANnel<Channel>][:POWer][:AVG]:RANGe:CLEVel[:VALue].. 322

CALCulate<Measurement>[:CHANnel<Channel>][:POWer][:AVG]:RANGe[:VALue]..... 323

**CALCulate<Measurement>[:CHANnel<Channel>]:INPut:ATTenuation:AUTO**  
<auto>

Requires an R&S frequency selective power sensor.



Enables or disables the automatic setting of the input attenuation.

**Suffix:**

<Measurement>      1 to 4  
Measurement channel

<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 117

**CALCulate<Measurement>[:CHANnel<Channel>]:INPut:ATTenuation[:VALue]**  
<value>

Requires an R&S frequency selective power sensor.

Effective if [CALCulate<Measurement>\[:CHANnel<Channel>\]:INPut:ATTenuation:AUTO](#) OFF is set.

Sets the input attenuation.

**Suffix:**

<Measurement>      1 to 4  
Measurement channel

<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 to 30.0

\*RST:                30.0

Default unit: dB

**Manual operation:** See ["Attenuation"](#) on page 117

**CALCulate<Measurement>[:CHANnel<Channel>][:POWer][:AVG]:RANGe:AUTO**  
<value>

Enables or disables the automatic measurement path selection.

**Suffix:**

<Measurement>      1 to 4  
Measurement channel

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<value> \*RST: ON

**Manual operation:** See ["Range State"](#) on page 116

**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 range between the measurement paths, set by [CALCulate<Measurement>\[:CHANnel<Channel>\]\[:POWer\]\[:AVG\]:RANGe:CLeVel\[:VALue\]](#).

**Suffix:**

<Measurement> 1 to 4  
Measurement channel

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<value> \*RST: OFF

**Manual operation:** See ["User Defined Transition"](#) on page 116

**CALCulate<Measurement>[:CHANnel<Channel>][:POWer][:AVG]:RANGe:CLeVel[:VALue] <value>**

Reduces the transition range 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 S/N ratio is reduced at the lower limits of the transition ranges.

**Suffix:**

<Measurement> 1 to 4  
Measurement channel

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<value> Range: -20.0 to 0.0  
\*RST: 0.0  
Default unit: dB

**Manual operation:** See ["Offset"](#) on page 117

---

**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 power sensor is measuring.

**Suffix:**

<Measurement>      1 to 4  
                          Measurement channel

<Channel>            1 to 2  
                          1 = primary sensor, 2 = secondary sensor

**Parameters:**

<value>              LOW | MID | HIGH  
                          \*RST:        MID

**Manual operation:**   See "Range" on page 116

## 14.6.7 LAN Power Sensors

CALCulate<Measurement>[:CHANnel<Channel>]:ROSCillator:REFio:FREQUENCY.....323  
 CALCulate<Measurement>[:CHANnel<Channel>]:ROSCillator:REFio:OUTPut[:STATe].....324  
 CALCulate<Measurement>[:CHANnel<Channel>]:ROSCillator:SOURce.....324  
 [SENSe<Sensor>:]ADD.....324  
 [SENSe<Sensor>:]BANDwidth[:RESolution]:TYPE:AUTO[:STATe].....325  
 [SENSe<Sensor>:]BANDwidth[:RESolution]:TYPE[:VALue].....325  
 [SENSe<Sensor>:]BANDwidth[:RESolution][:VALue].....325

---

**CALCulate<Measurement>[:CHANnel<Channel>]:ROSCillator:REFio:FREQUENCY**  
 <freq>

Only effective for:

- R&S frequency selective power sensors
- CALCulate<Measurement>[:CHANnel<Channel>]:ROSCillator:SOURce on page 324 REFio is set.

Sets the frequency of the reference clock signal that is supplied at the REF connector of the power sensor.

**Suffix:**

<Measurement>      1 to 4  
                          Measurement channel

<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>**

Only effective for R&S frequency selective power sensors.

If the REF connector of the power sensor is used as an output, enables or disables the output signal.

**Suffix:**

<Measurement>      1 to 4  
Measurement channel

<Channel>            1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<state>                \*RST:        OFF

---

**CALCulate<Measurement>[:CHANnel<Channel>]:ROSCillator:SOURce <source>**

Only effective for R&S frequency selective power sensors.

Sets the source of the reference oscillator.

**Suffix:**

<Measurement>      1 to 4  
Measurement channel

<Channel>            1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<source>                HOST | INTernal | REFio  
\*RST:                  INTernal

---

**[SENSe<Sensor>:]ADD <sensor>**

Adds a LAN power sensor and configures it automatically as long as the maximum number of power sensors is not reached.

**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 power sensor.

**Example:**             ADD "NRQ6-101435"

**Usage:**                Setting only

**Manual operation:**   See ["Add Sensor"](#) on page 141

---

**[SENSe<Sensor>:]BANDwidth[:RESolution]:TYPE:AUTO[:STATe] <state>**

Only effective for R&S 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>**

Only effective for R&S 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>**

Only effective for R&S 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 to 400.0e6  
\*RST:                      25.0e6  
Default unit: Hz

## 14.6.8 For NRT Measurement Type

- [NRT Mode Settings](#)..... 326
- [NRT Correction Settings](#)..... 329
- [NRT Filter Settings](#)..... 331

### 14.6.8.1 NRT Mode Settings

Further information:

- [Chapter 9.5.1, "NRT Mode Settings"](#), on page 118

<a href="#">CALCulate&lt;Measurement&gt;[:CHANnel&lt;Channel&gt;]:NRT:BURSt:MODE</a> .....	326
<a href="#">CALCulate&lt;Measurement&gt;[:CHANnel&lt;Channel&gt;]:NRT:BURSt:PERiod</a> .....	327
<a href="#">CALCulate&lt;Measurement&gt;[:CHANnel&lt;Channel&gt;]:NRT:BURSt:WIDTh</a> .....	327
<a href="#">CALCulate&lt;Measurement&gt;[:CHANnel&lt;Channel&gt;]:NRT:CCDF:THReshold</a> .....	327
<a href="#">CALCulate&lt;Measurement&gt;[:CHANnel&lt;Channel&gt;]:NRT:DIRection</a> .....	328
<a href="#">CALCulate&lt;Measurement&gt;[:CHANnel&lt;Channel&gt;]:NRT:PEP:HOLD:TIME</a> .....	328

---

**CALCulate<Measurement>[:CHANnel<Channel>]:NRT:BURSt:MODE <mode>**

Defines how the average burst power is determined.

**Suffix:**

<Measurement>      1 to 4  
Measurement channel

<Channel>            1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<mode>                AUTO | USER

**AUTO**

The power 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\[:VALue\]](#).

**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 118

**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 4  
Measurement channel

<Channel>            1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value>              Range:      0.0 to 1.0  
                      \*RST:      0.1  
                      Default unit: s

**Manual operation:**    See "[Burst Period](#)" on page 118

**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 4  
Measurement channel

<Channel>            1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value>              Range:      0.0 to 1.0  
                      \*RST:      0.01  
                      Default unit: s

**Manual operation:**    See "[Burst Width](#)" on page 119

**CALCulate<Measurement>[:CHANnel<Channel>]:NRT:CCDF:THReshold <value>**

Sets the threshold for the cumulative distribution function (CCDF). The distribution function states the probability (in %) of the envelope power lying above the threshold.

If you enter a value without unit, the unit is defined by [UNIT<Measurement>:POWER\[:VALue\]](#). For further information, see [Chapter 14.4.1.3, "Units"](#), on page 188.

**Suffix:**

<Measurement>      1 to 4  
Measurement channel

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value> Range: -290.0 to +110.0  
\*RST: +0.0  
Default unit: dBm

**Manual operation:** See ["CCDF Threshold"](#) on page 119

**CALCulate<Measurement>[:CHANnel<Channel>]:NRT:DIRection** <direction>

Selects the direction of forward power relative to the defined ports 1 and 2.

**Suffix:**

<Measurement> 1 to 4  
Measurement channel

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<direction> AUTO | FORWard | REVerse  
**AUTO**  
The port with the greater measured power is interpreted as forward power.  
\*RST: AUTO

**Manual operation:** See ["Direction"](#) on page 119

**CALCulate<Measurement>[:CHANnel<Channel>]:NRT:PEP:HOLD:TIME** <value>

Sets the hold time of the peak hold circuit of the power sensor.

**Suffix:**

<Measurement> 1 to 4  
Measurement channel

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value> Range: 1e-3 to 1e-1  
\*RST: 0.01  
Default unit: s

**Manual operation:** See ["PEP Hold Time"](#) on page 119



#### 14.6.8.2 NRT Correction Settings

Further information:

- [Chapter 9.5.2, "NRT Correction Settings"](#), on page 119

<a href="#">[SENSe&lt;Sensor&gt;:]DM:STATe.....</a>	329
<a href="#">[SENSe&lt;Sensor&gt;:]DM:STANdard.....</a>	329
<a href="#">CALCulate&lt;Measurement&gt;[:CHANnel&lt;Channel&gt;]:CORRection:OFFSet:RPLane.....</a>	329
<a href="#">CALCulate&lt;Measurement&gt;[:CHANnel&lt;Channel&gt;]:NRT:DMODulation[:VALue].....</a>	330
<a href="#">CALCulate&lt;Measurement&gt;[:CHANnel&lt;Channel&gt;]:NRT:DMODulation:WCDMa:CRATe.....</a>	330
<a href="#">INPut&lt;Sensor&gt;:PORT:OFFSet.....</a>	331
<a href="#">INPut&lt;Sensor&gt;:PORT:POSition.....</a>	331

---

##### **[SENSe<Sensor>:]DM:STATe <state>**

Requires the sensor interface for R&S NRT (R&S NRX-B9).

Enables or disables the modulation correction. Set the communication standard using [\[SENSe<Sensor>:\]DM:STANdard](#).

##### **Suffix:**

<Sensor> 101

##### **Parameters:**

<state> \*RST: 0

---

##### **[SENSe<Sensor>:]DM:STANdard <standard>**

Requires the sensor interface for R&S NRT (R&S NRX-B9).

Sets a communication standard for the modulation correction to reduce systematic deviations occurring in power measurements.

##### **Suffix:**

<Sensor> 101

##### **Parameters:**

<standard> IS95 | WCDMa | DVBT | DAB  
\*RST: IS95

**Manual operation:** See ["Modulation"](#) on page 120

---

##### **CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:OFFSet:RPLane <plane>**

Selects the reference plane. It defines at which sensor port the forward and reverse power is measured.

##### **Suffix:**

<Measurement> 1 to 4  
Measurement channel

<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 120

**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 4  
Measurement channel

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<modulation> OFF | IS95 | WCDMa | DVBT | DAB  
\*RST: OFF

**Manual operation:** See ["Modulation"](#) on page 120

**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 4  
Measurement channel

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value> Range: 0.0 to 8.2e6  
\*RST: 1.0e6  
Default unit: Hz

**Manual operation:** See ["WCDMA Chip Rate"](#) on page 121

**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 power 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 to 100.0  
\*RST: 0.0  
Default unit: dB

**Manual operation:** See ["Offset"](#) on page 120

**INPut<Sensor>:PORT:POSition <pos>**

Selects the reference plane. It defines at which sensor port the forward and reverse power is measured.

**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  
**SOURce**  
Source connector of the power sensor  
**LOAD**  
Load connector of the power sensor  
\*RST: SOURce

**Manual operation:** See ["Offset Reference Plane"](#) on page 120  
See ["Offset"](#) on page 120

**14.6.8.3 NRT Filter Settings**

Further information:

- [Chapter 9.5.3, "NRT Filter Settings"](#), on page 121

<a href="#">CALCulate&lt;Measurement&gt;[:CHANnel&lt;Channel&gt;]:AVERage:COUNt:AUTO[:STATe]</a> .....	332
<a href="#">CALCulate&lt;Measurement&gt;[:CHANnel&lt;Channel&gt;]:AVERage:COUNt[:VALue]</a> .....	332
<a href="#">CALCulate&lt;Measurement&gt;[:CHANnel&lt;Channel&gt;]:NRT:APERture:MODE</a> .....	332
<a href="#">CALCulate&lt;Measurement&gt;[:CHANnel&lt;Channel&gt;]:NRT:APERture[:VALue]</a> .....	333
<a href="#">CALCulate&lt;Measurement&gt;[:CHANnel&lt;Channel&gt;]:NRT:VBWidth[:VALue]</a> .....	333
<a href="#">[SENSe&lt;Sensor&gt;:]BWIDth:VIDeo:FNUMber</a> .....	333
<a href="#">[SENSe&lt;Sensor&gt;:]BANDwidth:VIDeo:FNUMber</a> .....	333

---

**CALCulate<Measurement>[:CHANnel<Channel>]:AVERage:COUNT:AUtO[:STATe] <state>**

If enabled, determines the average count automatically from the level of the input signal.

**Suffix:**

<Measurement>      1 to 4  
Measurement channel

<Channel>            1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<state>                \*RST:        ON

**Manual operation:**    See ["Averaging Mode"](#) on page 122

---

**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 4  
Measurement channel

<Channel>            1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<value>                Range:        1 to 1048576  
\*RST:                4

**Manual operation:**    See ["Averaging Count"](#) on page 122

---

**CALCulate<Measurement>[:CHANnel<Channel>]:NRT:APERture:MODE <mode>**

Selects a user-defined or default value for the integration time.

**Suffix:**

<Measurement>      1 to 4  
Measurement channel

<Channel>            1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<mode>                DEFault | USER  
\*RST:                DEFault

**Manual operation:** See ["Integration Time Mode"](#) on page 122

---

**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 4  
                             Measurement channel

<Channel>            1 to 2  
                             1 = primary sensor, 2 = secondary sensor

**Parameters:**

<value>              Range:        0.005 to 0.111  
                             \*RST:        0.037  
                             Default unit: s

**Manual operation:** See ["Integration Time"](#) on page 122

---

**CALCulate<Measurement>[:CHANnel<Channel>]:NRT:VBWidth[:VALue] <value>**

For measuring the peak envelope power, specify the video bandwidth that is used for measuring the detected RF signal.

**Suffix:**

<Measurement>      1 to 4  
                             Measurement channel

<Channel>            1 to 2  
                             1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value>              Range:        0 to 2  
                             \*RST:        2

**Manual operation:** See ["Video Bandwidth"](#) on page 121

---

**[SENSe<Sensor>:]BWIDTH:VIDeo:FNUMber <fnum>**

**[SENSe<Sensor>:]BANDwidth:VIDeo:FNUMber <fnum>**

Requires the sensor interface for R&S NRT (R&S NRX-B9).

Sets a video bandwidth filter.

**Suffix:**

<Sensor>            101  
                             Sensor interface for R&S NRT (R&S NRX-B9)

**Parameters:**

<fnum>                      Range:        0 = 4 kHz, 1 = 200 kHz, 2 = maximum bandwidth  
                                  \*RST:        0

**Manual operation:**    See ["Video Bandwidth"](#) on page 121

## 14.7 Configuring the Test Generator

If the sensor check source (R&S NRX-B1) is installed, you can use it as a power reference for testing the connected power sensors.

Further Information:

- [Chapter 3.1.2, "Module Bay"](#), on page 14
- ["Sensor Check Source tab"](#) on page 134

<a href="#">OUTPut:SOURce:STATe</a> .....	334
<a href="#">SOURce:OUTPut:STATe</a> .....	334
<a href="#">SOURce:POWer[:VALue]</a> .....	334
<a href="#">SOURce:PULM:STATe</a> .....	334
<a href="#">SOURce[:RF]:FREQuency[:VALue]</a> .....	335

---

**OUTPut:SOURce:STATe** <state>

**SOURce:OUTPut:STATe** <state>

Requires sensor check source (R&S NRX-B1)

Enables or disables the signal output.

**Parameters:**

<state>                      \*RST:        0

**Manual operation:**    See ["Signal Output"](#) on page 135

---

**SOURce:POWer[:VALue]** <value>

Requires sensor check source (R&S NRX-B1)

Sets the output level.

If you enter a value without unit, the unit is defined by [UNIT<Measurement>:POWer\[:VALue\]](#). For further information, see [Chapter 14.4.1.3, "Units"](#), on page 188.

**Parameters:**

<value>                      Range:        -40.0 to +20.0  
                                  \*RST:        +0.0  
                                  Default unit: dBm

**Manual operation:**    See ["Power Level"](#) on page 135

---

**SOURce:PULM:STATe** <state>

Requires sensor check source (R&S NRX-B1)

Enables or disables the pulse modulation.

**Parameters:**

<state>                      \*RST:        0

**Manual operation:**    See ["Signal Output"](#) on page 135

**SOURce[:RF]:FREQuency[:VALue] <freq>**

Requires sensor check source (R&S NRX-B1)

Sets the frequency.

**Parameters:**

<freq>                      Range:        50.0e6 to 1.0e9  
                                  \*RST:        50.0e6  
                                  Default unit: Hz

**Manual operation:**    See ["Frequency"](#) on page 135

## 14.8 Configuring the Analog Signal Output and the Trigger Output

Configures the two multifunctional BNC connectors at the rear of the R&S NRX.

Further Information:

- [Chapter 3.2.1, "Trig In / Out 2 and Out 1 / Trig Out Connectors"](#), on page 19
- ["I/O 1, I/O 2 tabs"](#) on page 136

OUTPut:LIMit:FAIL.....	336
OUTPut:LIMit:FEED:INDEX.....	336
OUTPut:MODE<output>.....	336
OUTPut:REcorder<output>:FEED:INDEX.....	337
OUTPut:REcorder<output>:LIMit:LOWer:CCDF.....	337
OUTPut:REcorder<output>:LIMit:LOWer[:VALue].....	337
OUTPut:REcorder<output>:LIMit:LOWer:POWer.....	338
OUTPut:REcorder<output>:LIMit:LOWer:RATio:RCoefficient.....	338
OUTPut:REcorder<output>:LIMit:LOWer:RATio:RFRatio.....	339
OUTPut:REcorder<output>:LIMit:LOWer:RATio:RLOSS.....	339
OUTPut:REcorder<output>:LIMit:LOWer:RATio:SWR.....	339
OUTPut:REcorder<output>:LIMit:LOWer:RATio[:VALue].....	340
OUTPut:REcorder<output>:LIMit:UPPer:CCDF.....	340
OUTPut:REcorder<output>:LIMit:UPPer[:VALue].....	340
OUTPut:REcorder<output>:LIMit:UPPer:POWer.....	341
OUTPut:REcorder<output>:LIMit:UPPer:RATio:RCoefficient.....	341
OUTPut:REcorder<output>:LIMit:UPPer:RATio:RFRatio.....	341
OUTPut:REcorder<output>:LIMit:UPPer:RATio:RLOSS.....	342
OUTPut:REcorder<output>:LIMit:UPPer:RATio:SWR.....	342
OUTPut:REcorder<output>:LIMit:UPPer:RATio[:VALue].....	342
OUTPut:TRIGger:SOURce.....	343

**OUTPut:LIMit:FAIL** <mode>

Effective if **OUTPut:MODE**<output> LIM or FLIMit or RLIMit is set for the Out 1 / Trig Out connector.

Sets the fail voltage that is output if a measured value causes a limit violation.

**Parameters:**

<mode>                      LOW | HIGH  
                               **HIGH**  
                               Output voltage of 5 V.  
                               **LOW**  
                               Output voltage of 0 V.  
                               \*RST:        LOW

**Manual operation:**    See "[Fail Voltage](#)" on page 139

**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 139

**OUTPut:MODE**<output> <mode>

Sets the functionality of the Out 1 / Trig Out and Trig In / Out 2 connectors. See also [Chapter 3.2.1, "Trig In / Out 2 and Out 1 / Trig Out Connectors"](#), on page 19.

**Suffix:**

<output>                    1 to 2  
                               BNC connectors at the rear; 1 = Out 1 / Trig Out,  
                               2 = Trig In / Out 2

**Setting parameters:**

<mode>                    OFF | REOrder | FREOrder | RREOrder | LIMit | FLIMit |  
                               RLIMit | TOUT | TIN  
                               **OFF**  
                               Disabled  
                               **REOrder**  
                               Analog output  
                               **FREOrder**  
                               Forward analog output  
                               **RREOrder**  
                               Reflection analog output  
                               **LIMit**  
                               Limit violation



**FLIMit**

Forward limit violation

**RLIMit**

Reflection limit violation

**TOUT**

Trigger output

**TIN**

Trigger input

\*RST: OFF

**Usage:** Setting only**Manual operation:** See ["Mode"](#) on page 137**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:**

&lt;index&gt;

**Manual operation:** See ["Measurement for Recorder Output"](#) on page 138**OUTPut:RECOder<output>:LIMit:LOWer:CCDF <value>**

Enter the CCDF measurement value that corresponds to the output voltage of 0 V.  
 Below this limit, the analog output is set to 0 V.

**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 to 100.0  
 \*RST: 0.0  
 Default unit: pct

**Manual operation:** See ["0 V Equivalent"](#) on page 138**OUTPut:RECOder<output>:LIMit:LOWer[VALue] <value>**

Enter the measurement value that corresponds to the output voltage of 0 V. Below this limit, the analog output is set to 0 V.

If you enter a value without unit, the unit is defined by `UNIT<Measurement>:POWER[:VALue]`. For further information, see [Chapter 14.4.1.3, "Units"](#), on page 188.

**Suffix:**

<output> 1 to 2  
BNC connectors at the rear; 1 = Out 1 / Trig Out,  
2 = Trig In / Out 2

**Parameters:**

<value>

**Manual operation:** See ["0 V Equivalent"](#) on page 138

**OUTPut:RECOder<output>:LIMit:LOWer:POWer <value>**

Enter the power measurement value that corresponds to the output voltage of 0 V. Below this limit, the analog output is set to 0 V.

If you enter a value without unit, the unit is defined by `UNIT<Measurement>:POWER[:VALue]`. For further information, see [Chapter 14.4.1.3, "Units"](#), on page 188.

**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 to +210.0  
\*RST: -30.0  
Default unit: dBm

**Manual operation:** See ["0 V Equivalent"](#) on page 138

**OUTPut:RECOder<output>:LIMit:LOWer:RATio:RCOefficient <value>**

Enter the reflection coefficient measurement value that corresponds to the output voltage of 0 V. Below this limit, the analog output is set to 0 V.

**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 138

**OUTPut:RECOder<output>:LIMit:LOWer:RATio:RFRatio <value>**

Enter the ratio of forward/reverse power that corresponds to the output voltage of 0 V.  
Below this limit, the analog output is set to 0 V.

**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 to 100.0  
\*RST: 0.0  
Default unit: pct

**Manual operation:** See ["0 V Equivalent"](#) on page 138

**OUTPut:RECOder<output>:LIMit:LOWer:RATio:RLOSSs <value>**

Enter the return loss measurement value that corresponds to the output voltage of 0 V.  
Below this limit, the analog output is set to 0 V.

**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 to 180.0  
\*RST: 0.0  
Default unit: dB

**Manual operation:** See ["0 V Equivalent"](#) on page 138

**OUTPut:RECOder<output>:LIMit:LOWer:RATio:SWR <value>**

Enter the SWR measurement value that corresponds to the output voltage of 0 V.  
Below this limit, the analog output is set to 0 V.

**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: 1.0  
Default unit: -

**Manual operation:** See ["0 V Equivalent"](#) on page 138

**OUTPut:RECOder<output>:LIMit:LOWer:RATio[:VALue] <value>**

Enter the power ratio measurement value that corresponds to the output voltage of 0 V. Below this limit, the analog output is set to 0 V.

If you enter a value without unit, the unit is defined by `UNIT<Measurement>:POWER:RATio`. For further information, see [Chapter 14.4.1.3, "Units"](#), on page 188.

**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 to +180.0  
                               \*RST:        +0.0  
                               Default unit: dB

**Manual operation:**    See ["0 V Equivalent"](#) on page 138

**OUTPut:RECOder<output>:LIMit:UPPer:CCDF <value>**

Enter the CCDF measurement value that corresponds to the output voltage of 2.5 V. Above this limit, the output is set to 2.5 V.

**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 to 100.0  
                               \*RST:        1.0  
                               Default unit: pct

**Manual operation:**    See ["2.5 V Equivalent"](#) on page 138

**OUTPut:RECOder<output>:LIMit:UPPer[:VALue] <value>**

Enter the measurement value that corresponds to the output voltage of 2.5 V. Above this limit, the output is set to 2.5 V.

If you enter a value without unit, the unit is defined by `UNIT<Measurement>:POWER[:VALue]`. For further information, see [Chapter 14.4.1.3, "Units"](#), on page 188.

**Suffix:**

<output>                    1 to 2  
                               BNC connectors at the rear; 1 = Out 1 / Trig Out,  
                               2 = Trig In / Out 2

**Parameters:**

<value>

**Manual operation:**    See ["2.5 V Equivalent"](#) on page 138

**OUTPut:RECOder<output>:LIMit:UPPer:POWer <value>**

Enter the power measurement value that corresponds to the output voltage of 2.5 V. Above this limit, the output is set to 2.5 V.

If you enter a value without unit, the unit is defined by **UNIT<Measurement>:POWer [:VALue]**. For further information, see [Chapter 14.4.1.3, "Units"](#), on page 188.

**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 to +210.0  
\*RST: +30.0  
Default unit: dBm

**Manual operation:** See ["2.5 V Equivalent"](#) on page 138

**OUTPut:RECOder<output>:LIMit:UPPer:RATio:RCOefficient <value>**

Enter the reflection coefficient measurement value that corresponds to the output voltage of 2.5 V. Above this limit, the output is set to 2.5 V.

**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: 1.0  
Default unit: -

**Manual operation:** See ["2.5 V Equivalent"](#) on page 138

**OUTPut:RECOder<output>:LIMit:UPPer:RATio:RFRatio <value>**

Enter the ratio of forward/reverse power that corresponds to the output voltage of 2.5 V. Above this limit, the output is set to 2.5 V.

**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 to 100.0  
\*RST: 100.0  
Default unit: pct

**Manual operation:** See ["2.5 V Equivalent"](#) on page 138

**OUTPut:RECOder<output>:LIMit:UPPer:RATio:RLOSs <value>**

Enter the return loss measurement value that corresponds to the output voltage of 2.5 V. Above this limit, the output is set to 2.5 V.

**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 to 180.0  
\*RST: 10.0  
Default unit: dB

**Manual operation:** See ["2.5 V Equivalent"](#) on page 138

**OUTPut:RECOder<output>:LIMit:UPPer:RATio:SWR <value>**

Enter the SWR measurement value that corresponds to the output voltage of 2.5 V. Above this limit, the output is set to 2.5 V.

**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 138

**OUTPut:RECOder<output>:LIMit:UPPer:RATio[:VALue] <value>**

Enter the power ratio measurement value that corresponds to the output voltage of 2.5 V. Above this limit, the output is set to 2.5 V.

If you enter a value without unit, the unit is defined by `UNIT<Measurement>:POWer:RATio`. For further information, see [Chapter 14.4.1.3, "Units"](#), on page 188.

**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 to +180.0  
\*RST: +10.0  
Default unit: dB

**Manual operation:** See ["2.5 V Equivalent"](#) on page 138

**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 139

## 14.9 Zeroing

Further Information:

- [Chapter 11, "Zeroing Sensors"](#), on page 125

<a href="#">CALibration&lt;Sensor&gt;:ZERO</a> .....	343
<a href="#">CALibration&lt;Sensor&gt;:ZERO:AUTO</a> .....	343
<a href="#">CALibration&lt;undef&gt;:ALL:ZERO:AUTO</a> .....	344
<a href="#">CALibration&lt;Sensor&gt;:ZERO:FAST:AUTO</a> .....	344
<a href="#">CALibration&lt;undef&gt;:ALL:ZERO:FAST:AUTO</a> .....	344

**CALibration<Sensor>:ZERO**

Performs zeroing for the power sensor connected to 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.

**Example:**                    CAL2:ZERO

**Usage:**                    Event

**CALibration<Sensor>:ZERO:AUTO <auto>**

Performs zeroing using the signal at the power 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 using **SYSTem:LANGuage** "NRP2".

**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

**Setting parameters:**

&lt;auto&gt;

**ONCE**

Only valid parameter for this command.

**0**

Return value if no calibration is in progress.

**Usage:**

Setting only

**CALibration<undef>:ALL:ZERO:AUTO <auto>**

Applies to all connected power sensors. See [CALibration<Sensor>:ZERO:AUTO](#) on page 343.

**Suffix:**

&lt;undef&gt;

1 to n

No suffix required.

**Setting parameters:**

&lt;auto&gt;

**Usage:**

Setting only

**CALibration<Sensor>:ZERO:FAST:AUTO <auto>**

Effective for trace measurements.

Performs fast zeroing. Since the commands are processed very quickly, they are not overlapping.

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 using [SYSTem:LANGuage](#) "NRP2".

**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

**Setting parameters:**

&lt;auto&gt;

**Usage:**

Setting only

**CALibration<undef>:ALL:ZERO:FAST:AUTO <auto>**

Applies to all connected power sensors. See [CALibration<Sensor>:ZERO:FAST:AUTO](#) on page 344.



**Suffix:**  
 <undef> 1 to n  
 No suffix required.

**Setting parameters:**  
 <auto>

**Usage:** Setting only

## 14.10 Running Selftests

Used for testing the connected power sensors and the R&S NRX.

Further information:

- [Chapter 12.4, "Test"](#), on page 153

<a href="#">DIAGnostic:INFO:OTIME?</a> .....	345
<a href="#">TEST:DEVIce:RESult?</a> .....	345
<a href="#">TEST:DEVIce[:ALL]</a> .....	345
<a href="#">TEST:USB:STORage?</a> .....	346
<a href="#">SYSTem:SENSor&lt;Sensor&gt;:TEST?</a> .....	346
<a href="#">TEST:SENSor&lt;Sensor&gt;?</a> .....	346

---

### 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.

**Example:** DIAG:INFO:OTIM?

**Usage:** Query only

---

### TEST:DEVIce:RESult?

Queries the test results for the keyboard, display and touch panel.

**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 test.

**"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>

**Usage:**               Query only

---

**SYSTem:SENSor<Sensor>:TEST?**

**TEST:SENSor<Sensor>?**

**Usage:**               Query only

**Manual operation:**   See "[Sensor Test](#)" on page 142

## 14.11 Managing Setups and Correction Tables

Manages setups and frequency-dependent correction tables.

Further information:

- [Chapter 10, "Saving and Recalling Settings"](#), on page 123
- ["Frequency Dependent Offset"](#) on page 110

<a href="#">MEMory:CATalog:STATe?</a> .....	347
<a href="#">MEMory:CATalog:TABLE?</a> .....	347
<a href="#">MEMory:CATalog[:ALL]?</a> .....	347
<a href="#">MEMory:CLEar:TABLE</a> .....	348
<a href="#">MEMory:CLEar[:NAME]</a> .....	348
<a href="#">MEMory:FREE:STATe?</a> .....	348
<a href="#">MEMory:FREE:TABLE?</a> .....	348
<a href="#">MEMory:FREE[:ALL]?</a> .....	349
<a href="#">MEMory:NStates?</a> .....	349
<a href="#">MEMory:STATe:CATalog?</a> .....	349
<a href="#">MEMory:STATe:DEFine?</a> .....	349
<a href="#">MEMory:STATe:MAP?</a> .....	349
<a href="#">MEMory:STATe:RESet</a> .....	350
<a href="#">MEMory:TABLE:DATA?</a> .....	350
<a href="#">MEMory:TABLE:DATA:POINts?</a> .....	350
<a href="#">MEMory:TABLE:FREQuency</a> .....	350
<a href="#">MEMory:TABLE:FREQuency:POINts?</a> .....	351
<a href="#">MEMory:TABLE:GAIN:POINts?</a> .....	351
<a href="#">MEMory:TABLE:GAIN[:MAGNitude]</a> .....	351
<a href="#">MEMory:TABLE:MAP?</a> .....	351

MEMory:TABLE:MOVE.....	352
MEMory:TABLE:RESet.....	352
MEMory:TABLE:SElect.....	352

---

### 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 frequency-dependent correction tables.

**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:TABL?  
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](#).

**Query parameters:**

<register\_name>       Setup name; allowed are alphanumeric characters and special characters.

<register\_number>    Memory location of the setup

**0**

Factory-set setup, cannot be changed.

**1 to 19**

Available memory locations.

**Example:**           MEM:STAT:MAP "test",5

**Manual operation:** See ["Save / Recall Setup"](#) on page 124  
 See ["Setup Name"](#) on page 124

**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:TABLE: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.

**Setting 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:TABLE:FREQ 50.00,60,70.3456  
Sets 3 frequency values; 50.00 Hz, 60.00 Hz, 70.35 Hz.

**Usage:** Setting only

**Manual operation:** See "Edit table "<table name>" on page 110

**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 110

**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 110

**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.

**Setting 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:TABL:GAIN 0,0.0033,0.04`  
Sets 3 offset values; 0.000 dB, 0.003 dB, 0.040 dB.

**Usage:** Setting only

**Manual operation:** See "Edit table "<table name>" on page 110

**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`.

**Query 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, cannot be changed.

1 to 9

Available memory locations.

**Example:** MEM:TABL:MAP "test5",5

**Manual operation:** See ["Edit table name"](#) on page 110

### 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.

#### Setting parameters:

<<name>> "<table name>"  
You can query the table names using MEMory:CATalog:TABLE?.

**Example:** MEM:TABL:SEL "Table 1"



**Usage:** Setting only

**Manual operation:** See ["Frequency dependent offset table"](#) on page 110

## 14.12 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 12, "System Settings"](#), on page 127

### 14.12.1 Presetting

<a href="#">SYSTem:PRESet</a> .....	353
<a href="#">SYSTem:SENSor&lt;Sensor&gt;:RESet</a> .....	353

---

#### SYSTem:PRESet

Sets the R&S NRX to a defined initial state.

This command corresponds to the [\\*RST](#) command.

**Usage:** Event

**Manual operation:** See ["Preset"](#) on page 124

---

#### SYSTem:SENSor<Sensor>:RESet

Sets the power 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

### 14.12.2 Shutdown and Reboot

<a href="#">SYSTem:REBoot</a> .....	353
<a href="#">SYSTem:SENSor&lt;Sensor&gt;:REBoot</a> .....	354
<a href="#">SYSTem:SHUTdown</a> .....	354

---

#### SYSTem:REBoot

Reboots the R&S NRX.

**Usage:** Event

**SYSTem:SENSor<Sensor>:REBoot**

Reboots the power 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 instrument.

**Usage:** Event

**14.12.3 Firmware Update**

SYSTem:FWUPdate.....	354
SYSTem:FWUPdate:STATus?.....	355

**SYSTem:FWUPdate <fwudata>**

This command is used to load new operating firmware into the device.

Rohde & Schwarz provides new firmware in form of \*.rsu files. An \*.rsu file often can be downloaded from the Rohde & Schwarz web sites or can be supplied by the customer support or the product marketing. The \*.rsu file is usually packed in a \*zip archive that must be extracted before.

If you want to integrate a firmware update function in their own application, use the SYSTem:FWUPdate command. The parameter of this command is a "Definite Length Arbitrary Block Data" containing the direct copy of the binary \*.rsu file.

A "Definite Length Datablock" has a well-defined format. It consists of:

- A '#' sign.
- A single digit indicating the length of the number which represents the size of the binary file.
- The binary data.
- An appended delimiter (LF, 0x0a).

**Example:**

Lets assume that this file has a size of 10242884 bytes.

To send the file to the sensor for updating the firmware, your application has to assemble a memory block containing:

- The command.
- The "Definite Length Block" header.
- The contents of the \*.rsu file.

- A trailing delimiter (0x0a = Linefeed).

First, have a look at the size of the binary data; it is 10242884 in this case. This number has 8 digits. Now you have all the information to assemble everything:

- The `SYST:FWUP` command
- A blank as a separator
- The '#' sign
- The '8' for the length of the file size
- The '10242884' specifying the size of the file
- ..... (the contents of the \*.rsu file).....
- 0x0a as a delimiter

In this example, you would write exactly 10242905 bytes to the sensor (for example via a 'viWrite()' function).

The result sums up from the values of the above list to:

$9 + 1 + 1 + 1 + 8 + 10242884 + 1 = 10242905$

In a (pseudo) string notation, it is:

`SYST:FWUP #810242884.....(file content)..... <LF> ,`

Where `<LF>` is a single 0x0a character and `.....(file content).....` is the direct byte-by-byte contents of the \*.rsu file.

#### Setting parameters:

`<fwudata>`                      `<block_data>`

**Usage:**                      Setting only

---

#### SYSTem:FWUPdate:STATus?

Reads the result of the firmware update.

While a firmware update is in progress, the LED of the sensor flashes in bright white color. When the firmware update is completed, you can read the result.

The result of the query is a readable string.

**Example:**                      `SYST:FWUP:STAT?`  
                                     Query  
                                     "Success"  
                                     Response

**Usage:**                      Query only

### 14.12.4 Network Settings

<code>SYSTem:COMMunicate:NETWork[:COMMOn]:WORKgroup.....</code>	356
<code>SYSTem:COMMunicate:NETWork:MACaddress?.....</code>	356
<code>SYSTem:COMMunicate:NETWork:REStart.....</code>	356
<code>SYSTem:COMMunicate:NETWork:STATus?.....</code>	356

SYSTem:COMMunicate:INET[:SELF]:DNS:SUFFix.....	356
SYSTem:COMMunicate:NETWork[:COMMON]:DOMain.....	356
SYSTem:COMMunicate:NETWork[:COMMON]:HOSTname.....	357
SYSTem:COMMunicate:INET[:SELF]:DNS:ADDRes.....	357
SYSTem:COMMunicate:NETWork[:IPADdress]:DNS.....	357
SYSTem:COMMunicate:INET[:SELF]:GATeway:ADDRes.....	357
SYSTem:COMMunicate:NETWork[:IPADdress]:GATeway.....	357
SYSTem:COMMunicate:INET[:SELF]:MODE.....	358
SYSTem:COMMunicate:NETWork[:IPADdress]:MODE.....	358
SYSTem:COMMunicate:INET[:SELF]:SUBNetmask:ADDRes.....	358
SYSTem:COMMunicate:NETWork[:IPADdress]:SUBNet:MASK.....	358
SYSTem:COMMunicate:INET[:SELF]:ADDRes.....	358
SYSTem:COMMunicate:NETWork[:IPADdress][:ADDRes].....	358

---

### **SYSTem:COMMunicate:NETWork[:COMMON]:WORKgroup <Workgroup>**

Sets an individual workgroup name for the instrument.

#### **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 instrument, i.e. terminates the connection and sets it up again.

**Usage:**                      Event

---

### **SYSTem:COMMunicate:NETWork:STATus?**

Queries the network configuration state.

**Example:**                      SYSTem:COMMunicate:NETWork:STATus?  
    Response: UP  
    The network is active.

**Usage:**                      Query only

---

### **SYSTem:COMMunicate:INET[:SELF]:DNS:SUFFix <Domain>**

### **SYSTem:COMMunicate:NETWork[:COMMON]:DOMain <Domain>**

Sets the primary DNS (Domain Name System) suffix, that means the DNS name without the hostname part. The DNS system uses the suffix for registration and name resolution for unique identification of the instrument in the entire network.

**Parameters:**

&lt;Domain&gt;

**Example:**

SYSTem:COMMunicate:NETWork:COMMON:DOMain ABC.DE  
Sets the domain of the network to ABC.DE.

**Manual operation:** See ["DNS Suffix"](#) on page 130

**SYSTem:COMMunicate:NETWork[:COMMON]:HOSTname** <Hostname>

Sets the individual hostname of the R&S NRX.

**Parameters:**

&lt;Hostname&gt;

**Example:**

SYST:COMM:NETW:COMM:HOST 'power\_meter\_2'  
Sets *power\_meter\_2* as new hostname.

**Manual operation:** See ["Host Name"](#) on page 129

**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 IP address of the network DNS server.

**Parameters:**

&lt;DNS&gt;

DNS server IPv4 address, consisting of four blocks separated by dots.

Range: 0 to 255

**Example:**

SYST:COMM:NETW:DNS "123.456.0.1"  
Sets the IP address of the DNS server to 123.456.0.1.

**Manual operation:** See ["DNS Server"](#) on page 131

**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:**

&lt;Gateway&gt;

The four parameter form the IP address x.y.z.a.

Range: 0 to 255

**Example:**

SYST:COMM:NETW:GAT "192.168.10.254"  
Sets the IP address of the default gateway to 192.168.10.254.

**Manual operation:** See ["Default Gateway"](#) on page 131

---

**SYSTem:COMMunicate:INET[:SELF]:MODE** <state>

**SYSTem:COMMunicate:NETWork[:IPADdress]:MODE** <mode>

Selects if the IP address is assigned automatically or manually.

**Parameters:**

<mode>                      AUTO | STATic

**AUTO**

Assigns the IP address automatically, provided the network supports DHCP.

**STATic**

Enables assigning the IP address manually.

\*RST:                      AUTO

**Manual operation:**    See ["Address Mode"](#) on page 130

---

**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.

**Parameters:**

<Mask>                      Consists of four blocks separated by dots.

Range:                      0 to 255

**Example:**                      SYST:COMM:NETW:SUBN:MASK "255.255.255.0"  
Sets the subnet mask IP address to 255.255.255.0.

**Manual operation:**    See ["Subnet Mask"](#) on page 131

---

**SYSTem:COMMunicate:INET[:SELF]:ADDRes** <address>

**SYSTem:COMMunicate:NETWork[:IPADdress][:ADDRes]** <IPaddress>

Effective if [SYSTem:COMMunicate:NETWork\[:IPADdress\]:MODE](#) STATic is set.

Sets the IP address of the R&S NRX

**Parameters:**

<IPaddress>                      Consists of four blocks separated by dots.

Range:                      0 to 255

**Example:**                      SYST:COMM:NETW:ADDR 108.0.0.255  
Sets the IP address to 104.0.0.255

**Manual operation:**    See ["IPv4 Address"](#) on page 131

## 14.12.5 Remote Settings

SYSTem:COMMunicate:GPIB[:SELF]:ADDRESS.....	359
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SYSTem:OPT:ANSWer.....	361
SYSTem:OPT:AUTO.....	361
SYSTem:OPT:MODE.....	361
SYSTem:VERSion?.....	361

---

### SYSTem:COMMunicate:GPIB[:SELF]:ADDRESS <address>

Sets the address with which the R&S NRX can be addressed via the IEC/IEEE bus.

#### Parameters:

<address>                      Range:        1 to 30  
                                      \*RST:        20

**Manual operation:**    See "GPIB Address" on page 133

---

### SYSTem:HELP:HEADers? [<Item>]

Returns a list of all SCPI commands supported by the sensor.

#### Query parameters:

<Item>                              <block\_data>

**Usage:**                              Query only

---

### SYSTem:HELP:SYNTax:ALL?

Queries the implemented SCPI commands and their parameters. Returns the result as a block data.

#### Return values:

<Syntax>                              <dblock>

**Usage:**                              Query only

---

### SYSTem:HELP:SYNTax? [<Item>]

Returns the relevant parameter information for the specified SCPI.

#### Query parameters:

<Item>

**Example:**                              SYSTem:HELP:SYNTax? 'sens:aver:coun'

**Usage:** Query only

---

### **SYSTem:IDN:ANSWer** <string>

Effective if **SYSTem:IDN:MODE** USER is set.

Defines the return value for **\*IDN?**.

#### **Parameters:**

<string> Identification string. Maximum string length is 128 characters.

#### **Example:**

SYST:IDN:ANSW "Test Device"

Defines 'Test Device' as identification string.

\*IDN?

Response: 'Test Device'

**Manual operation:** See ["Custom IDN String"](#) on page 134

---

### **SYSTem:IDN:AUTO** <state>

Enables or disables the automatic instrument identification for **\*IDN?**.

#### **Parameters:**

<status> ON | OFF

\*RST: 1

---

### **SYSTem:IDN:MODE** <mode>

Selects which instrument identification string is used.

#### **Parameters:**

<mode> AUTO | USER

#### **AUTO**

Automatic instrument identification

#### **USER**

User-defined instrument identification string. Define the string using **SYSTem:IDN:ANSWer**.

\*RST: AUTO

**Manual operation:** See ["Customization of \\*IDN?"](#) on page 133

---

### **SYSTem:LANGuage** <language>

Sets an emulation of a remote command set of the predecessors or other power meters.

#### **Setting parameters:**

<language> String

#### **SCPI | NRX**

Native remote command set of the R&S NRX.



**NRP2**

Emulation of the R&amp;S NRP2.

**Query parameters:**

&lt;language&gt; String

**SCPI | NRP2****Manual operation:** See "[Language](#)" on page 133**SYSTem:OPT:ANSWer <string>**Effective if [SYSTem:IDN:MODE](#) USER is set.Defines the return value for [\\*OPT?](#).**Parameters:**

&lt;string&gt; Option string. Maximum string length is 128 characters.

**Example:**

SYST:OPT:ANSW "Test Option"

Defines 'Test Option' as option string.

[\\*OPT?](#)

Response: 'Test Option'

**Manual operation:** See "[Custom OPT String](#)" on page 134**SYSTem:OPT:AUTO <state>**Enables or disables the automatic instrument identification for [\\*OPT?](#).**Parameters:**

&lt;status&gt; ON | OFF

[\\*RST:](#) 1**SYSTem:OPT:MODE <mode>**

Selects which option identification string is used.

**Parameters:**

&lt;mode&gt; AUTO | USER

**AUTO**

Automatic option identification string.

**USER**

User-defined option string is used. Define the string using

[\\*OPT?](#).[\\*RST:](#) AUTO**Manual operation:** See "[Customization of \\*OPT?](#)" on page 134**SYSTem:VERSion?**

Queries the SCPI version that the command set of the sensor complies with.

**Example:**           SYST:VERS?  
                   Query  
                   1999.0  
                   Response: SCPI version from 1999.

**Usage:**            Query only

#### 14.12.6 Instrument Information

SYSTem:DID?	362
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SYSTem:INFO[[:INFO]]?	363

---

##### SYSTem:DID?

##### SYSTem:DEVIce:ID?

Queries the Rohde & Schwarz instrument ID.

##### Return values:

<DeviceID>

**Usage:**            Query only

---

##### 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 character(s) for returned information.

**Parameters:**

<termination>              CR | LF | CRLF | STRS  
                                  \*RST:        STRS

**SYSTem:INFO[:INFO]?** [<argument>]

Queries information about the R&S NRX. See ["System Info"](#) on page 144.

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 144

## 14.12.7 Sensor Information

**SYSTem:SENSor<Sensor>:INFO?** [<argument>]

Queries information about the selected power 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

**Query parameters:**

&lt;argument&gt;

**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 "
```

**Response****Usage:**

Query only

**Manual operation:**See ["Sensor Info"](#) on page 141See ["Hide Sensor Overload Message"](#) on page 155**14.12.8 Date and Time Settings**

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SYSTem:DATE:LOCal.....	365
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SYSTem:TIME:HRTimer:ABSolute:SET.....	366
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SYSTem:TIME:UTC.....	367
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---

**SYSTem:DATE** <year>, <month>, <day>

Sets the date for the instrument-internal calendar in coordinated universal time (UTC).

This parameter is protected, in order to prevent accidental changes.

**Parameters:**

<year>	YYYY
<month>	Range: 1 to 12
DD	Range: 1 to 31

---

**SYSTem:DATE:LOCal** <year>, <month>, <day>

Sets the local date.

**Parameters:**

<year>	YYYY
<month>	Range: 1 to 12
<day>	Range: 1 to 31

**Manual operation:** See ["Date"](#) on page 145

---

**SYSTem:DATE:UTC** <year>, <month>, <day>

Sets the date in the coordinated universal time (UTC).

**Parameters:**

<year>	YYYY
<month>	Range: 1 to 12
<day>	Range: 1 to 31

**Manual operation:** See ["Date"](#) on page 145

---

**SYSTem:TIME** <hour>, <min>, <sec>

Sets the time for the instrument-internal calendar.

**Parameters:**

<hour>	hh
<min>	mm
<sec>	ss

---

**SYSTem:TIME:DSTime:MODE** <dst>

Configures whether the operating system automatically adjusts its clock for daylight saving time (DST) or not.

The rules defining when exactly the clock must be adjusted by which offset depend on the configured time zone, see [SYSTem:TIME:DSTime:RULE](#) on page 366.

If the automatism is disabled, the local time is calculated as:

*Local time = UTC + time zone offset (no DST offset)*

**Parameters:**

<dst>                    **1**  
Automatism enabled.

**0**  
Automatism disabled.

**Example:**

SYSTem:TIME:DSTime:MODE 1  
The clock is automatically adjusted.

**SYSTem:TIME:DSTime:RULE <rule>**

Sets the timezone. You can query the list of the available timezones with [SYSTem:TIME:DSTime:RULE:CATalog?](#).

**Parameters:**

<rule>

**Manual operation:** See ["Time Zone Region"](#) on page 145  
See ["Time Zone"](#) on page 145

**SYSTem:TIME:DSTime:RULE:CATalog?**

Querys the list of available timezones.

**Return values:**

<cat>

**Usage:**                    Query only

**Manual operation:** See ["Time Zone Region"](#) on page 145  
See ["Time Zone"](#) on page 145

**SYSTem:TIME:HRTimer:ABSolute:SET**

Define the start time for an absolute timer.

**Return values:**

<year>                    YYYY

<month>                   MM

<day>                    DD

<hour>                   hh

<min>                    mm

<sec>                    ss

<msec>

---

#### **SYSTem:TIME:LOCal** <hour>, <minute>, <second>

Sets the local time.

##### **Parameters:**

<hour>	hh
<minute>	mm
<second>	ss

**Manual operation:** See "Time" on page 145

---

#### **SYSTem:TIME:UTC** <hour>, <minute>, <second>

Sets the time in the coordinated universal time (UTC).

##### **Parameters:**

<hour>	hh
<minute>	mm
<second>	ss

**Manual operation:** See "Time" on page 145

---

#### **SYSTem:TZONE** <hour>, <minute>

Specifies 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).

Changing the time zone (offset) does not affect an eventual DST offset and the time zone configured using `SYSTem:TIME:DSTime:RULE`.

The local time is calculated as: *local time = UTC + time zone offset + DST offset*.

##### **Parameters:**

<hour>	Range:	-12 to 15
<minute>	Range:	-59 to 59

### 14.12.9 Standardized Signal Configuration

<code>SYSTem:STANdard:CATalog?</code> .....	368
<code>SYSTem:STANdard:PRESet</code> .....	368
<code>SYSTem:STANdard:PWSettings</code> .....	368
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---

**SYSTem:STANdard:CATalog?**

Queries the supported standards. Use the returned strings for `SYSTem:STANdard:PRESet`.

**Usage:** Query only

---

**SYSTem:STANdard:PRESet <string>**

Configures the R&S NRX for the selected standard. Query the supported standards using `SYSTem:STANdard:CATalog?`.

Also configures:

- Dialogs, depending on the setting of `SYSTem:STANdard:PWSettings`.
- Triggering, depending on the setting of `SYSTem:STANdard:TRIGger:SOURce`.

**Setting parameters:**

<string>                      <block\_data>

**Usage:** Setting only

---

**SYSTem:STANdard:PWSettings <state>**

Specifies the effect of `SYSTem:STANdard:PRESet` on dialog configurations.

**Parameters:**

<state>                      **ON**  
 Only sets the power sensor parameters. Retains the dialog configurations.

**OFF**  
 Also configures the dialogs for the selected standard.

\*RST:                      OFF

---

**SYSTem:STANdard:TRIGger:SOURce <source>**

`SYSTem:STANdard:PRESet` uses the trigger source as set here.

**Parameters:**

<source>                      INTernal | EXTernal

**INTernal**  
 Internal triggering

**EXTernal**  
 External triggering

\*RST:                      INTernal



## 14.12.10 Error Messages

SYSTem:ERRor:ALL?	369
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SYSTem:SERRor:LIST:NEXT?	370
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SYSTem:SERRor[:ALL]?	371

---

### SYSTem:ERRor:ALL?

Queries all unread entries in the error/event queue and removes them from the queue. The response is a comma-separated list of error numbers and a short error description in the first-in first-out order.

#### Return values:

<ErrorNumber>      Positive error numbers are instrument-dependent. Negative error numbers are reserved by the SCPI standard.

<ErrorText>      Short error description

**Usage:**      Query only

---

### SYSTem:ERRor:CODE:ALL?

Queries all unread entries in the error/event queue and removes them from the queue. Only the error numbers are returned and not the entire error text.

#### Return values:

<ErrorCode>      Error number

**0**

No errors have occurred since the error queue was last read out.

**Usage:**      Query only

---

### SYSTem:ERRor:CODE[:NEXT]?

Queries the oldest entry in the error queue and then deletes it. Only the error number is returned and not the entire error text.

#### Return values:

<Error>

#### Example:

SYSTem:ERRor:CODE

Queries the oldest entry in the error queue.

Response: 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 error queue.

**Return values:**

<ErrorCount>

**Example:**

SYSTem:ERRor:COUNT

Queries the number of entries in the error queue.

Response: 1

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, with 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 error/event queue for the oldest item and removes it from the queue. The response consists of an error number and a short error description.

**Return values:**

<ErrorCode>

Positive error numbers are instrument-dependent. Negative error numbers are reserved by the SCPI standard.

0

No errors have occurred since the error queue was last read out.

<ErrorDescription>

Short error description

**Usage:**

Query only

---

**SYSTem:SERRor:LIST:ALL?**

Queries the list of all static errors that have occurred so far. The list is persistent. You can remove entries using [SYSTem:SERRor:REMove](#).

**Usage:**

Query only

---

**SYSTem:SERRor:LIST:NEXT?**

Queries the list of all static errors that have occurred but have already been resolved for the oldest entry and removes it from the queue. The response consists of an error number and a short description of the error.

**Usage:**

Query only

**SYSTem:SERRor:REMove <num>**

Removes an entry from the list of static errors. The entry is identified by its error number.

**Setting parameters:**

<num> Unique sequence number

**Usage:** Setting only

**SYSTem:SERRor[:ALL]?**

Queries the (next) error from the list of static errors.

**Usage:** Query only

**14.12.11 Locking****SYSTem:LOCK:SHARed:STRing?**

Returns 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:**

<result>

**Usage:** Query only

**SYSTem:LOCK:TIMEout <timeout>**

Sets the maximum time in milliseconds to wait when processing a command if the device is locked and the sender of the command is not the owner of the lock before the command is discarded and an error is written to the error queue.

**Setting parameters:**

<timeout>

**Return values:**

<result>

**14.13 Using the Status Register**

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### 14.13.1 General Status Register Commands

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---

#### 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.

Positive error numbers indicate sensor specific errors, negative error numbers are error messages defined by SCPI.

If the error queue is empty, the error number 0, "No error", is returned.

#### Return values:

<ErrorCode>

<ErrorDescription>

**Usage:**                      Query only

### 14.13.2 Reading Out the CONDition Part

---

#### STATus:DEvIce:CONDition?

STATus:OPERation:BIT<bitno>:CONDition?

STATus:OPERation:CALibrating:CONDition?

STATus:OPERation:CONDition?

STATus:OPERation:LLFail<RegisterIndex>:CONDition?

STATus:OPERation:MEASuring:CONDition?

STATus:OPERation:MEASuring:EXTension<RegisterIndex>:CONDition?

STATus:OPERation:SENSe:CONDition?

STATus:OPERation:TRIGger:CONDition?

STATus:OPERation:TRIGger:EXTension<RegisterIndex>:CONDition?

STATus:OPERation:ULFail<RegisterIndex>:CONDition?

STATus:QUESTionable:BIT<bitno>:CONDition?

STATus:QUESTionable:CALibration:CONDition?

STATus:QUESTionable:CONDition?

STATus:QUESTionable:MEASure<RegisterIndex>:CONDition?

STATus:QUESTionable:POWEr:CONDition?

STATus:QUESTionable:WINDow<RegisterIndex>:CONDition?

#### Suffix:

<RegisterIndex>            1 to 8  
                                 Register

**Usage:**                      Query only

### 14.13.3 Reading Out 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

### 14.13.4 Controlling the ENABLE Part

---

**STATus:DEVIce:ENABLE <value>**  
**STATus:OPERation:BIT<bitno>:ENABLE <RegisterBit>**  
**STATus:OPERation:CALibrating:ENABLE <value>**  
**STATus:OPERation:ENABLE <RegisterValue>**  
**STATus:OPERation:LLFail<RegisterIndex>:ENABLE <value>**  
**STATus:OPERation:MEASuring:ENABLE <value>**  
**STATus:OPERation:MEASuring:EXTension<RegisterIndex>:ENABLE <value>**  
**STATus:OPERation:SENSe:ENABLE <value>**  
**STATus:OPERation:TRIGger:ENABLE <value>**  
**STATus:OPERation:TRIGger:EXTension<RegisterIndex>:ENABLE <value>**  
**STATus:OPERation:ULFail<RegisterIndex>:ENABLE <value>**  
**STATus:QUESTionable:BIT<bitno>:ENABLE <RegisterBit>**  
**STATus:QUESTionable:CALibration:ENABLE <value>**  
**STATus:QUESTionable:ENABLE <RegisterValue>**  
**STATus:QUESTionable:MEASure<RegisterIndex>:ENABLE <value>**  
**STATus:QUESTionable:POWer:ENABLE <value>**  
**STATus:QUESTionable:WINDow<RegisterIndex>:ENABLE <value>**  
**Suffix:**  
 <RegisterIndex>      1 to 8  
                              Register

**Parameters:**

&lt;value&gt;                      \*RST:        0

**14.13.5 Controlling the Negative Transition Part**


---

**STATus:DEvIce:NTRansition** <value>  
**STATus:OPERation:BIT<bitno>:NTRansition** <RegisterBit>  
**STATus:OPERation:CALibrating:NTRansition** <value>  
**STATus:OPERation:LLFail<RegisterIndex>:NTRansition** <value>  
**STATus:OPERation:MEASuring:NTRansition** <value>  
**STATus:OPERation:MEASuring:EXTension<RegisterIndex>:NTRansition** <value>  
**STATus:OPERation:NTRansition** <RegisterValue>  
**STATus:OPERation:SENSe:NTRansition** <value>  
**STATus:OPERation:TRIGger:NTRansition** <value>  
**STATus:OPERation:TRIGger:EXTension<RegisterIndex>:NTRansition** <value>  
**STATus:OPERation:ULFail<RegisterIndex>:NTRansition** <value>  
**STATus:QUEStionable:BIT<bitno>:NTRansition** <RegisterBit>  
**STATus:QUEStionable:CALibration:NTRansition** <value>  
**STATus:QUEStionable:NTRansition** <RegisterValue>  
**STATus:QUEStionable:MEASure<RegisterIndex>:NTRansition** <value>  
**STATus:QUEStionable:POWer:NTRansition** <value>  
**STATus:QUEStionable:WINDow<RegisterIndex>:NTRansition** <value>  
**Suffix:**  
 <RegisterIndex>        1 to 8  
                              Register

**Parameters:**

&lt;value&gt;                      \*RST:        0

**14.13.6 Controlling the Positive Transition Part**


---

**STATus:DEvIce:PTRansition** <value>  
**STATus:OPERation:BIT<bitno>:PTRansition** <RegisterBit>  
**STATus:OPERation:CALibrating:PTRansition** <value>  
**STATus:OPERation:LLFail<RegisterIndex>:PTRansition** <value>  
**STATus:OPERation:MEASuring:PTRansition** <value>  
**STATus:OPERation:PTRansition** <RegisterValue>  
**STATus:OPERation:MEASuring:EXTension<RegisterIndex>:PTRansition** <value>  
**STATus:OPERation:SENSe:PTRansition** <value>  
**STATus:OPERation:TRIGger:PTRansition** <value>  
**STATus:OPERation:TRIGger:EXTension<RegisterIndex>:PTRansition** <value>  
**STATus:OPERation:ULFail<RegisterIndex>:PTRansition** <value>  
**STATus:QUEStionable:BIT<bitno>:PTRansition** <RegisterBit>  
**STATus:QUEStionable:CALibration:PTRansition** <value>  
**STATus:QUEStionable:MEASure<RegisterIndex>:PTRansition** <value>  
**STATus:QUEStionable:POWer:PTRansition** <value>

**STATus:QUESTIONable:PTRansition** <RegisterValue>

**STATus:QUESTIONable:WINDow<RegisterIndex>:PTRansition** <value>

**Suffix:**

<RegisterIndex>      1 to 8  
Register

**Parameters:**

<value>                      \*RST:          65535

## 14.14 R&S NRP2 Compatibility

This chapter 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.

### 14.14.1 CALCulate Commands

<a href="#">CALCulate&lt;Measurement&gt;:STATistics:MARKer:HORizontal:POSition[:X][:POWER]</a> .....	375
<a href="#">CALCulate&lt;Measurement&gt;:STATistics:MARKer:VERTical:POSition[:Y]</a> .....	375
<a href="#">CALCulate&lt;Measurement&gt;:TRACe:MARKer&lt;Marker&gt;:XPOSition</a> .....	376

---

**CALCulate<Measurement>:STATistics:MARKer:HORizontal:POSition[:X][:POWER]** <value>

Available for R&S NRP2 compatibility. Recommended R&S NRX 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 using [SYSTem:LANGuage](#) "NRP2".

**Suffix:**

<Measurement>      1 to 4  
Measurement channel

**Parameters:**

<value>

---

**CALCulate<Measurement>:STATistics:MARKer:VERTical:POSition[:Y]** <value>

Available for R&S NRP2 compatibility. Recommended R&S NRX 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 using `SYSTem:LANGuage "NRP2"`.

**Suffix:**

<Measurement>      1 to 4  
Measurement channel

**Parameters:**

<value>

**CALCulate<Measurement>:TRACe:MARKer<Marker>:XPOStion <value>**

Available for R&S NRP2 compatibility. Recommended R&S NRX command:

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

**Suffix:**

<Measurement>      1 to 4  
Measurement channel

<Marker>              1 to 4  
Marker (M1 to M4)

**Parameters:**

<value>              Default unit: s

## 14.14.2 DISPlay Commands

<code>DISPlay:ILLumination</code> .....	376
<code>DISPlay[:WINDow&lt;Undef&gt;]:SElect</code> .....	377
<code>DISPlay[:WINDow&lt;Undef&gt;]:SIZE</code> .....	377
<code>DISPlay[:WINDow&lt;Window&gt;]:ANALog:LOWer:POWer</code> .....	377
<code>DISPlay[:WINDow&lt;Window&gt;]:ANALog:LOWer:RATio</code> .....	377
<code>DISPlay[:WINDow&lt;Window&gt;]:ANALog:UPPer:POWer</code> .....	378
<code>DISPlay[:WINDow&lt;Window&gt;]:ANALog:UPPer:RATio</code> .....	378
<code>DISPlay[:WINDow&lt;Window&gt;]:AVALue</code> .....	378
<code>DISPlay[:WINDow&lt;Window&gt;]:FORMat</code> .....	378
<code>DISPlay[:WINDow&lt;Window&gt;]:METer:LOWer:POWer</code> .....	379
<code>DISPlay[:WINDow&lt;Window&gt;]:METer:LOWer:RATio</code> .....	379
<code>DISPlay[:WINDow&lt;Window&gt;]:METer:UPPer:POWer</code> .....	379
<code>DISPlay[:WINDow&lt;Window&gt;]:METer:UPPer:RATio</code> .....	380
<code>DISPlay[:WINDow&lt;Window&gt;]:RESolution</code> .....	380
<code>DISPlay[:WINDow&lt;Window&gt;]:TRACe:LOWer</code> .....	380
<code>DISPlay[:WINDow&lt;Window&gt;]:TRACe:UPPer</code> .....	381
<code>DISPlay[:WINDow&lt;Window&gt;]:TSLot</code> .....	381

**DISPlay:ILLumination <state>**

Available for R&S NRP2 compatibility. Recommended R&S NRX command:

`DISPlay:BRIGhtness`



**Parameters:**

<state>                      \*RST:        ON

**DISPlay[:WINDow<Undef>]:SElect <window>**

Available for R&S NRP2 compatibility. Recommended R&S NRX command:

None. The commands of the DISPlay system conform to the R&S NRX concept.

**Suffix:**

<Undef>                      1 to n  
No suffix required.

**Parameters:**

<window>                    Range:        1 to 4  
\*RST:                        1

**DISPlay[:WINDow<Undef>]:SIZE <size>**

Available for R&S NRP2 compatibility. Recommended R&S NRX command:

None. The commands of the DISPlay system conform to the R&S NRX concept.

**Suffix:**

<Undef>                      1 to n  
No suffix required.

**Parameters:**

<size>                        NORMal | ZOOMed  
\*RST:                        NORMal

**DISPlay[:WINDow<Window>]:ANALog:LOWer:POWer <value>**

Available for R&S NRP2 compatibility. Recommended R&S NRX command:

CALCulate<Measurement>:METer<DirectionalChannel>:LOWer[:DATA] [:  
POWer] on page 202

**Suffix:**

<Window>                    1 to 4  
Measurement channel

**Parameters:**

<value>

**DISPlay[:WINDow<Window>]:ANALog:LOWer:RATio <value>**

Available for R&S NRP2 compatibility. Recommended R&S NRX command:

CALCulate<Measurement>:METer<DirectionalChannel>:LOWer[:DATA] :  
RATio[:VALue] on page 201

**Suffix:**

<Window>                      1 to 4  
Measurement channel

**Parameters:**

<value>

**DISPlay[:WINDow<Window>]:ANALog:UPPer:POWer <value>**

Available for R&S NRP2 compatibility. Recommended R&S NRX command:

CALCulate<Measurement>:METer<DirectionalChannel>:UPPer[:DATA][:POWer] on page 204

**Suffix:**

<Window>                      1 to 4  
Measurement channel

**Parameters:**

<value>                      <block\_data>

**DISPlay[:WINDow<Window>]:ANALog:UPPer:RATio <value>**

Available for R&S NRP2 compatibility. Recommended R&S NRX command:

CALCulate<Measurement>:METer<DirectionalChannel>:UPPer[:DATA]:RATio[:VALue] on page 204

**Suffix:**

<Window>                      1 to 4  
Measurement channel

**Parameters:**

<value>                      <block\_data>

**DISPlay[:WINDow<Window>]:AVALue <auxiliaries>**

Available for R&S NRP2 compatibility. Recommended R&S NRX command:

CALCulate<Measurement>:AVALue

**Suffix:**

<Window>                      1 to 4  
Measurement channel

**Parameters:**

<auxiliaries>                      NONE | NORMAl | EXTRemes | STATistics  
\*RST:                      NONE

**DISPlay[:WINDow<Window>]:FORMat <format>**

Available for R&S NRP2 compatibility. Recommended R&S NRX 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 channel

**Parameters:**

<format>                    DIGital | ANALog | GRAPhical  
\*RST:                    DIGital

**DISPlay[:WINDow<Window>]:METer:LOWer:POWer <value>**

Available for R&S NRP2 compatibility. Recommended R&S NRX command:

CALCulate<Measurement>:METer<DirectionalChannel>:LOWer[:DATA][:  
POWer] on page 202

**Suffix:**

<Window>                    1 to 4  
Measurement channel

**Parameters:**

<value>

**DISPlay[:WINDow<Window>]:METer:LOWer:RATio <value>**

Available for R&S NRP2 compatibility. Recommended R&S NRX command:

CALCulate<Measurement>:METer<DirectionalChannel>:LOWer[:DATA]:  
RATio[:VALue] on page 201

**Suffix:**

<Window>                    1 to 4  
Measurement channel

**Parameters:**

<value>

**DISPlay[:WINDow<Window>]:METer:UPPer:POWer <value>**

Available for R&S NRP2 compatibility. Recommended R&S NRX command:

CALCulate<Measurement>:METer<DirectionalChannel>:UPPer[:DATA][:  
POWer] on page 204

**Suffix:**

<Window>                    1 to 4  
Measurement channel

**Parameters:**

<value>

**DISPlay[:WINDow<Window>]:METer:UPPer:RATio <value>**

Available for R&S NRP2 compatibility. Recommended R&S NRX command:

CALCulate<Measurement>:METer<DirectionalChannel>:UPPer[:DATA]:  
RATio[:VALue] on page 204

**Suffix:**

<Window>                    1 to 4  
                                 Measurement channel

**Parameters:**

<value>

**DISPlay[:WINDow<Window>]:RESolution <resolution>**

Available for R&S NRP2 compatibility. Recommended R&S NRX command:

CALCulate<Measurement>:RESolution

**Suffix:**

<Window>                    1 to 4  
                                 Measurement channel

**Parameters:**

<resolution>                I | OI | OOI | OOOI

**DISPlay[:WINDow<Window>]:TRACe:LOWer <value>**

Available for R&S NRP2 compatibility. Recommended R&S NRX 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 channel

**Parameters:**

&lt;value&gt;

**DISPlay[:WINDow<Window>]:TRACe:UPPer <value>**

Available for R&amp;S NRP2 compatibility. Recommended R&amp;S NRX 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 channel

**Parameters:**

&lt;value&gt;

**DISPlay[:WINDow<Window>]:TSLot <slot>**

Available for R&amp;S NRP2 compatibility. Recommended R&amp;S NRX command:

```

CALCulate<Measurement>[:POWER]:TSLot[:AVG]:SElection

```

**Suffix:**

<Window>	1 to 4
	Measurement channel

**Parameters:**

<slot>	Range:	1 to 4
	*RST:	1

### 14.14.3 OUTPut Commands

OUTPut:RECOder<output>[:STATe].....	382
OUTPut:RECOder<output>:FEED[:VALue].....	382
OUTPut:ROSCillator[:STATe].....	382
OUTPut:TRIGger[:STATe].....	382
OUTPut:TTL:ACTive.....	383
OUTPut:TTL:FAIL.....	383
OUTPut:TTL:FEED.....	383
OUTPut:TTL[:STATe].....	383

---

#### OUTPut:RECOder<output>[:STATe] <state>

Available for R&S NRP2 compatibility. Recommended R&S NRX 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:RECOder<output>:FEED[:VALue] <string>

Available for R&S NRP2 compatibility. Recommended R&S NRX command:

OUTPut:RECOder<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 R&S NRP2 compatibility. Recommended R&S NRX command:

OUTPut:SOURce:STATe

##### Parameters:

<state>

---

#### OUTPut:TRIGger[:STATe] <state>

Available for R&S NRP2 compatibility. Recommended R&S NRX command:

OUTPut:MODE<output>

**Parameters:**

&lt;state&gt;

**OUTPut:TTL:ACTive** <mode>

Available for R&amp;S NRP2 compatibility. Recommended R&amp;S NRX command:

`OUTPut:LIMit:FAIL`**Parameters:**

&lt;mode&gt;                      LOW | HIGH

**OUTPut:TTL:FAIL** <mode>

Available for R&amp;S NRP2 compatibility. Recommended R&amp;S NRX command:

`OUTPut:LIMit:FAIL`**Parameters:**

&lt;mode&gt;                      LOW | HIGH

**OUTPut:TTL:FEED** <feed>

Available for R&amp;S NRP2 compatibility. Recommended R&amp;S NRX command:

`OUTPut:LIMit:FEED:INDEX`**Parameters:**

&lt;feed&gt;

**OUTPut:TTL[:STATe]** <state>

Available for R&amp;S NRP2 compatibility. Recommended R&amp;S NRX command:

`OUTPut:MODE<output>`**Parameters:**

&lt;state&gt;

**14.14.4 SENSE Commands**

<code>[SENSe&lt;Sensor&gt;:]AVERage:COUNT:AUTO:MTIME</code> .....	385
<code>[SENSe&lt;Sensor&gt;:]AVERage:COUNT:AUTO:NSRatio</code> .....	386
<code>[SENSe&lt;Sensor&gt;:]AVERage:COUNT:AUTO:SLOT</code> .....	386
<code>[SENSe&lt;Sensor&gt;:]AVERage:COUNT:AUTO:TYPE</code> .....	386
<code>[SENSe&lt;Sensor&gt;:]AVERage:COUNT:AUTO[:STATe]</code> .....	387
<code>[SENSe&lt;Sensor&gt;:]AVERage:COUNT:ENUM</code> .....	387
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[SENSe<Sensor>:]CORRection:DCYClE:STATe.....	390
[SENSe<Sensor>:]CORRection:DCYClE[:INPut][:MAGNitude].....	390
[SENSe<Sensor>:]CORRection:DCYClE[:VALue].....	391
[SENSe<Sensor>:]CORRection:FDOFFset[:INPut][:MAGNitude]?.....	391
[SENSe<Sensor>:]CORRection:FDOTable:STATe.....	391
[SENSe<Sensor>:]CORRection:FDOTable[:SElect].....	391
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[SENSe<Sensor>:]FUNCTion[:ON].....	393
[SENSe<Sensor>:]INFormation?.....	393
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[SENSe<Sensor>:]INPut:ATTenuation[:VALue].....	393
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[SENSe<Sensor>:][POWer:][BURSt:DTOLerance.....	395
[SENSe<Sensor>:][POWer:][NCORrection[:STATe].....	395
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[SENSe<Sensor>:][POWer:][TGATe<Gate>[:EXCLude]:MID:TIME.....	397
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[SENSe<Sensor>:][POWer:][TSLot[:AVG][:EXCLude]:MID:OFFSet[:TIME].....	398
[SENSe<Sensor>:][POWer:][TSLot[:AVG][:EXCLude]:MID:TIME.....	398
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[SENSe<Sensor>:]ROSCillator:REFio:OUTPut[:STATe].....	400
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[SENSe<Sensor>:]STATistics:SCALE:X:POINts.....	402
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[SENSe<Sensor>:]TRACe:ESAMpling:AUTO.....	406
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[SENSe<Sensor>:]TRACe:MEASurement:DEFine:DURation:REFerence.....	406
[SENSe<Sensor>:]TRACe:MEASurement:DEFine:TRANSition:HREFerence.....	407
[SENSe<Sensor>:]TRACe:MEASurement:DEFine:TRANSition:LREFerence.....	407
[SENSe<Sensor>:]TRACe:MEASurement:POWer:AVG?.....	408
[SENSe<Sensor>:]TRACe:MEASurement:POWer:HREFerence?.....	408
[SENSe<Sensor>:]TRACe:MEASurement:POWer:LREFerence?.....	408
[SENSe<Sensor>:]TRACe:MEASurement:POWer:MAX?.....	408
[SENSe<Sensor>:]TRACe:MEASurement:POWer:MIN?.....	409
[SENSe<Sensor>:]TRACe:MEASurement:POWer:PULSe:BASE?.....	409
[SENSe<Sensor>:]TRACe:MEASurement:POWer:PULSe:TOP?.....	409
[SENSe<Sensor>:]TRACe:MEASurement:POWer:REFerence?.....	409
[SENSe<Sensor>:]TRACe:MEASurement:PULSe:DCYCLe?.....	410
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[SENSe<Sensor>:]TRACe:MEASurement:PULSe:PERiod?.....	410
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[SENSe<Sensor>:]TRACe:MEASurement:TRANSition:POSitive:OCCurrence?.....	412
[SENSe<Sensor>:]TRACe:MEASurement:TRANSition:POSitive:OVERshoot?.....	412
[SENSe<Sensor>:]TRACe:MEASurement:TRANSition:SPERiod?.....	412
[SENSe<Sensor>:]TRACe:POINts.....	413

---

### [SENSe<Sensor>:]AVERAge:COUNT:AUTO:MTIME <maximum\_time>

Available for R&S NRP2 compatibility. Recommended R&S NRX 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 to 1000.0  
                              \*RST:      4.00  
                              Default unit: s

**[SENSe<Sensor>:]AVERage:COUNT:AUTO:NSRatio <nsr>**

Available for R&S NRP2 compatibility. Recommended R&S NRX 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 to 1.0  
                              \*RST:      0.01  
                              Default unit: dB

**[SENSe<Sensor>:]AVERage:COUNT:AUTO:SLOT <slot>**

Available for R&S NRP2 compatibility. Recommended R&S NRX 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 R&S NRP2 compatibility. Recommended R&S NRX 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 R&S NRP2 compatibility. Recommended R&S NRX 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>

**[SENSe<Sensor>:]AVERage:COUNT:ENUM <value>**

Available for R&S NRP2 compatibility. Recommended R&S NRX 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 R&S NRP2 compatibility. Recommended R&S NRX 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  
 \*RST: 4

**[SENSe<Sensor>:]AVERage:TCONtrol <mode>**

Available for R&S NRP2 compatibility. Recommended R&S NRX 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  
\*RST: REPeat

**[SENSe<Sensor>:]AVERage:TYPE <type>**

Available for R&S NRP2 compatibility. Recommended R&S NRX 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 R&S NRP2 compatibility. Recommended R&S NRX 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>:]BANDwidth:VIDeo <mode>**

Available for R&S NRP2 compatibility. Recommended R&S NRX command:

CALCulate<Measurement>[:CHANnel<Channel>][:POWer]:VBWidth:ENUM

CALCulate<Measurement>[:CHANnel<Channel>]:NRT:VBWidth[:VALue]

**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;mode&gt;

**[SENSe<Sensor>:]BURSt:MODE <mode>**

Available for R&S NRP2 compatibility. Recommended R&S NRX command:

```
CALCulate<Measurement>[:CHANnel<Channel>]:NRT:BURSt:MODE
```

**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;mode&gt;

AUTO | USER

\*RST: AUTO

**[SENSe<Sensor>:]BURSt:PERiod <value>**

Available for R&S NRP2 compatibility. Recommended R&S NRX command:

```
CALCulate<Measurement>[:CHANnel<Channel>]:NRT:BURSt:PERiod
```

**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;value&gt;

Range: 0.0 to 1.0

\*RST: 0.1

Default unit: s

**[SENSe<Sensor>:]BURSt:WIDTh <width>**

Available for R&S NRP2 compatibility. Recommended R&S NRX command:

```
CALCulate<Measurement>[:CHANnel<Channel>]:NRT:BURSt:WIDTh
CALCulate<Measurement>[:CHANnel<Channel>][:POWer]:VBWidth:ENUM
on page 320
```

**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:**

<width>                      Range:        0.0 to 1.0  
                                  \*RST:        0.01  
                                  Default unit: s

**[SENSe<Sensor>:]BWIDth:VIDeo <mode>**

Available for R&S NRP2 compatibility. Recommended R&S NRX 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>:]CORRection:DCYClE:STATe <state>**

Available for R&S NRP2 compatibility. Recommended R&S NRX 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 R&S NRP2 compatibility. Recommended R&S NRX 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 R&S NRP2 compatibility. Recommended R&S NRX 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 to 100.00

\*RST: 50.0

Default unit: pct

**[SENSe<Sensor>:]CORRection:FDOFFset[:INPut][:MAGNitude]?**

Available for R&S NRP2 compatibility. Recommended R&S NRX 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 R&S NRP2 compatibility. Recommended R&S NRX command:

```
CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:OFFSet:TABLE[: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>:]CORRection:FDOTable[:SELEct] <table\_name>**

Available for R&S NRP2 compatibility. Recommended R&S NRX 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 R&S NRP2 compatibility. Recommended R&S NRX 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 R&S NRP2 compatibility. Recommended R&S NRX 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:**

&lt;offset&gt;

Range: -200.00 to 200.00

\*RST: 0.0

Default unit: dB

**[SENSe<Sensor>:]DATA? [<function>]**

Available for R&S NRP2 compatibility. Recommended R&S NRX command:

```
CALCulate<Measurement>:DATA?
```

**Query parameters:**

&lt;function&gt;

**Usage:**

Query only



---

**[SENSe<Sensor>:]DM:WCDMa:CRATe <value>**

Available for R&S NRP2 compatibility. Recommended R&S NRX command:

`CALCulate<Measurement>[:CHANnel<Channel>]:NRT:DMODulation:WCDMa:CRATe`

**Parameters:**

<value>                      Range:        0.0 to 8.2e6  
                              \*RST:        1.0e6  
                              Default unit: Hz

---

**[SENSe<Sensor>:]FUNCTION[:ON] <function>**

Available for R&S NRP2 compatibility. Recommended R&S NRX command:

`CALCulate<Measurement>[:CHANnel<Channel>]:FEED<Channel>`

**Parameters:**

<function>                      \*RST:        POWER:AVG

---

**[SENSe<Sensor>:]INFormation?**

Available for R&S NRP2 compatibility. Recommended R&S NRX command:

`SYSTem:SENSor<Sensor>:INFO?`

**Usage:**                      Query only

---

**[SENSe<Sensor>:]INPut:ATTenuation:AUTO <auto>**

Available for R&S NRP2 compatibility. Recommended R&S NRX 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 R&S NRP2 compatibility. Recommended R&S NRX command:

`CALCulate<Measurement>[:CHANnel<Channel>]:INPut:ATTenuation[:VALue]`

**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;value&gt;

Range: 0.0 to 30.0

\*RST: 30.0

Default unit: dB

**[SENSe<Sensor>:]INTernal:TRIGger:JITTer:METHod <method>**

Available for R&S NRP2 compatibility. Recommended R&S NRX command:

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

**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;method&gt;

COMPensate | MEASure | NONE

\*RST: COMPensate

**[SENSe<Sensor>:][POWER:][AVG:]APERture[:VALue] <integration\_time>**

Available for R&S NRP2 compatibility. Recommended R&S NRX command:

```
CALCulate<Measurement>[:CHANnel<Channel>][:POWER][:AVG]:  
APERture[:VALue]
```

**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;integration\_time&gt;

Range: 8.3e-9 to 30.0

\*RST: 0.005

Default unit: s

**[SENSe<Sensor>:][POWER:][AVG:]SMOothing:STATe <state>**

Available for R&S NRP2 compatibility. Recommended R&S NRX command:

```
CALCulate<Measurement>[:CHANnel<Channel>][:POWER][:AVG]:  
SMOothing[: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;

ON | OFF

\*RST: OFF

**[SENSe<Sensor>:][POWER:]BURSt:DTOLerance <tolerance>**

Available for R&S NRP2 compatibility. Recommended R&S NRX command:

```
CALCulate<Measurement>[:CHANnel<Channel>][:POWER]:BURSt:DTOLerance
```

**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;tolerance&gt;

Range: 0.00 to 0.30

\*RST: 1.000e-6

Default unit: s

**[SENSe<Sensor>:][POWER:]NCORrection[:STATe] <state>**

Available for R&S NRP2 compatibility. Recommended R&S NRX command:

```
CALCulate<Measurement>[:CHANnel<Channel>][:POWER]:NCORrection[: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>:][POWER:]TGATe:SELEct <gate>**

Available for R&S NRP2 compatibility. Recommended R&S NRX command:

```
CALCulate<Measurement>[:POWER]:TGATe<Undef>[:AVG]:SELEction
```

**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;gate&gt;

**[SENSe<Sensor>:][POWER:]TGATe<Gate>:OFFSet:TIME <time>**

Available for R&amp;S NRP2 compatibility. Recommended R&amp;S NRX command:

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

&lt;Gate&gt;

1 to 4

Time gate

**Parameters:**

&lt;time&gt;

Default unit: s

**[SENSe<Sensor>:][POWER:]TGATe<Gate>:TIME <time>**

Available for R&amp;S NRP2 compatibility. Recommended R&amp;S NRX command:

`CALCulate<Measurement>[:POWER]:TGATe<Gate>[:AVG]:TIME`**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

&lt;Gate&gt;

1 to 4

Time gate

**Parameters:**

&lt;time&gt;

Default unit: s

**[SENSe<Sensor>:][POWER:]TGATe<Gate>[:EXCLude]:MID:OFFSet[:TIME]  
<time\_interval>**

Available for R&amp;S NRP2 compatibility. Recommended R&amp;S NRX command:

`CALCulate<Measurement>[:POWER]:TGATe<Gate>[:AVG][:EXCLude]:MID:OFFSet[:TIME]`**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

&lt;Gate&gt;

1 to 4

Time gate

**Parameters:**

<time\_interval>      Default unit: s

---

**[SENSe<Sensor>:][POWER:]TGATe<Gate>[:EXCLude]:MID:TIME** <time\_interval>

Available for R&S NRP2 compatibility. Recommended R&S NRX 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 R&S NRP2 compatibility. Recommended R&S NRX 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 R&S NRP2 compatibility. Recommended R&S NRX 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 R&S NRP2 compatibility. Recommended R&S NRX 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 to 0.10  
\*RST: 1.000e-3  
Default unit: s

---

**[SENSe<Sensor>:][POWER:]TSLot[:AVG][:EXCLude]:MID:OFFSet[:TIME] <time>**

Available for R&S NRP2 compatibility. Recommended R&S NRX 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 to 0.10  
\*RST: 0.00  
Default unit: s

---

**[SENSe<Sensor>:][POWER:]TSLot[:AVG][:EXCLude]:MID:TIME <time>**

Available for R&S NRP2 compatibility. Recommended R&S NRX 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 to 0.10  
\*RST: 0.00  
Default unit: s

---

**[SENSe<Sensor>:][POWER:]TSLot[:AVG][:EXCLude]:MID:STATe] <state>**

Available for R&S NRP2 compatibility. Recommended R&S NRX 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 R&S NRP2 compatibility. Recommended R&S NRX command:

CALCulate<Measurement>[:CHANnel<Channel>]:NRT:CCDF:THReshold  
on page 327

**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 to +110.0  
\*RST: +0.0  
Default unit: dBm

**[SENSe<Sensor>:]POWER:PEP:HOLD <time>**

Available for R&S NRP2 compatibility. Recommended R&S NRX command:

CALCulate<Measurement>[:CHANnel<Channel>]:NRT:PEP:HOLD:TIME

**Parameters:**

<time> Range: 1.0e-3 to 1.0e-1  
\*RST: 6.0e-2  
Default unit: s

**[SENSe<Sensor>:]RANGe:AUTO <state>**

Available for R&S NRP2 compatibility. Recommended R&S NRX 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 R&S NRP2 compatibility. Recommended R&S NRX 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 to 0.00  
\*RST: 0.00  
Default unit: dB

**[SENSe<Sensor>:]RANGe[:VALue] <range>**

Available for R&S NRP2 compatibility. Recommended R&S NRX 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 R&S NRP2 compatibility. Recommended R&S NRX 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 to 1.2e+8  
\*RST: 1.0e+7  
Default unit: Hz

**[SENSe<Sensor>:]ROSCillator:REFio:OUTPut[:STATe] <value>**

Available for R&S NRP2 compatibility. Recommended R&S NRX 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 R&S NRP2 compatibility. Recommended R&S NRX 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 R&S NRP2 compatibility. Recommended R&S NRX 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 R&S NRP2 compatibility. Recommended R&S NRX 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 R&S NRP2 compatibility. Recommended R&S NRX 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 R&S NRP2 compatibility. Recommended R&S NRX 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 R&S NRP2 compatibility. Recommended R&S NRX 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 R&S NRP2 compatibility. Recommended R&S NRX 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 R&S NRP2 compatibility. Recommended R&S NRX 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 to 100.0  
\*RST: 50.0  
Default unit: dB

---

**[SENSe<Sensor>:]STATistics:SCALE:X:RLEVel <rlev>**

Available for R&S NRP2 compatibility. Recommended R&S NRX 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 to 220.0  
\*RST: -30.0  
Default unit: dBm

---

**[SENSe<Sensor>:]STATistics:TIME <time>**

Available for R&S NRP2 compatibility. Recommended R&S NRX command:

`CALCulate<Measurement>[:POWER]:TGATe<Gate>[:AVG]:TIME` if a gate is set.

`CALCulate<Measurement>:STATistics:APERTure` if no gate is set.

**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;time&gt;

Range: 10.0e-6 to 0.3

\*RST: 0.01

Default unit: s

**[SENSe<Sensor>:]STATistics[:EXCLude]:MID:OFFSet[:TIME] <time>**

Available for R&S NRP2 compatibility. Recommended R&S NRX command:

```
CALCulate<Measurement>[:POWER]:TGATe<Gate>[:AVG][:EXCLude]:MID:OFFSet[:TIME]
```

**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;time&gt;

Range: 0.0 to 0.3

\*RST: 0.0

Default unit: s

**[SENSe<Sensor>:]STATistics[:EXCLude]:MID:TIME <time>**

Available for R&S NRP2 compatibility. Recommended R&S NRX command:

```
CALCulate<Measurement>[:POWER]:TGATe<Gate>[:AVG][:EXCLude]:MID:TIME
```

**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;time&gt;

Range: 0.0 to 0.3

\*RST: 0.0

Default unit: s

**[SENSe<Sensor>:]TIMing:EXCLude:START <exclude\_start>**

Available for R&S NRP2 compatibility. Recommended R&S NRX 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 to 15.0  
\*RST: 0.0  
Default unit: s

**[SENSe<Sensor>:]TIMing:EXCLude:STOP <exclude\_stop>**

Available for R&S NRP2 compatibility. Recommended R&S NRX 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 to 15.0  
\*RST: 0.0  
Default unit: s

**[SENSe<Sensor>:]TRACe:AVERage:COUNT <filter length>**

Available for R&S NRP2 compatibility. Recommended R&S NRX 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 R&S NRP2 compatibility. Recommended R&S NRX 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 R&S NRP2 compatibility. Recommended R&S NRX 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 R&S NRP2 compatibility. Recommended R&S NRX 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 R&S NRP2 compatibility. Recommended R&S NRX 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 R&S NRP2 compatibility. Recommended R&S NRX 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 R&S NRP2 compatibility. Recommended R&S NRX 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 R&S NRP2 compatibility. Recommended R&S NRX 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 R&S NRP2 compatibility. Recommended R&S NRX command:

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

**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:HREFerence?**

Available for R&S NRP2 compatibility. Recommended R&S NRX command:

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

**Usage:**

Query only

---

**[SENSe<Sensor>:]TRACe:MEASurement:POWer:LREFerence?**

Available for R&S NRP2 compatibility. Recommended R&S NRX command:

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

**Usage:**

Query only

---

**[SENSe<Sensor>:]TRACe:MEASurement:POWer:MAX?**

Available for R&S NRP2 compatibility. Recommended R&S NRX command:

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

**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:MIN?**

Available for R&S NRP2 compatibility. Recommended R&S NRX command:

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

**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 R&S NRP2 compatibility. Recommended R&S NRX command:

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

**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 R&S NRP2 compatibility. Recommended R&S NRX command:

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

**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 R&S NRP2 compatibility. Recommended R&S NRX command:

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

---

**[SENSe<Sensor>:]TRACe:MEASurement:PULSe:DCYClE?**

Available for R&S NRP2 compatibility. Recommended R&S NRX 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 R&S NRP2 compatibility. Recommended R&S NRX 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 R&S NRP2 compatibility. Recommended R&S NRX 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 R&S NRP2 compatibility. Recommended R&S NRX 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 R&S NRP2 compatibility. Recommended R&S NRX command:

`CALCulate<Measurement>:TRACe:MEASurement:TRANSition:ESAMpling:AUTO[:STATe]` on page 308

**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 R&S NRP2 compatibility. Recommended R&S NRX 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 R&S NRP2 compatibility. Recommended R&S NRX 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 R&S NRP2 compatibility. Recommended R&S NRX command:

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

**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

**Usage:**

Query only

**[SENSe<Sensor>:]TRACe:MEASurement:TRANSition:POSitive:DURation?**

Available for R&S NRP2 compatibility. Recommended R&S NRX command:

CALCulate<Measurement>:TRACe:MEASurement:TRANSition:POSitive:DURation?

**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

**Usage:**

Query only

**[SENSe<Sensor>:]TRACe:MEASurement:TRANSition:POSitive:OCCurrence?**

Available for R&S NRP2 compatibility. Recommended R&S NRX 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&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Usage:**

Query only

**[SENSe<Sensor>:]TRACe:MEASurement:TRANSition:POSitive:OVERshoot?**

Available for R&S NRP2 compatibility. Recommended R&S NRX 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&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Usage:**

Query only

**[SENSe<Sensor>:]TRACe:MEASurement:TRANSition:SPERiod?**

Available for R&S NRP2 compatibility. Recommended R&S NRX command:

`CALCulate<Measurement>:TRACe:MEASurement:TRANsition:SPERiod?`

**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:POINts** <points>

Available for R&S NRP2 compatibility. Recommended R&S NRX command:

`CALCulate<Measurement>:TRACe: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: 1 to 8192

\*RST: 260

# 15 Remote Control Basics

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## 15.1 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 15-1: Supported interfaces and protocols**

Interface	Protocol	VISA <sup>*)</sup> address string	Library	Further information
USB	USBTMC	USB::<vendor ID>::<product ID>::<serial number>::INSTR	VISA	<a href="#">Chapter 15.1.1, "USB Interface"</a> , on page 414
Ethernet	VXI-11	TCPIP::host address[::LAN device name]::INSTR	VISA	<a href="#">Chapter 15.1.2.2, "VXI-11 Protocol"</a> , on page 417
	HiSLIP High-speed LAN instrument protocol (IVI-6.1)	TCPIP::host address::hislip0[::INSTR]	VISA	<a href="#">Chapter 15.1.2.3, "HiSLIP Protocol"</a> , on page 417
	Socket communication (SCPI raw)	TCPIP::host address[::LAN device name]::<port>::SOCKET		<a href="#">Chapter 15.1.2.4, "Socket Communication"</a> , on page 418
GPIB/ IEEE488 interface (R&S NRX-B8)	GPIB/IEEE 488	GPIB::<primary address>::INSTR		<a href="#">Chapter 15.1.3, "GPIB Interface"</a> , on page 418
<sup>*)</sup> 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 15.1.2.1, "VISA Resource Strings"</a> , on page 416.				

### 15.1.1 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

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 instrument- and vendor-specific information. The syntax of the used USB resource string is:

USB::::<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::0x015B::100001

0x0AAD is the vendor ID for Rohde & Schwarz.

0x015B is the product ID for the R&S NRX.

100001 is the serial number of the particular R&S NRX.

## 15.1.2 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.

### 15.1.2.1 VISA Resource Strings

The VISA resource string for network device communication is required to establish a communication session between the controller and the power 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::[::<LAN device name>][::INSTR]

- *TCPIP* designates the network protocol used
- *<IP address or hostname>* is the IP address or hostname of the device
- *[::<LAN device name>]* defines the protocol and the instance number of a sub-instrument:
- *[::INSTR]* indicates the power sensors resource class (optional)

The IP address or hostname is used by the programs to identify and control the sensor. While the hostname 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.

#### VXI-11

TCPIP::[::*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.

For further details, see [Chapter 15.1.2.2, "VXI-11 Protocol"](#), on page 417.

#### HiSLIP

TCPIP::::*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.

For further details, see [Chapter 15.1.2.3, "HiSLIP Protocol"](#), on page 417.

#### Socket communication

TCPIP::::*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.

For further details, see [Chapter 15.1.2.4, "Socket Communication"](#), on page 418.

**Example:**

A power sensor has the IP address *10.111.11.20*; the valid resource string using VXI-11 protocol is:

TCPIP::10.111.11.20::INSTR

The DNS hostname 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

### 15.1.2.2 VXI-11 Protocol

The VXI-11 standard is based on the ONC RPC (Open Network Computing Remote Procedure Call) protocol which in turn relies on TCP/IP as the network/transport layer. The TCP/IP network protocol and the associated network services are preconfigured. TCP/IP ensures connection-oriented communication, where the order of the exchanged messages is adhered to and interrupted links are identified. With this protocol, messages cannot be lost.

### 15.1.2.3 HiSLIP Protocol

The HiSLIP (high-speed LAN instrument protocol) is the successor protocol for VXI-11 for TCP-based instruments specified by the IVI foundation. The protocol uses two TCP sockets for a single connection - the first for fast data transfer, the second one for non-sequential control commands (e.g. *Device Clear* or *SRQ*).

HiSLIP has the following characteristics:

- High performance as with raw socket network connections
- Compatible IEEE 488.2 support for Message Exchange Protocol, Device Clear, Serial Poll, Remote/Local, Trigger, and Service Request.
- Uses a single IANA registered port (4880), which simplifies the configuration of firewalls.
- Supports simultaneous access of multiple users by providing versatile locking mechanisms.
- Usable for IPv6 or IPv4 networks.



The HiSLIP data is sent to the device using the "fire and forget" method with immediate return. Opposed to VXI-11, where each operation is blocked until a VXI-11 device handshake returns. Thus, a successful return of a VISA operation such as `viWrite()` does not guarantee that the sensor has finished (or even started) executing the requested command. It just indicates that the command has been delivered to the TCP/IP buffers.

For more information see also the application note at:

<http://www.rohde-schwarz.com/appnote/1MA208>.

#### 15.1.2.4 Socket Communication

An alternative way for remote control of the software is to establish a simple TCP/IP connection to the device using the standard network drivers of your operating system. The so-called "socket" on Linux, "winsock" on Windows. The socket communication, also referred to as "raw Ethernet communication", does not necessarily require a VISA installation on the remote controller side.

Socket connections are established on a specially defined port. The socket address is a combination of the IP address or hostname of the sensor and the number of the port configured for remote control. The power sensors use port number 5025 for this purpose.

#### 15.1.3 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

## 15.2 SCPI Command Structure

SCPI commands - messages - are used for remote control. Commands that are not taken from the SCPI standard follow the SCPI syntax rules. The power sensor supports the SCPI version 1999. The SCPI standard is based on standard IEEE 488.2 and aims at the standardization of device-specific commands, error handling and the status registers.

SCPI commands consist of a so-called header and, usually, one or more parameters. The header and the parameters are separated by a "white space" (ASCII code 0 to 9, 11 to 32 decimal, e.g. blank). The headers can consist of several mnemonics (key-words). Queries are formed by appending a question mark directly to the header.

The commands can be either device-specific or device-independent (common commands). Common and device-specific commands differ in their syntax.

### 15.2.1 Syntax for Common Commands

Common (=device-independent) commands consist of a header preceded by an asterisk (\*) and possibly one or more parameters.

**Examples:**

*RST	RESET	Resets the instrument.
*ESE	EVENT STATUS ENABLE	Sets the bits of the event status enable registers.
*ESR?	EVENT STATUS QUERY	Queries the contents of the event status register.
*IDN?	IDENTIFICATION QUERY	Queries the instrument identification string.

### 15.2.2 Syntax for Device-Specific Commands

#### Long and short form

The mnemonics feature a long form and a short form. The short form is marked by upper case letters here, to distinguish it from the long form, which constitutes the complete word. Either the short form or the long form can be entered; other abbreviations are not permitted.

**Example:**

`INITiate:CONTinuous` is equivalent to `INIT:CONT` or `init:cont`.



#### Case-insensitivity

Upper case and lower case notation only serves to distinguish the two forms in the manual, the instrument itself is case-insensitive.

#### Numeric suffixes

If a command can be applied to multiple instances of an object, e.g. specific channels or sources, the required instances can be specified by a suffix added to the command. Numeric suffixes are indicated by angular brackets (<1...4>, <n>, <i>) and are replaced by a single value in the command. Entries without a suffix are interpreted as having the suffix 1.



### Different numbering in remote control

For remote control, the suffix can differ from the number of the corresponding selection used in manual operation. SCPI prescribes that suffix counting starts with 1. Suffix 1 is the default state and used when no specific suffix is specified.

Some standards define a fixed numbering, starting with 0. If the numbering differs in manual operation and remote control, it is indicated for the corresponding command.

### Optional mnemonics

Some command systems permit certain mnemonics to be inserted into the header or omitted. These mnemonics are marked by square brackets in the description. The instrument must recognize the long command to comply with the SCPI standard. Some commands are considerably shortened by these optional mnemonics.

#### Example:

Definition: `INITiate[:IMMediate]`

Command: `INIT:IMM` is equivalent to `INIT`

### Parameters

Parameters must be separated from the header by a "white space". If several parameters are specified in a command, they are separated by a comma.

For a description of the parameter types, refer to [Chapter 15.2.3, "SCPI Parameters"](#), on page 420.

### Special characters

	<b>Parameters</b> A vertical stroke in parameter definitions indicates alternative possibilities in the sense of "or". The effect of the command differs, depending on which parameter is used.
[ ]	Mnemonics in square brackets are optional and can be inserted into the header or omitted. <b>Example:</b> <code>INITiate[:IMMediate]</code> <code>INIT:IMM</code> is equivalent to <code>INIT</code>
{ }	Parameters in curly brackets are optional and can be inserted once or several times, or omitted.

## 15.2.3 SCPI Parameters

Many commands are supplemented by a parameter or a list of parameters. The parameters must be separated from the header by a "white space" (ASCII code 0 to 9, 11 to 32 decimal, e.g. blank). Allowed parameters are:

- Numeric values
- Special numeric values
- Boolean parameters
- Text

- Character strings
- Block data

The parameters required for each command and the allowed range of values are specified in the command description.

### Numeric values

Numeric values can be entered in any form, i.e. with sign, decimal point and exponent. Values exceeding the resolution of the instrument are rounded up or down. The mantissa can comprise up to 255 characters, the exponent must lie inside the value range -32000 to 32000. The exponent is introduced by an "E" or "e". Entry of the exponent alone is not allowed.

### Units

For physical quantities, you can enter the unit. Units and prefixes, as defined by the international system of units (SI), are allowed and recognized. If you omit the unit, the default or set unit is used. See also [Chapter 14.4.1.3, "Units"](#), on page 188.

If you need decimal multiples and submultiples of a unit, you can use SCPI prefixes, see [Table 15-2](#). 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 15-2: 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

### Special numeric values

The texts listed below are interpreted as special numeric values. For a query, the numeric value is provided.

- **MIN/MAX**  
MINimum and MAXimum denote the minimum and maximum value.
- **DEF**

DEFault denotes a preset value which has been stored in the non-variable memory. This value conforms to the default setting, as it is called by the \*RST command.

- **UP/DOWN**

UP, DOWN increases or reduces the numeric value by one step. The step width can be specified via an allocated step command for each parameter which can be set via UP, DOWN.

- **INF/NINF**

INFINITY, Negative INFINITY (NINF) represent the numeric values 9.9E37 or -9.9E37, respectively. INF and NINF are only sent as instrument responses.

- **NAN**

Not A Number (NAN) represents the value 9.91E37. NAN is only sent as an instrument response. This value is not defined. Possible causes are the division by zero, the subtraction of infinite from infinite and the representation of missing values.

### Boolean Parameters

Boolean parameters represent two states. The "ON" state (logically true) is represented by "ON" or a numeric value 1. The "OFF" state (logically untrue) is represented by "OFF" or the numeric value 0. The numeric values are provided as the response for a query.

#### Example:

Setting command: `SENSe:AVERage:COUNT:AUTO ON`

Query: `SENSe:AVERage:COUNT:AUTO?`

Response: 1

### Text parameters

Text parameters observe the syntactic rules for mnemonics, i.e. they can be entered using a short or long form. Like any parameter, they have to be separated from the header by a white space. For a query, the short form of the text is provided.

#### Example:

Setting command: `TRIGger:SLOPe POSitive`

Query: `TRIG:SLOP?`

Response: POS

### Character strings

Enter strings always in quotation marks (' or ").

#### Example:

Setting command: `SENSe:FUNCtion "POWer:AVG"`

Query: `SENS:FUNC?`

Response: "POWer:AVG"

### Block data

Block data is a format which is suitable for the transmission of large amounts of data. A command using a block data parameter has the following structure:

#### Example:

```
SYSTem:HELP:SYNTax:ALL?
```

```
Response: #45168xxxxxxxxx
```

The ASCII character # introduces the data block. The next number indicates how many of the following digits describe the length of the data block. In the example, the 4 following digits indicate the length to be 5168 bytes. The data bytes follow. During the transmission of these data bytes all end or other control signs are ignored until all bytes are transmitted.

#0 specifies a data block of indefinite length. The use of the indefinite format requires a `NL^END` message to terminate the data block. This format is useful when the length of the transmission is not known or if speed or other considerations prevent segmentation of the data into blocks of definite length.

## 15.2.4 Overview of Syntax Elements

The following table provides an overview of the syntax elements:

:	The colon separates the mnemonics of a command. In a command line, the separating semicolon marks the uppermost command level.
;	The semicolon separates two commands of a command line. It does not alter the path.
,	The comma separates several parameters of a command.
?	The question mark forms a query.
*	The asterisk marks a common command.
' "	Quotation marks introduce a string and terminate it (both single and double quotation marks are possible).
#	The hash symbol introduces binary, octal, hexadecimal and block data. <ul style="list-style-type: none"> <li>• Binary: #B10110</li> <li>• Octal: #O7612</li> <li>• Hex: #HF3A7</li> <li>• Block: #21312</li> </ul>
	A "white space" (ASCII-Code 0 to 9, 11 to 32 decimal, e.g. blank) separates the header from the parameters.

## 15.2.5 Structure of a Command Line

A command line can consist of one or several commands. It is terminated by one of the following:

- a <New Line>
- a <New Line> with EOI

- an EOI together with the last data byte

Several commands in a command line must be separated by a semicolon ";". If the next command belongs to a different command system, the semicolon is followed by a colon.

If the successive commands belong to the same system, having one or several levels in common, the command line can be abbreviated. To this end, the second command after the semicolon starts with the level that lies below the common levels. The colon following the semicolon must be omitted in this case.

**Example:**

```
TRIG:LEV 0.1mW;TRIG:DEL 3E-3
```

This command line contains two commands. Both commands are part of the `TRIG` command system, i.e. they have one level in common.

When abbreviating the command line, the second command begins with the level below `TRIG`. The colon after the semicolon is omitted. The abbreviated form of the command line reads as follows:

```
TRIG:LEV 0.1E-3;DEL 3E-3
```

A new command line always begins with the complete path.

**Example:**

```
TRIG:LEV 0.1E-3
```

```
TRIG:DEL 3E-3
```

## 15.2.6 Responses to Queries

A query is defined for each setting command unless explicitly specified otherwise. It is formed by adding a question mark to the associated setting command. According to SCPI, the responses to queries are partly subject to stricter rules than in standard IEEE 488.2.

- The requested parameter is transmitted without a header.  
**Example:** `TRIG:SOUR?`, Response: `INT`
- Maximum values, minimum values and all other quantities that are requested via a special text parameter are returned as numeric values.
- Numeric values are output without a unit. Physical quantities are referred to the basic units or to the units set using the `Unit` command. The response `3.5E9` for example stands for 3.5 GHz.
- Truth values (Boolean values) are returned as 0 (for OFF) and 1 (for ON).

**Example:**

Setting command: `SENS:AVER:COUN:AUTO ON`

Query: `SENS:AVER:COUN:AUTO?`

Response: 1

- Text (character data) is returned in a short form.

**Example:**



Setting command: TRIGger:SOURce INTernal

Query: TRIG:SOUR?

Response: INT

## 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

### G

**GPIB:** 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 acknowledgement

### P

**PEP:** Peak envelope power

### S

**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

## List of Commands

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