

# R&S®NRX Power Meter User Manual



1178556602  
Version 08

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This manual describes the R&S®NRX (1424.7005.02) with firmware version FW 02.40 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)
- R&S®NRX-K301 (1444.0041.02)

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1178.5566.02 | Version 08 | 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.

# Contents

<b>1</b>	<b>Safety and Regulatory Information.....</b>	<b>13</b>
1.1	Korea Certification Class B.....	13
<b>2</b>	<b>Welcome.....</b>	<b>14</b>
2.1	Documentation Overview.....	14
2.1.1	Getting Started Manual.....	14
2.1.2	User Manual.....	14
2.1.3	Tutorials.....	14
2.1.4	Instrument Security Procedures.....	14
2.1.5	Basic Safety Instructions.....	15
2.1.6	Data Sheets and Brochures.....	15
2.1.7	Release Notes and Open Source Acknowledgment (OSA).....	15
2.2	Key Features.....	15
<b>3</b>	<b>Getting Started.....</b>	<b>17</b>
3.1	Preparing for Use.....	17
3.1.1	Unpacking and Checking.....	17
3.1.1.1	Accessory List.....	17
3.1.2	Operating Conditions.....	17
3.1.3	Considerations for Test Setup.....	18
3.1.4	Placing on a Bench Top.....	18
3.1.5	Mounting in a Rack.....	19
3.1.6	Connecting to the AC Power Supply.....	19
3.1.7	Switching On or Off.....	20
3.1.8	Connecting Power Sensors.....	21
3.1.8.1	Sensor Connectors A to D.....	21
3.1.8.2	Optional Sensor Interface for R&S NRT (R&S NRX-B9).....	22
3.1.8.3	LAN Interface.....	22
3.1.8.4	USB 2.0 Host Interfaces.....	23
3.1.9	Connecting USB and External Devices.....	23
3.2	Instrument Tour.....	23
3.2.1	Front Panel Tour.....	23
3.2.1.1	Sensor Connector A and B.....	24

3.2.1.2	Module Bay.....	24
3.2.1.3	Touchscreen.....	25
3.2.1.4	Keys.....	25
3.2.1.5	USB Host Interface.....	27
3.2.1.6	On/Standby Key.....	27
3.2.2	Rear Panel Tour.....	28
3.2.2.1	Trig In / Out 2 and Out 1 / Trig Out Connectors.....	28
3.2.2.2	Ethernet Interface.....	28
3.2.2.3	USB Device Interface.....	29
3.2.2.4	USB Host Interface.....	29
3.2.2.5	AC Supply and Power Switch.....	29
3.2.2.6	IEC 625/IEEE 488 Interface.....	29
3.2.2.7	Sensor Connectors C and D.....	30
<b>4</b>	<b>Operating Concepts.....</b>	<b>31</b>
<b>4.1</b>	<b>Manual Operation.....</b>	<b>31</b>
4.1.1	Start Dialog.....	31
4.1.2	Main Measurement Dialog.....	32
4.1.3	Status Information.....	34
4.1.4	Notification Center.....	35
4.1.5	Selecting the Display Layout.....	36
4.1.6	Swapping Measurement Panes.....	38
4.1.7	Editing Parameters.....	39
4.1.8	Creating and Saving Screenshots.....	40
4.1.9	Restricting Manual Operation.....	40
<b>4.2</b>	<b>Remote Operation.....</b>	<b>41</b>
<b>4.3</b>	<b>Remote Control.....</b>	<b>42</b>
4.3.1	Switching to Remote Control (REMOTE).....	42
4.3.2	Returning to Manual Operation (LOCAL).....	43
<b>5</b>	<b>Measurement Basics.....</b>	<b>44</b>
<b>5.1</b>	<b>Parallel Measurements.....</b>	<b>44</b>
<b>5.2</b>	<b>Sensor Assignment and Memory.....</b>	<b>44</b>
<b>5.3</b>	<b>Performing a Measurement.....</b>	<b>46</b>
<b>5.4</b>	<b>Limit Violation.....</b>	<b>47</b>

5.5	Settings Conflict.....	48
<b>6</b>	<b>Configuration for All Measurement Types.....</b>	<b>50</b>
6.1	Display Settings.....	50
6.2	Controlling the Measurement.....	59
6.2.1	Controlling the Measurement Results.....	60
6.3	Triggering.....	60
6.3.1	Trigger States.....	60
6.3.2	Trigger Sources.....	61
6.3.3	Dropout Time.....	62
6.3.4	Hold-Off Time.....	62
6.3.5	Trigger Settings.....	63
6.4	Measurement Settings Dialog.....	67
<b>7</b>	<b>Measurement Types and Result Displays.....</b>	<b>71</b>
7.1	Continuous Average.....	71
7.1.1	Continuous Average Result Display.....	71
7.1.2	Continuous Average Settings.....	72
7.2	Burst Average.....	73
7.2.1	Burst Average Result Display.....	74
7.2.2	Burst Average Settings.....	74
7.3	Trace.....	75
7.3.1	Trace Result Display.....	75
7.3.2	Trace Settings.....	76
7.3.3	Trace Marker Dialog.....	77
7.4	Pulse Analysis.....	80
7.4.1	Pulse Analysis Result Display.....	81
7.4.2	Pulse Analysis Settings.....	81
7.4.3	Pulse Analysis Dialog.....	82
7.5	Time Gate.....	89
7.5.1	Time Gate Result Display.....	90
7.5.2	Time Gate Settings.....	91
7.5.3	Gate Configuration Dialog.....	93
7.6	Timeslot.....	94
7.6.1	Timeslot Result Display.....	95

7.6.2	Timeslot Settings.....	97
7.6.3	Timeslot Configuration Dialog.....	98
<b>7.7</b>	<b>Statistics.....</b>	<b>100</b>
7.7.1	Statistics Result Display.....	100
7.7.2	Statistics Settings.....	102
7.7.3	Measurement Settings Dialog.....	103
7.7.4	Scale Configuration Dialog.....	104
7.7.5	Statistics Timing Dialog.....	106
<b>7.8</b>	<b>NRT.....</b>	<b>107</b>
7.8.1	NRT Result Display.....	107
7.8.2	NRT Settings.....	108
7.8.3	Measurement Main Configuration Dialog.....	112
<b>8</b>	<b>Sensor Configuration.....</b>	<b>114</b>
<b>8.1</b>	<b>Mode Settings.....</b>	<b>114</b>
<b>8.2</b>	<b>Correction Settings.....</b>	<b>118</b>
<b>8.3</b>	<b>Filter Settings.....</b>	<b>121</b>
<b>8.4</b>	<b>Range Settings.....</b>	<b>125</b>
<b>8.5</b>	<b>NRT Measurement Type.....</b>	<b>127</b>
8.5.1	NRT Mode Settings.....	128
8.5.2	NRT Correction Settings.....	129
8.5.3	NRT Filter Settings.....	131
<b>9</b>	<b>Saving and Recalling Settings.....</b>	<b>133</b>
<b>10</b>	<b>Zeroing Sensors.....</b>	<b>135</b>
<b>11</b>	<b>System Settings.....</b>	<b>137</b>
<b>11.1</b>	<b>Connections.....</b>	<b>137</b>
11.1.1	Network Settings.....	138
11.1.2	Remote Settings.....	141
11.1.3	Input/Output Settings (I/O).....	144
11.1.4	Sensor Manager.....	150
<b>11.2</b>	<b>Instrument Info.....</b>	<b>153</b>
11.2.1	System Info.....	153
11.2.2	Security Settings.....	156

11.2.3	Option Settings.....	161
11.2.4	Help & Copyrights.....	164
<b>11.3</b>	<b>Hardware Configuration.....</b>	<b>165</b>
<b>11.4</b>	<b>Test.....</b>	<b>166</b>
<b>11.5</b>	<b>Global Settings.....</b>	<b>167</b>
<b>12</b>	<b>Option Management.....</b>	<b>169</b>
<b>12.1</b>	<b>Installing a License Key.....</b>	<b>169</b>
<b>13</b>	<b>Firmware Update.....</b>	<b>170</b>
<b>13.1</b>	<b>Firmware Update via PC and USB or Ethernet Connection.....</b>	<b>170</b>
13.1.1	Hardware and Software Requirements.....	170
13.1.2	Preparing an Update.....	171
13.1.3	Updating the Application Firmware.....	172
<b>13.2</b>	<b>Firmware Update via a USB Flash Memory Stick.....</b>	<b>175</b>
13.2.1	Hardware and Software Requirements.....	175
13.2.2	Preparing an Update.....	175
13.2.3	Updating the Application Firmware.....	176
<b>14</b>	<b>Remote Control Commands.....</b>	<b>177</b>
<b>14.1</b>	<b>Conventions Used in SCPI Command Descriptions.....</b>	<b>177</b>
<b>14.2</b>	<b>Common Commands.....</b>	<b>177</b>
<b>14.3</b>	<b>Addressing Measurements and Sensors.....</b>	<b>186</b>
<b>14.4</b>	<b>Making Measurements.....</b>	<b>187</b>
14.4.1	Continuous Average Measurements.....	187
14.4.2	Continuous Average Measurements with Buffering.....	194
14.4.3	Trace Measurements.....	201
14.4.4	Burst Average Measurements.....	203
14.4.5	Timeslot Measurements.....	211
14.4.6	Statistics Measurements.....	220
<b>14.5</b>	<b>Starting and Ending a Measurement.....</b>	<b>222</b>
<b>14.6</b>	<b>Measurement Settings and Results.....</b>	<b>225</b>
14.6.1	Configuring Display and Results.....	226
14.6.1.1	General Settings.....	226
14.6.1.2	Scaling.....	232

14.6.1.3	Units.....	245
14.6.1.4	Limits.....	248
14.6.1.5	Result Formats and Screenshots.....	257
14.6.2	Configuring the Trigger.....	258
14.6.3	Selecting the Measurement.....	267
14.6.4	Selecting the Power Sensor.....	270
14.6.5	Relative Measurements.....	271
14.6.6	Continuous Average.....	274
14.6.7	Trace.....	275
14.6.7.1	Trace Measurement Settings.....	275
14.6.7.2	Using Markers.....	277
14.6.8	Pulse Analysis.....	284
14.6.9	Time Gate.....	300
14.6.10	Timeslot.....	302
14.6.11	Statistics.....	305
14.6.11.1	Statistics Measurement Settings.....	305
14.6.11.2	Scaling.....	308
14.6.11.3	Using Markers.....	312
14.6.12	NRT.....	314
14.6.13	Querying Measurement Results.....	321
<b>14.7</b>	<b>Calculation Functions.....</b>	<b>323</b>
14.7.1	Selecting a Calculation Function.....	323
<b>14.8</b>	<b>Configuring Sensors.....</b>	<b>325</b>
14.8.1	Setting the Frequency.....	325
14.8.2	Sensor Modes.....	326
14.8.3	Sensor Corrections.....	330
14.8.4	Sensor Filters.....	335
14.8.5	Sensor Ranges.....	343
14.8.6	Standardized Signals.....	346
14.8.6.1	Commands.....	346
14.8.6.2	Preconfigured Settings.....	348
14.8.6.3	Display Configuration.....	358
14.8.7	Frequency Selective Power Sensors.....	359



14.8.8	NRT Measurement Type.....	361
14.8.8.1	NRT Mode Settings.....	361
14.8.8.2	NRT Correction Settings.....	365
14.8.8.3	NRT Filter Settings.....	368
<b>14.9</b>	<b>Configuring the Test Generator.....</b>	<b>371</b>
<b>14.10</b>	<b>Configuring the Analog Signal Output and the Trigger Input/Output.....</b>	<b>373</b>
<b>14.11</b>	<b>Zeroing.....</b>	<b>382</b>
<b>14.12</b>	<b>Running Selftests.....</b>	<b>384</b>
<b>14.13</b>	<b>Managing Setups and Correction Tables.....</b>	<b>386</b>
<b>14.14</b>	<b>System Information and Configuration.....</b>	<b>393</b>
14.14.1	Presetting.....	394
14.14.2	Shutdown and Reboot.....	394
14.14.3	Firmware Update.....	395
14.14.4	Network Settings.....	396
14.14.5	Remote Settings.....	399
14.14.6	Managing Sensors.....	403
14.14.7	Instrument Information.....	404
14.14.8	Date and Time Settings.....	406
14.14.9	Notifications and Errors.....	408
14.14.9.1	System Event Queue.....	409
14.14.9.2	Changes in the System Event Queue.....	410
14.14.9.3	SCPI Communication Error Queue.....	410
14.14.10	Locking.....	412
<b>14.15</b>	<b>Using the Status Register.....</b>	<b>413</b>
14.15.1	General Status Register Commands.....	413
14.15.2	Reading Out the CONDition Part.....	414
14.15.3	Reading Out the EVENT Part.....	414
14.15.4	Controlling the ENABLE Part.....	415
14.15.5	Controlling the Negative Transition Part.....	415
14.15.6	Controlling the Positive Transition Part.....	416
<b>14.16</b>	<b>Remote Emulation.....</b>	<b>417</b>
14.16.1	R&S NRP2 Compatibility.....	417
14.16.1.1	CALCulate Commands.....	417

14.16.1.2	DISPlay Commands.....	419
14.16.1.3	OUTPut Commands.....	424
14.16.1.4	SENSe Commands.....	426
<b>15</b>	<b>Remote Control Basics.....</b>	<b>457</b>
<b>15.1</b>	<b>Remote Control Interfaces and Protocols.....</b>	<b>457</b>
15.1.1	USB Interface.....	457
15.1.2	Ethernet Interface.....	458
15.1.2.1	VISA Resource Strings.....	459
15.1.2.2	VXI-11 Protocol.....	460
15.1.2.3	HiSLIP Protocol.....	460
15.1.2.4	Socket Communication.....	461
15.1.3	GPIB Interface.....	461
<b>15.2</b>	<b>SCPI Command Structure.....</b>	<b>461</b>
15.2.1	Syntax for Common Commands.....	462
15.2.2	Syntax for Device-Specific Commands.....	462
15.2.3	SCPI Parameters.....	463
15.2.4	Overview of Syntax Elements.....	466
15.2.5	Structure of a Command Line.....	466
15.2.6	Responses to Queries.....	467
<b>15.3</b>	<b>Command Sequence and Synchronization.....</b>	<b>468</b>
15.3.1	Preventing Overlapping Execution.....	468
<b>15.4</b>	<b>Status Reporting System.....</b>	<b>468</b>
15.4.1	Hierarchy of the Status Registers.....	469
15.4.2	Structure of a SCPI Status Register.....	470
15.4.3	Status Byte (STB) and Service Request Enable Register (SRE).....	472
15.4.4	IST Flag and Parallel Poll Enable Register (PPE).....	473
15.4.5	Device Status Register.....	473
15.4.6	Questionable Status Register.....	475
15.4.6.1	Questionable Power Status Register.....	476
15.4.6.2	Questionable Measurement Status Registers.....	477
15.4.6.3	Questionable Calibration Status Register.....	478
15.4.7	Standard Event Status and Enable Register (ESR, ESE).....	479
15.4.8	Operation Status Register.....	480

15.4.8.1	Operation Calibrating Status Register.....	481
15.4.8.2	Operation Measuring Status Register.....	482
15.4.8.3	Operation Measuring Extended Status Registers.....	483
15.4.8.4	Operation Trigger Status Register.....	484
15.4.8.5	Operation Trigger Extended Status Registers.....	485
15.4.8.6	Operation Sense Status Register.....	486
15.4.8.7	Operation Lower Limit Fail Status Registers.....	487
15.4.8.8	Operation Upper Limit Fail Status Registers.....	489
<b>16</b>	<b>Troubleshooting.....</b>	<b>491</b>
<b>16.1</b>	<b>Displaying Information.....</b>	<b>491</b>
<b>16.2</b>	<b>Notifications.....</b>	<b>491</b>
16.2.1	Interpreting Notifications and Their Number.....	492
16.2.1.1	System Notifications.....	492
16.2.1.2	Power Sensor Notifications.....	493
16.2.1.3	Sensor Check Source (R&S NRX-B1) Notifications.....	494
16.2.1.4	License Key Notifications.....	495
16.2.1.5	Queue Handling Notifications.....	495
<b>16.3</b>	<b>Performing Tests.....</b>	<b>495</b>
<b>16.4</b>	<b>Collecting Information for Technical Support.....</b>	<b>496</b>
<b>16.5</b>	<b>Contacting Customer Support.....</b>	<b>496</b>
	<b>Glossary: List of Abbreviations.....</b>	<b>497</b>
	<b>List of Commands.....</b>	<b>499</b>
	<b>Index.....</b>	<b>518</b>



# 1 Safety and Regulatory 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.

## 1.1 Korea Certification Class B



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

## 2 Welcome

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

### 2.1 Documentation Overview

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

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

#### 2.1.1 Getting Started Manual

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

#### 2.1.2 User Manual

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

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

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

For further details, see [Chapter 11.2.4, "Help & Copyrights"](#), on page 164.

#### 2.1.3 Tutorials

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

#### 2.1.4 Instrument Security Procedures

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

### 2.1.5 Basic Safety Instructions

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

### 2.1.6 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)

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

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

The open source acknowledgment and the license texts of open source software packages used in the R&S NRX software are provided under:

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

For further details, see [Chapter 11.2.4, "Help & Copyrights"](#), on page 164.

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

## 2.2 Key Features

The R&S NRX supports:

- Easy RF power measurements
- 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).



## 3 Getting Started

### 3.1 Preparing for Use

• Unpacking and Checking.....	17
• Operating Conditions.....	17
• Considerations for Test Setup.....	18
• Placing on a Bench Top.....	18
• Mounting in a Rack.....	19
• Connecting to the AC Power Supply.....	19
• Switching On or Off.....	20
• Connecting Power Sensors.....	21
• Connecting USB and External Devices.....	23

#### 3.1.1 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.

##### 3.1.1.1 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

#### 3.1.2 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.

### 3.1.3 Considerations 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.

### 3.1.4 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.

#### To place the R&S NRX on a bench top

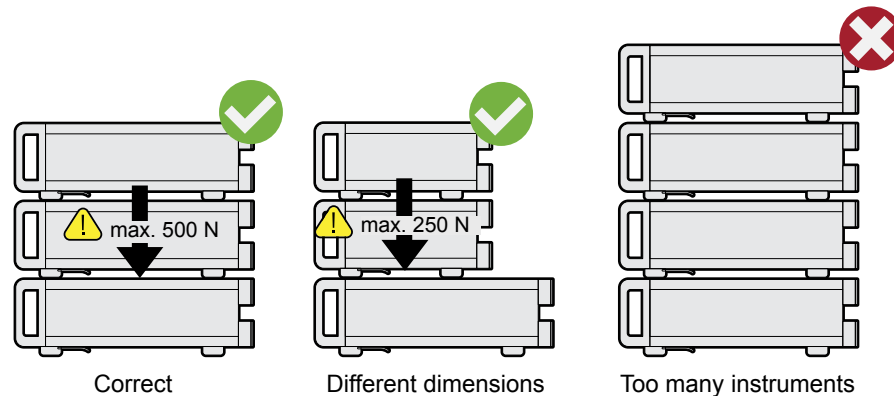
1. Place the R&S NRX on a stable, flat and level surface. Ensure that the surface can support the weight of the R&S NRX. For information on the weight, see the data sheet.
2. **CAUTION!** Foldable feet can collapse. Always fold the feet completely in or out to ensure stability. The feet can collapse if they are not folded out completely or if the product is moved without lifting it. The foldable feet are designed to carry the weight of the product, but not an extra load.

With folded-out feet, do not place anything on top or underneath the instrument.

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

Stack as follows:

- It is best if all instruments have the same dimensions (width and length).
- The overall load on the lowest instrument must not exceed 500 N.
- With smaller instruments on top of the lowest instrument, the overall load on the lowest instrument must not exceed 250 N.



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

Prevent overheating as follows:

- Keep a minimum distance of 10 cm between the fan openings of the R&S NRX and any object in the vicinity.
- Do not place the R&S NRX next to heat-generating equipment such as radiators or other instruments.

### 3.1.5 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 product. Design and implement an efficient ventilation concept for the rack.

### 3.1.6 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 3.2.2.5, "AC Supply and Power Switch"](#), on page 29

### 3.1.7 Switching On or Off

The possible instrument states are described in [Chapter 3.2.1.6, "On/Standby Key"](#), on page 27.

#### 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 4.1.1, "Start Dialog"](#), on page 31.  
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 134.

#### 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 9, "Saving and Recalling Settings"](#), on page 133
- [Chapter 3.2.1.6, "On/Standby Key"](#), on page 27

### 3.1.8 Connecting Power Sensors

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

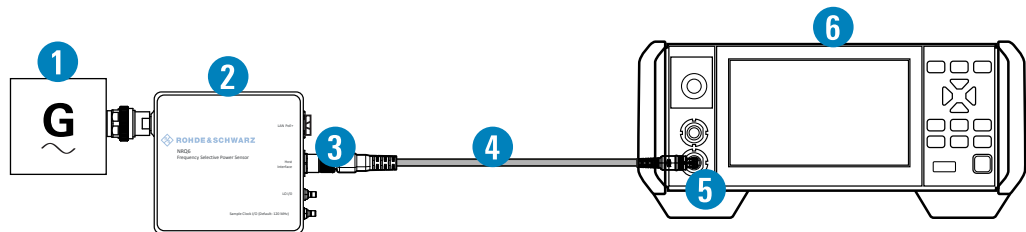
Depending on the power sensor, you have different choices for connecting power sensors.

#### 3.1.8.1 Sensor Connectors A to D

See [Chapter 3.2.1.1, "Sensor Connector A and B"](#), on page 24 and [Chapter 3.2.2.7, "Sensor Connectors C and D"](#), on page 30.

Suitable for:

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



**Figure 3-1: 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.

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

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

See [Chapter 3.2.1.2, "Module Bay"](#), on page 24.

Suitable for R&S NRT directional power sensors.

Communication between R&S NRT-Zxx power sensor and R&S NRX is only possible with a baud rate setting of 38400 Bd. This setting is the factory default that must be restored if the setting was changed. If the R&S NRT-Zxx power sensor is not recognized by the R&S NRX, check that the baud rate setting of the R&S NRT-Zxx power sensor is 38400 Bd. See the manual of the R&S NRT-Zxx power sensor for details.

1. Connect the R&S NRT-Zxx power sensor between source and load.
  - a) Connector (1) to the source.
  - b) Connector (2) to the load.
2. Connect the cable of the R&S NRT-Zxx power sensor (3) to the sensor interface for R&S NRT (R&S NRX-B9).



### 3.1.8.3 LAN Interface

See [Chapter 3.2.2.2, "Ethernet Interface"](#), on page 28.

Suitable for LAN power sensors.

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 150.

### 3.1.8.4 USB 2.0 Host Interfaces

See [Chapter 3.2.1.5, "USB Host Interface"](#), on page 27 and [Chapter 3.2.2.4, "USB Host Interface"](#), on page 29.

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

## 3.1.9 Connecting USB and External Devices

Apart from connecting power sensors, you can use the USB interfaces to connect USB devices. You can increase the number of connected devices by using USB hubs.

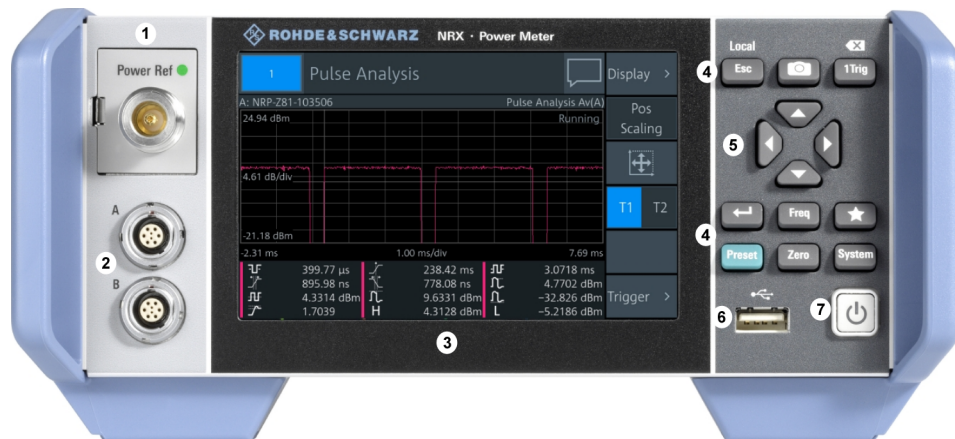
Due to the large number of available USB devices, there is almost no limit to the possible expansions. In the following, useful USB devices are listed exemplarily:

- 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.

## 3.2 Instrument Tour

- [Front Panel Tour](#).....23
- [Rear Panel Tour](#).....28

### 3.2.1 Front Panel Tour



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

- 1 = Module bay for optional connectors, see [Chapter 3.2.1.2, "Module Bay"](#), on page 24.  
 2 = Sensor connectors A and B, see [Chapter 3.2.1.1, "Sensor Connector A and B"](#), on page 24.  
 3 = Touchscreen, see [Chapter 3.2.1.3, "Touchscreen"](#), on page 25.  
 4 = Keys, see [Chapter 3.2.1.4, "Keys"](#), on page 25.

5 = Cursor keys, see ["Cursor keys"](#) on page 27.

6 = USB host interface, see [Chapter 3.2.1.5, "USB Host Interface"](#), on page 27.

7 = On/standby key, see [Chapter 3.2.1.6, "On/Standby Key"](#), on page 27.

### 3.2.1.1 Sensor Connector A and B

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

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 3.1.8, "Connecting Power Sensors"](#), on page 21

### 3.2.1.2 Module Bay

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

Two options fit in this bay. If you have both options, you can exchange them, see ["To exchange the option"](#) on page 24.

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 3.1.8, "Connecting Power Sensors"](#), on page 21
- ["Sensor Check Source tab"](#) on page 145
- [Chapter 14.9, "Configuring the Test Generator"](#), on page 371

### 3.2.1.3 Touchscreen

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

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



#### False triggers can occur

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

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

Further information:

- ["Using the touchscreen"](#) on page 31

### 3.2.1.4 Keys

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

Esc

#### [Esc] / Local

If you press shortly:

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

If you press and hold:

- Goes to the start dialog that shows an overview of the active measurements. See [Chapter 4.1.1, "Start Dialog"](#), on page 31.

Further information:

- ["Going back to a higher hierarchy level"](#) on page 31
- [Chapter 4.3.2, "Returning to Manual Operation \(LOCAL\)"](#), on page 43



### Screenshot

Creates a screenshot of the current display.

See [Chapter 4.1.8, "Creating and Saving Screenshots"](#), on page 40.

Remote command:

[SYSTem:HCOPY](#) on page 258



### [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 63.

- Resets the auxiliary values that provide additional information about the measured values.
  - See also ["Auxiliary Values"](#) on page 52.
- 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 325



### Favorites

Reserved for future use.



### [Preset]

Opens the "Save / Recall / Preset" dialog.

See [Chapter 9, "Saving and Recalling Settings"](#), on page 133.

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

See ["Preset"](#) on page 134.

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



### [Zero]

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

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

Also displays status information:

- Zeroing status
- Sensor status

**System****[System]**

Opens the "System Overview" dialog.

See [Chapter 11, "System Settings"](#), on page 137.

**Cursor keys**

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

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

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

**3.2.1.5 USB Host Interface**

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

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

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

Further information:

- [Chapter 3.1.8.4, "USB 2.0 Host Interfaces"](#), on page 23
- [Chapter 3.1.9, "Connecting USB and External Devices"](#), on page 23

**3.2.1.6 On/Standby Key**

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

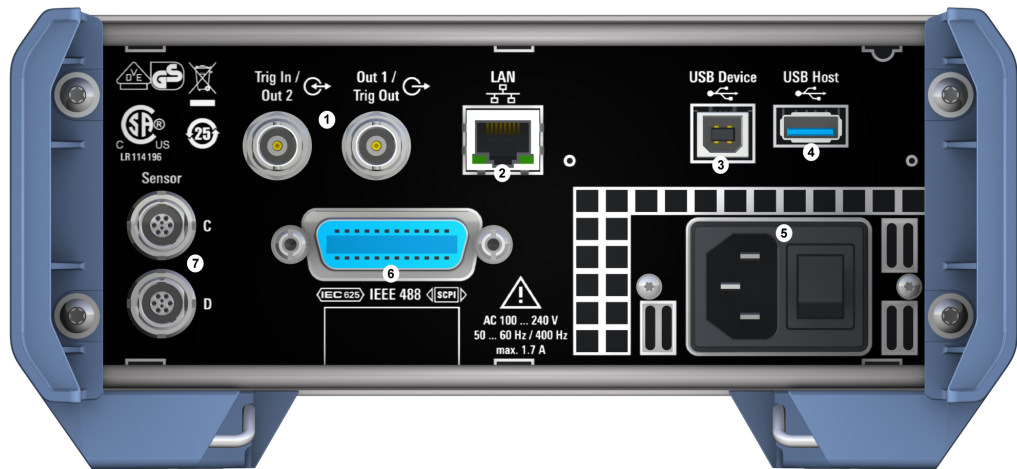
The on/standby key toggles the R&S NRX between standby and ready state.

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 3.1.7, "Switching On or Off"](#), on page 20.

## 3.2.2 Rear Panel Tour



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

- 1 = Trig In / Out 2 and Out 1 / Trig Out connectors, see [Chapter 3.2.2.1, "Trig In / Out 2 and Out 1 / Trig Out Connectors"](#), on page 28.
- 2 = Ethernet interface, see [Chapter 3.2.2.2, "Ethernet Interface"](#), on page 28.
- 3 = USB device interface, see [Chapter 3.2.2.3, "USB Device Interface"](#), on page 29.
- 4 = USB host interface, see [Chapter 3.2.2.4, "USB Host Interface"](#), on page 29.
- 5 = AC supply and power switch, see [Chapter 3.2.2.5, "AC Supply and Power Switch"](#), on page 29.
- 6 = IEC 625/IEEE 488 interface, optional, see [Chapter 3.2.2.6, "IEC 625/IEEE 488 Interface"](#), on page 29.
- 7 = Sensor connectors C and D (optional), used to connect R&S power sensors, see [Chapter 3.2.2.7, "Sensor Connectors C and D"](#), on page 30.

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

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

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 146

### 3.2.2.2 Ethernet Interface

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

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

### 3.2.2.3 USB Device Interface

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

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

### 3.2.2.4 USB Host Interface

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

See [Chapter 3.2.1.5, "USB Host Interface"](#), on page 27.

### 3.2.2.5 AC Supply and Power Switch

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

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 3.1.6, "Connecting to the AC Power Supply"](#), on page 19.

### 3.2.2.6 IEC 625/IEEE 488 Interface

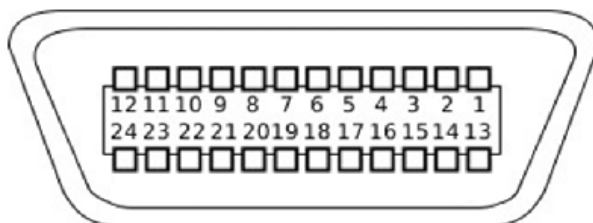
See (6) in [Figure 3-3](#).

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)



### 3.2.2.7 Sensor Connectors C and D

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

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

For more details, see [Chapter 3.2.1.1, "Sensor Connector A and B"](#), on page 24.

## 4 Operating Concepts

- [Manual Operation](#).....31
- [Remote Operation](#).....41
- [Remote Control](#).....42

### 4.1 Manual Operation

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

#### Using the touchscreen

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



*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

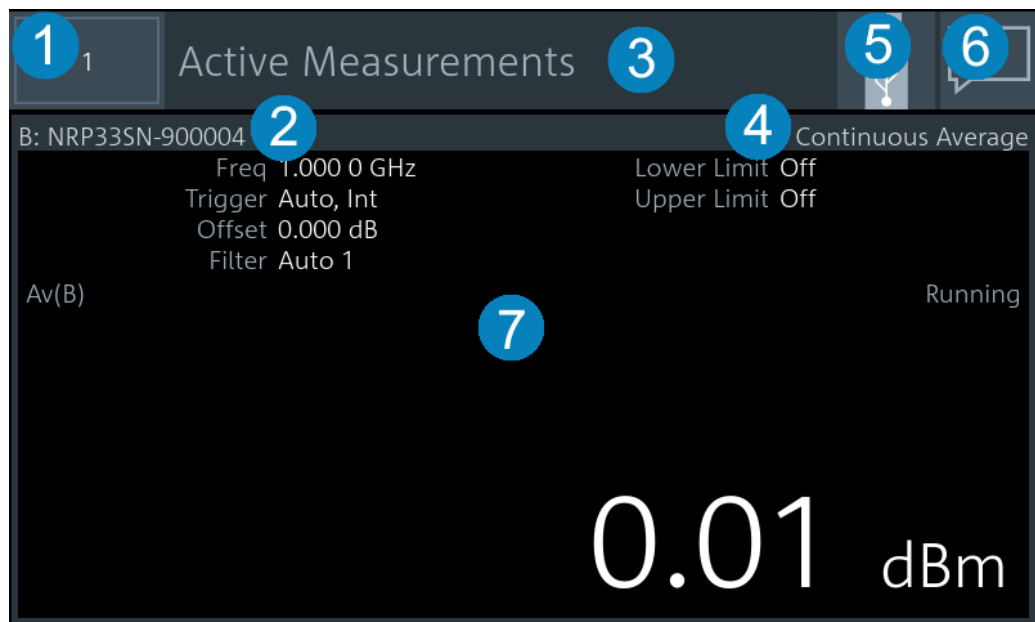
Esc

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

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

#### 4.1.1 Start Dialog

1. Connect a power sensor to the R&S NRX.  
See [Chapter 3.1.8, "Connecting Power Sensors"](#), on page 21.
2. Boot the R&S NRX.  
After successful booting, the R&S NRX displays the start dialog.



**Figure 4-1: Start dialog (example for setup with one power sensor)**

- 1 = Miniature display layout. See [Chapter 4.1.5, "Selecting the Display Layout"](#), on page 36.
- 2 = Connected sensors
- 3 = Title
- 4 = Measurement type
- 5 = Status information. See [Chapter 4.1.3, "Status Information"](#), on page 34.
- 6 = Notification center status, see [Chapter 4.1.4, "Notification Center"](#), on page 35.
- 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 4.1.5, "Selecting the Display Layout"](#), on page 36.

## 4.1.2 Main Measurement Dialog

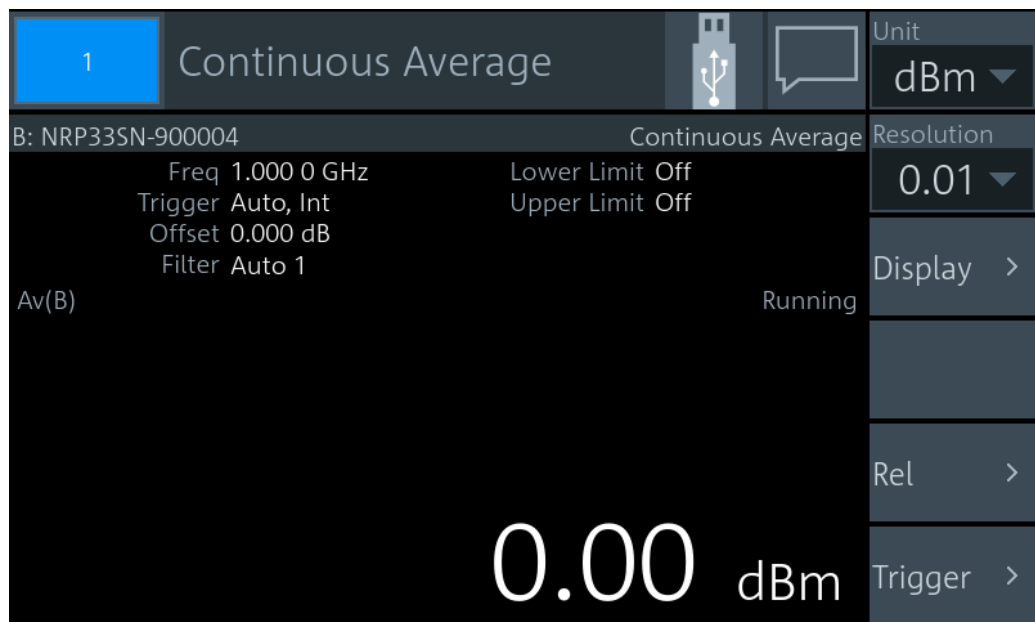
From the start dialog, you can access the measurements.

### 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 4-1](#).

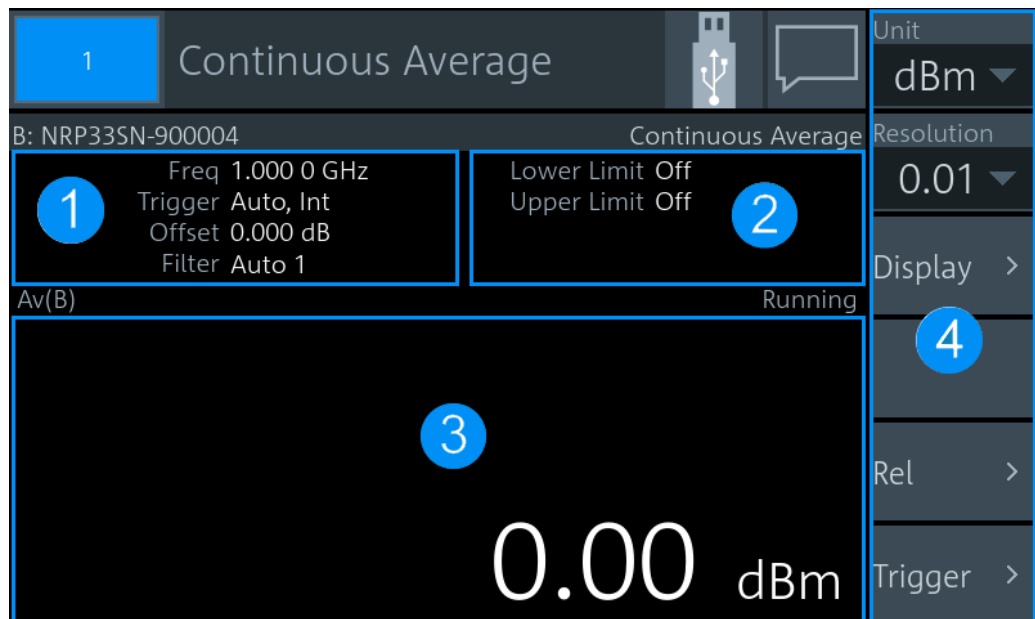
The selected measurement is displayed in full screen. Its number is highlighted in the miniature display layout in the upper left corner.





#### 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 4-2: 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 4-2](#), to access the sensor settings.

The "Primary Sensor" dialog is displayed.

See [Chapter 8, "Sensor Configuration"](#), on page 114.

- ▶ Tap the *displayed limit values*, (2) in [Figure 4-2](#), to change limit values.

The "Limit Monitor" dialog is displayed.

See ["Limit Monitor"](#) on page 57.

- ▶ Tap the *displayed measurement value or graph*, (3) in [Figure 4-2](#), to change the measurement type, assign a sensor, access the sensor settings, ...

The "Measurement Settings" dialog is displayed.

See [Chapter 6.4, "Measurement Settings Dialog"](#), on page 67.

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






See [Chapter 6, "Configuration for All Measurement Types"](#), on page 50.

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.

### 4.1.3 Status Information

The status information is displayed in the upper right corner, left from the notification center. See [Figure 4-1](#).

**Table 4-1: Status symbols**

Symbol	Description	Further information
	Memory stick is connected and ready for use.	<a href="#">Chapter 3.1.9, "Connecting USB and External Devices"</a> , on page 23
	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 4.3.2, "Returning to Manual Operation (LOCAL)"</a> , on page 43
	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.	

#### 4.1.4 Notification Center

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





- Notices
- Warning messages
- Error messages

The notification status is displayed in the upper right corner:

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

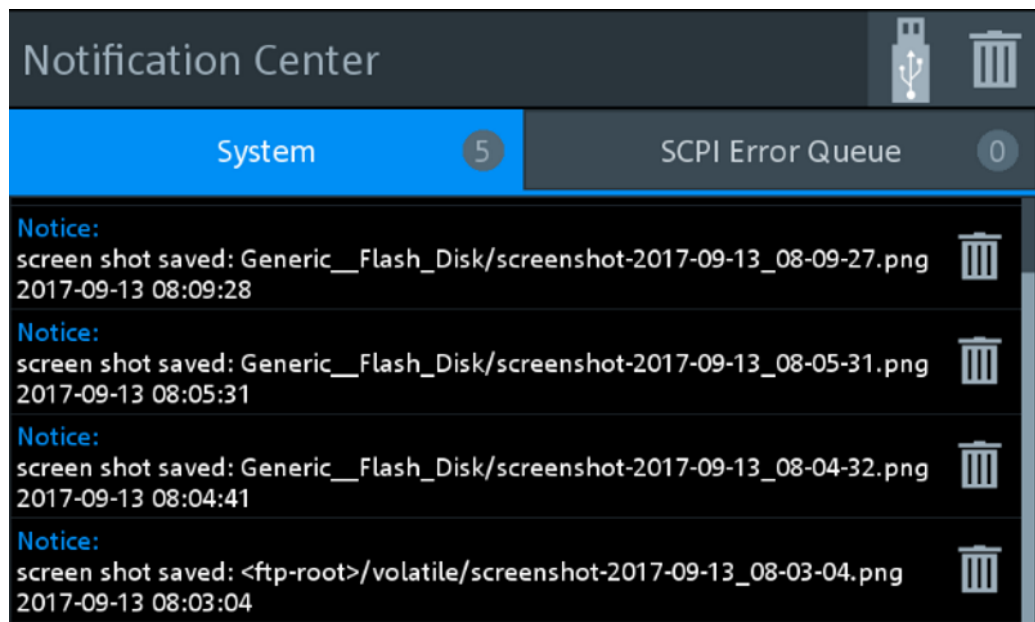
See (6) in [Figure 4-1](#).

**Table 4-2: Notification symbols**

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

#### To display the messages

- ▶ 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.

### 4.1.5 Selecting the Display Layout

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

#### To change the display layout

1. Press and hold [Esc] until the start dialog is displayed.
2. 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 4-3: Two measurement panes

Remote command:

`DISPlay:LAYout` on page 230

`DISPlay[:WINDow<Window>][:STATe]` on page 231

### 4.1.6 Swapping Measurement Panes

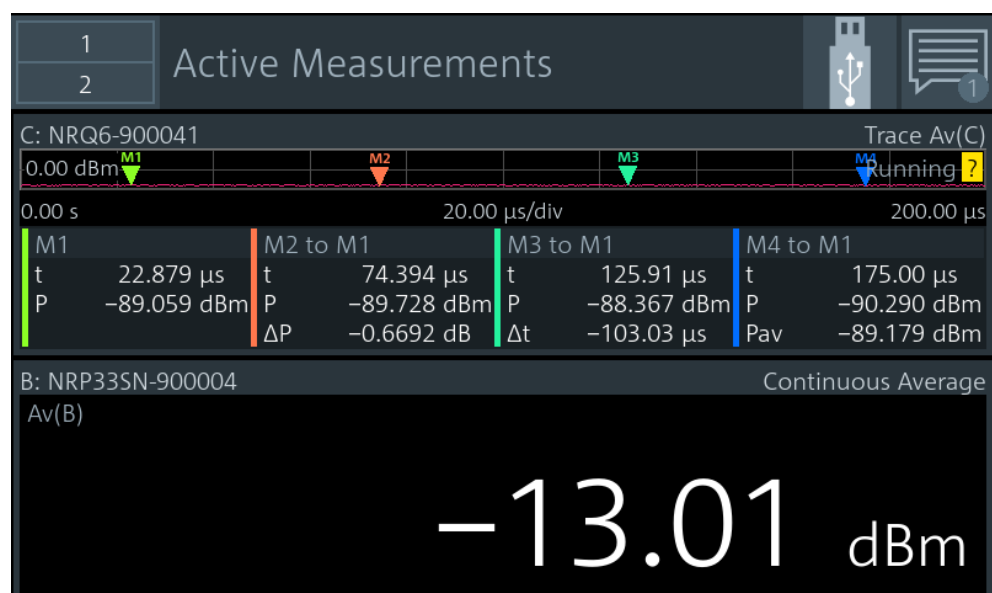
You can swap the position of measurement panes using drag and drop. The numbering of the panes is not changed.

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

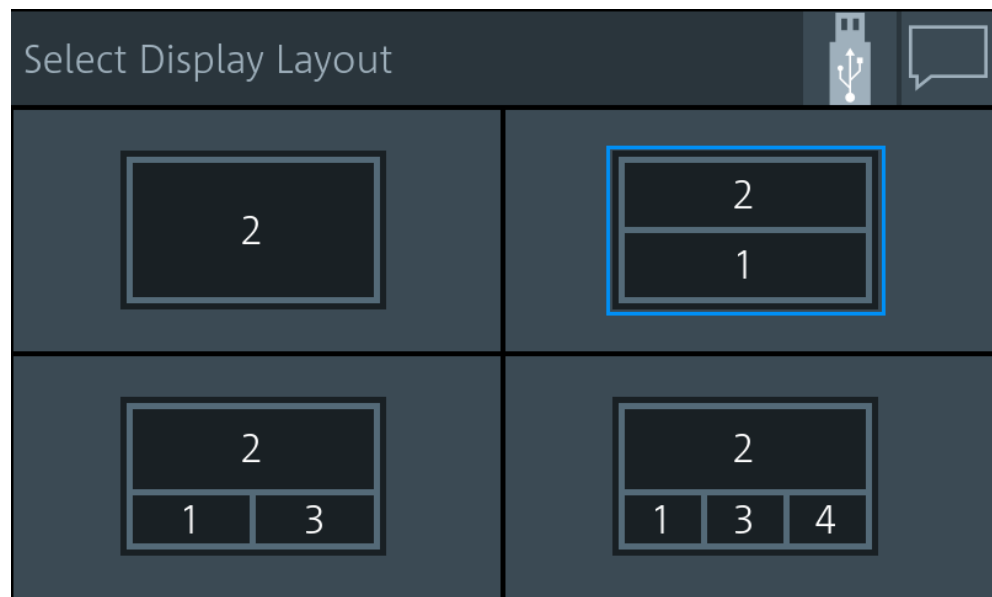
- Touch & hold a measurement pane and drag it into the new position.



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:

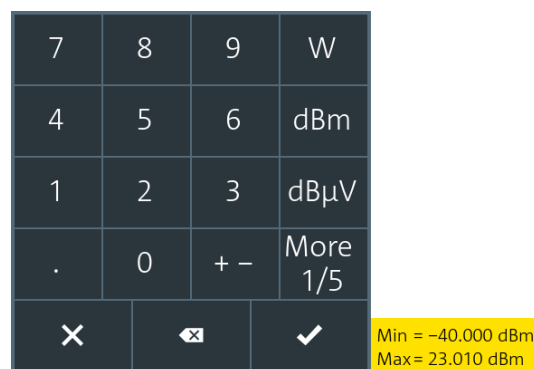
`DISPlay[:WINDow<Window>]:POSition` on page 232

#### 4.1.7 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 4-4: Numeric editor**

Use the alphanumeric editor as a standard keyboard.

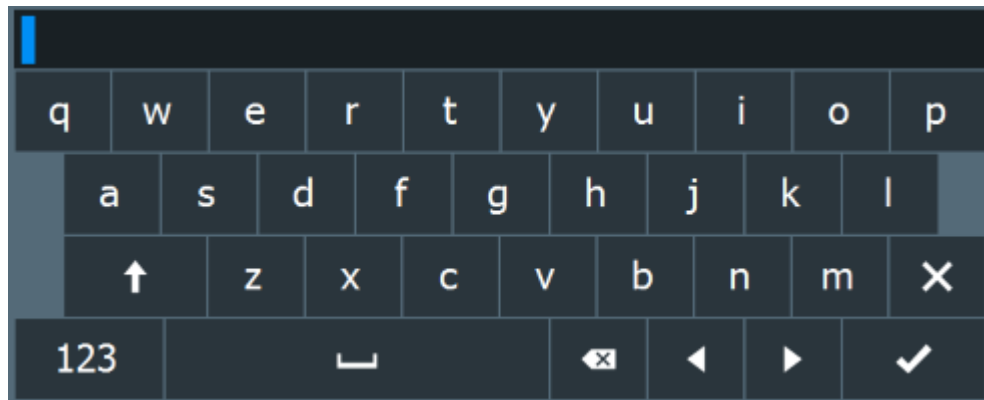


Figure 4-5: Alphanumeric editor

### 4.1.8 Creating and Saving Screenshots

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

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

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

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

Otherwise, the PNG is saved in the volatile directory of the FTP directory. You can download the PNG using FTP. For preconfigured user identification and password, see "[Old Password](#)" on page 159.

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

Remote control:

[SYSTem:HCOPY](#) on page 258

Further information:

- [Chapter 3.1.9, "Connecting USB and External Devices"](#), on page 23
- [Chapter 3.2.1.5, "USB Host Interface"](#), on page 27

### 4.1.9 Restricting Manual Operation

For security measures, you can restrict the manual operation allowed at the R&S NRX.

1. Select [System] > "Instrument Info" > "Security".
2. On the "General" tab, select "User Interface".

The "User Interface" dialog contains settings to restrict access in various degrees. See "[User Interface](#)" on page 157.

- ▶ To lift the restrictions indicated by :



- a) Tap the touchscreen.
- b) Enter the security password.

Further information:

- ["Security Password to Unlock Settings"](#) on page 157

## 4.2 Remote Operation

VNC (virtual network computing) simulates the user interface of the R&S NRX. Thus, you can operate the R&S NRX manually from an external computer in the same way as operating the R&S NRX itself. During VNC operation, local operation (manual operation, see [Chapter 4.1, "Manual Operation"](#), on page 31) 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 159.

### 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 139.
4. Click "Connect".
5. Enter the session password. For preconfigured password, see ["Old Password"](#) on page 159.

### 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 139.
3. Enter the password. For preconfigured password, see ["Old Password"](#) on page 159.

### Shortcuts for the front panel keys

During remote operation, you can operate the keys on the front panel using shortcuts:

Front panel key	Remote operation replacement
[1 Trig]	Backspace
[Esc]	ESC
 Favorites	Ctrl + C
[Freq]	Ctrl + F
 Screenshot	Ctrl + Y
[Preset]	Ctrl + P
[System]	Ctrl + E
[Zero]	Ctrl + N

## 4.3 Remote Control

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

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

Connectors are installed at the rear of the R&S NRX. See [Chapter 3.2, "Instrument Tour"](#), on page 23.

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 177.

### 4.3.1 Switching to Remote Control (REMOTE)

Prerequisites

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

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

### 4.3.2 Returning to Manual Operation (LOCAL)

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

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

- ▶ Press the [Esc/Local] key. See "[\[Esc\] / Local](#)" on page 25.  
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 4.1.3, "Status Information"](#), on page 34.

## 5 Measurement Basics

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

- [Parallel Measurements](#)..... 44
- [Sensor Assignment and Memory](#)..... 44
- [Performing a Measurement](#).....46
- [Limit Violation](#).....47
- [Settings Conflict](#)..... 48

### 5.1 Parallel Measurements

An R&S NRX without enhancements supports the configuration of one power sensor for one measurement type. If you want to use more than one power sensor simultaneously, 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 4.1.5, "Selecting the Display Layout"](#), on page 36.

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 11.1.4, "Sensor Manager"](#), on page 150.

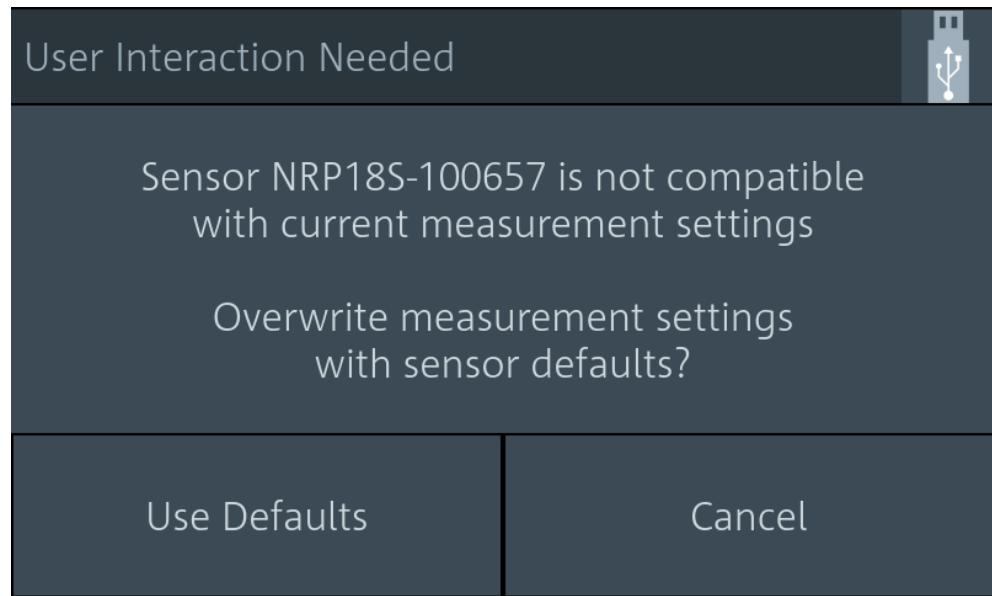
### 5.2 Sensor Assignment and Memory

When you connect an R&S power sensor to the R&S NRX, the R&S NRX tries to recognize the sensor. The sensor recognition is based on the sensor type and the serial number of the 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 45.

- Sensor type is different to the sensor type that was previously assigned to the measurement. Decide whether you want to use the settings of the sensor.
  - "Use Default"  
Uses the sensor settings. For details, see the user manual of the sensor.
  - "Cancel"  
Keeps the measurement settings and does not assign the sensor to the measurement.



If conflicting settings occur when connecting a sensor, the R&S NRX shows where the problematic setting is located. See [Chapter 5.5, "Settings Conflict"](#), on page 48.

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

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

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

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

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

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

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

**Example: Connecting sensors after a preset**

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

The measurement results are displayed in measurement pane 1.

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

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

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

4. Press [Preset].

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

Further information:

- [Chapter 14.3, "Addressing Measurements and Sensors"](#), on page 186  
Suffix usage in remote control

## 5.3 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 6, "Configuration for All Measurement Types"](#), on page 50
- [Chapter 7, "Measurement Types and Result Displays"](#), on page 71
- [Chapter 8, "Sensor Configuration"](#), on page 114

**Setup**

1. Connect one or more R&S power sensors to the R&S NRX. See [Chapter 3.1.8, "Connecting Power Sensors"](#), on page 21.

How many R&S power sensors you can connect depends on the options of your R&S NRX. See [Chapter 5.1, "Parallel Measurements"](#), on page 44.

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 9, "Saving and Recalling Settings"](#), on page 133.

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 10, "Zeroing Sensors"](#), on page 135.

3. Configure the measurement.
  - a) Open the "Measurement Settings" dialog, as described in [Chapter 4.1.2, "Main Measurement Dialog"](#), on page 32.
  - b) Select the "Measurement Type", for example "Continuous Average".
  - c) Tap "Quick Setup" > "Auto Set".

4. Switch on the signal source.

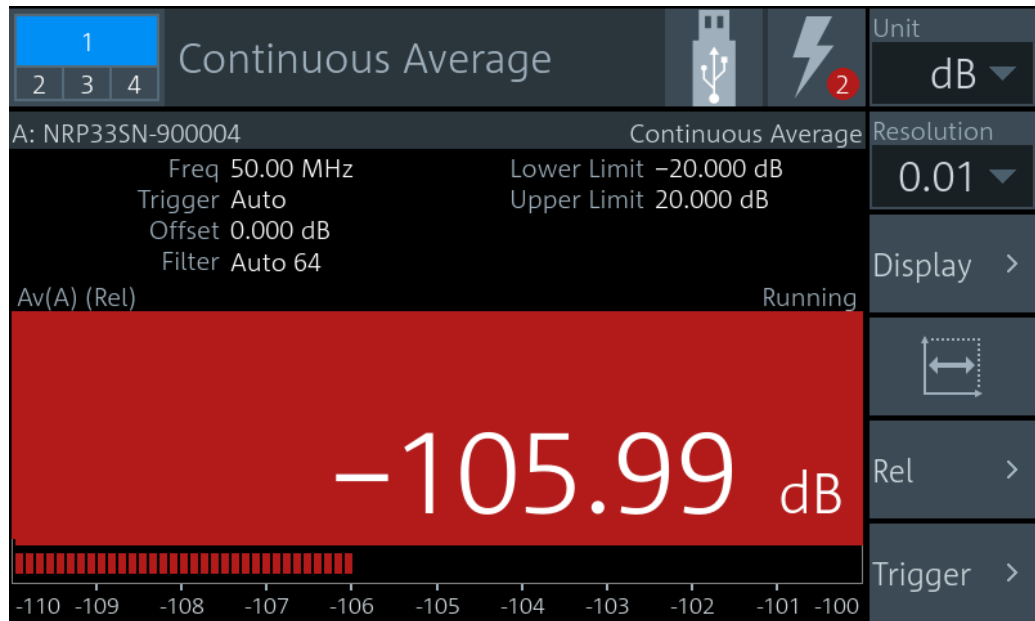
The measurement starts, and the result is displayed in dBm.

5. If necessary, perform further settings.

## 5.4 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 4-2](#).



## 5.5 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 5.4, "Limit Violation"](#), on page 47.

### 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 4-2](#).  
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 168.



## 6 Configuration for All Measurement Types

The main measurement dialog offers access to all measurement settings. The layout of the dialog and how to open it are described in [Chapter 4.1.2, "Main Measurement Dialog"](#), on page 32.

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 7, "Measurement Types and Result Displays"](#), on page 71.

### 6.1 Display Settings

Access: Main measurement dialog > "Display"

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

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

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

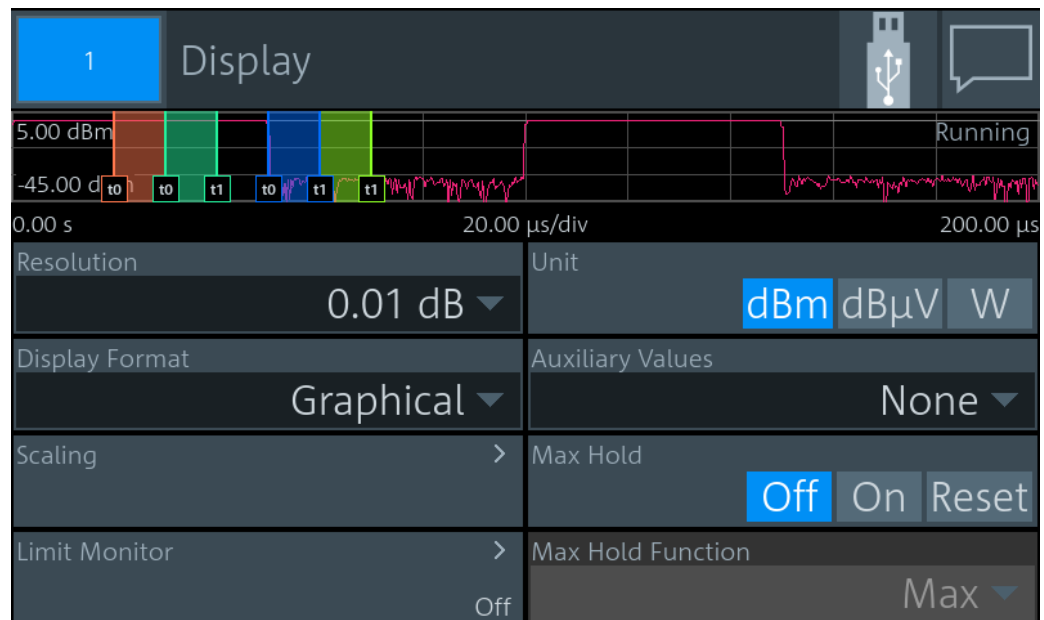


Figure 6-1: Display dialog, example for time gate measurement

Resolution.....	51
Unit.....	51
Forward Unit.....	52

Display Format.....	52
Auxiliary Values.....	52
Scaling.....	53
L Scale Lower Limit.....	53
L Scale Upper Limit.....	53
L Forward Scale Lower Limit, Reflection Scale Lower Limit.....	53
L Forward Scale Upper Limit, Reflection Scale Upper Limit.....	54
L Start Time.....	54
L Time / Div.....	54
L Trace Length.....	55
L Power Reference.....	55
L Power / Div.....	55
L Power Span.....	55
L Unit.....	55
Relative Measurements.....	55
L Forward Reference Value, Reflection Reference Value.....	56
L Forward Relative State, Reflection Relative State.....	56
Max Hold.....	56
Max Hold Function.....	57
Limit Monitor.....	57
L Lower Limit State.....	57
L Lower Limit.....	57
L Upper Limit State.....	57
L Upper Limit.....	58
L Forward Lower Limit State, Reflection Lower Limit State.....	58
L Forward Lower Limit, Reflection Lower Limit.....	58
L Forward Upper Limit State, Reflection Upper Limit State.....	59
L Forward Upper Limit, Reflection Upper Limit.....	59

### Resolution

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

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

Sets the resolution to the specified value.

Remote command:

`CALCulate<Measurement>:RESolution` on page 229

`[SENSe<Sensor>:]RRESolution` on page 321

### Unit

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

"dBm"	Power in dBm
"dB $\mu$ V"	Power in dB $\mu$ V
"W"	Power in W
"dB"	Quotient of the power values as dB

"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 247

[UNIT<Measurement>:POWer:RATio](#) on page 246

### Forward Unit

Available for NRT measurements.

Sets the unit of the forward power measurement.

"dBm" Power in dBm

"dBμV" Power in dBμV

"W" Power in W

Remote command:

[\[SENSe<Sensor>:\]UNIT:POWer\[:VALue\]](#) on page 245

[UNIT<Measurement>:POWer\[:VALue\]](#) on page 247

[UNIT<Measurement>:POWer:RATio](#) on page 246

### Display Format

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

Sets the display format of the measured values.

"Scalar Digital" Numeric format

"Scalar Analog"

Numeric format with bar chart

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

Remote command:

[CALCulate<Measurement>:DMODE](#) on page 226

### 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 long-term mean, the standard deviation and the total number of measurement results that have been evaluated since the search for statistic values has been started.

Remote command:

`CALCulate<Measurement>:AVALue` on page 226

### Scaling

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

- [Measurement Type](#)
- ["Display Format"](#) on page 52

#### Scale Lower Limit ← Scaling

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

Defines the lower limit of the bargraph display.

Remote command:

`CALCulate<Measurement>:METer<DirectionalChannel>:LOWer[:DATA]:RATio:RCOefficient` on page 233

`CALCulate<Measurement>:METer<DirectionalChannel>:LOWer[:DATA]:RATio:RFRatio` on page 234

`CALCulate<Measurement>:METer<DirectionalChannel>:LOWer[:DATA]:RATio:RLOSs` on page 234

`CALCulate<Measurement>:METer<DirectionalChannel>:LOWer[:DATA]:RATio:SWR` on page 235

`CALCulate<Measurement>:METer<DirectionalChannel>:LOWer[:DATA]:RATio[:VALue]` on page 235

`CALCulate<Measurement>:METer<DirectionalChannel>:LOWer[:DATA][:POWER]` on page 235

#### Scale Upper Limit ← Scaling

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

Defines the upper limit of the bargraph display.

Remote command:

`CALCulate<Measurement>:METer<DirectionalChannel>:UPPer[:DATA]:RATio:RCOefficient` on page 236

`CALCulate<Measurement>:METer<DirectionalChannel>:UPPer[:DATA]:RATio:RFRatio` on page 237

`CALCulate<Measurement>:METer<DirectionalChannel>:UPPer[:DATA]:RATio:RLOSs` on page 237

`CALCulate<Measurement>:METer<DirectionalChannel>:UPPer[:DATA]:RATio:SWR` on page 238

`CALCulate<Measurement>:METer<DirectionalChannel>:UPPer[:DATA]:RATio[:VALue]` on page 238

`CALCulate<Measurement>:METer<DirectionalChannel>:UPPer[:DATA][:POWER]` on page 238

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

Available for NRT measurements.

Defines the lower limit of the bargraph display.

Remote command:

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

`CALCulate<Measurement>:METer<DirectionalChannel>:LOWer[:DATA]:RATio:RCOefficient` on page 233

`CALCulate<Measurement>:METer<DirectionalChannel>:LOWer[:DATA]:RATio:RFRatio` on page 234

`CALCulate<Measurement>:METer<DirectionalChannel>:LOWer[:DATA]:RATio:RLOSs` on page 234

`CALCulate<Measurement>:METer<DirectionalChannel>:LOWer[:DATA]:RATio:SWR` on page 235

`CALCulate<Measurement>:METer<DirectionalChannel>:LOWer[:DATA]:RATio[:VALue]` on page 235

`CALCulate<Measurement>:METer<DirectionalChannel>:LOWer[:DATA][:POWER]` on page 235

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

Available for NRT measurements.

Defines the upper limit of the bargraph display.

Remote command:

`CALCulate<Measurement>:METer<DirectionalChannel>:UPPer[:DATA]:CCDF` on page 236

`CALCulate<Measurement>:METer<DirectionalChannel>:UPPer[:DATA]:RATio:RCOefficient` on page 236

`CALCulate<Measurement>:METer<DirectionalChannel>:UPPer[:DATA]:RATio:RFRatio` on page 237

`CALCulate<Measurement>:METer<DirectionalChannel>:UPPer[:DATA]:RATio:RLOSs` on page 237

`CALCulate<Measurement>:METer<DirectionalChannel>:UPPer[:DATA]:RATio:SWR` on page 238

`CALCulate<Measurement>:METer<DirectionalChannel>:UPPer[:DATA]:RATio[:VALue]` on page 238

`CALCulate<Measurement>:METer<DirectionalChannel>:UPPer[:DATA][:POWER]` on page 238

#### **Start Time ← Scaling**

Available for trace, pulse analysis measurements. If **Display Format** is set to "Graphical", available for time gate, timeslot measurements.

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

Remote command:

`CALCulate<Measurement>:TRACe:X[:SCALE]:LEFT` on page 239

#### **Time / Div ← Scaling**

Available for trace, pulse analysis measurements. If **Display Format** is set to "Graphical", available for time gate, timeslot measurements.

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

#### Trace Length ← Scaling

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

Sets the duration of the trace.

Remote command:

[CALCulate<Measurement>:TRACe:X\[:SCALe\]:LENGth](#) on page 239

#### Power Reference ← Scaling

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

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

Remote command:

[CALCulate<Measurement>:TRACe:Y\[:SCALe\]:TOP:DB](#) on page 241

[CALCulate<Measurement>:TRACe:Y\[:SCALe\]:TOP:DBM](#) on page 242

[CALCulate<Measurement>:TRACe:Y\[:SCALe\]:TOP:DBUV](#) on page 242

[CALCulate<Measurement>:TRACe:Y\[:SCALe\]:TOP:DPCT](#) on page 242

[CALCulate<Measurement>:TRACe:Y\[:SCALe\]:TOP:ONE](#) on page 243

[CALCulate<Measurement>:TRACe:Y\[:SCALe\]:TOP:WATT](#) on page 243

#### 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 245

#### 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 239

[CALCulate<Measurement>:TRACe:Y\[:SCALe\]:SPAN:DBM](#) on page 240

[CALCulate<Measurement>:TRACe:Y\[:SCALe\]:SPAN:DBUV](#) on page 240

[CALCulate<Measurement>:TRACe:Y\[:SCALe\]:SPAN:DPCT](#) on page 240

[CALCulate<Measurement>:TRACe:Y\[:SCALe\]:SPAN:ONE](#) on page 241

[CALCulate<Measurement>:TRACe:Y\[:SCALe\]:SPAN:WATT](#) on page 241

#### Unit ← Scaling

Sets the unit of the power axis.

#### Relative Measurements

Available for NRT measurements.

Groups the settings for relative measurements.

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

Available for NRT measurements.

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

Sets the reference value.

Remote command:

`CALCulate<Measurement>:RELative<DirectionalChannel>[:MAGNitude]`  
on page 272

`CALCulate<Measurement>:RELative<DirectionalChannel>:CCDF`  
on page 315

`CALCulate<Measurement>:RELative<DirectionalChannel>:POWER[:MAGNitude]` on page 315

`CALCulate<Measurement>:RELative<DirectionalChannel>:RATio:RCOefficient` on page 316

`CALCulate<Measurement>:RELative<DirectionalChannel>:RATio:RFRatio` on page 316

`CALCulate<Measurement>:RELative<DirectionalChannel>:RATio:RLOSS`  
on page 316

`CALCulate<Measurement>:RELative<DirectionalChannel>:RATio:SWR`  
on page 317

`CALCulate<Measurement>:RELative<DirectionalChannel>:RATio[:MAGNitude]` on page 317

`[SENSe<Sensor>:]POWER:REFerence` on page 273

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

Available for NRT measurements.

Allows you to relate measured power to a reference value.

- |     |   |
|-----|---|
| Off | Displays the absolute power or power ratio.   |
| On  | Displays the relative power or power ratio. As reference value, the value specified under <a href="#">Forward Reference Value</a> , <a href="#">Reflection 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 272

#### **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 228



**Max Hold Function**

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

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

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

Remote command:

[CALCulate<Measurement>:HOLD:FUNction](#) on page 227

**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**

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

Enables or disables the monitoring function for the lower limit.

Remote command:

[CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer:STATE](#) on page 253

**Lower Limit ← Limit Monitor**

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

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

Defines a lower limit.

Remote command:

[CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer\[:DATA\]](#) on page 249

[CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer\[:DATA\]:POWER](#) on page 252

[CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer\[:DATA\]:RATio:RCoefficient](#) on page 250

[CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer\[:DATA\]:RATio:RFRatio](#) on page 251

[CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer\[:DATA\]:RATio:RLOSs](#) on page 251

[CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer\[:DATA\]:RATio:SWR](#) on page 251

[CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer\[:DATA\]:RATio\[:VALue\]](#) on page 252

**Upper Limit State ← Limit Monitor**

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

Enables or disables the monitoring function for the upper limit.

Remote command:

`CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer:STATe`  
on page 256

#### **Upper Limit ← Limit Monitor**

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

Available if **Upper Limit State** is set to "On".

Defines an upper limit.

Remote command:

`CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer[:DATA]`  
on page 253

`CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer[:DATA]:POWER` on page 256

`CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer[:DATA]:RATio:RCOefficient` on page 254

`CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer[:DATA]:RATio:RFRatio` on page 254

`CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer[:DATA]:RATio:RLOSs` on page 254

`CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer[:DATA]:RATio:SWR` on page 255

`CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer[:DATA]:RATio[:VALue]` on page 255

#### **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 253

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

Available for NRT measurements.

Defines a lower limit.

Remote command:

`CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer[:DATA]`  
on page 249

`CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer[:DATA]:CCDF` on page 250

`CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer[:DATA]:POWER` on page 252

`CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer[:DATA]:RATio:RCOefficient` on page 250

`CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer[:DATA]:RATio:RFRatio` on page 251

[CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer\[:DATA\]:RATio:RLOSs](#) on page 251

[CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer\[:DATA\]:RATio:SWR](#) on page 251

[CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer\[:DATA\]:RATio\[:VALue\]](#) on page 252

#### **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 256

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

Available for NRT measurements.

Defines an upper limit.

Remote command:

[CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer\[:DATA\]](#) on page 253

[CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer\[:DATA\]:CCDF](#) on page 253

[CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer\[:DATA\]:POWER](#) on page 256

[CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer\[:DATA\]:RATio:RCoefficient](#) on page 254

[CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer\[:DATA\]:RATio:RFRatio](#) on page 254

[CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer\[:DATA\]:RATio:RLOSs](#) on page 254

[CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer\[:DATA\]:RATio:SWR](#) on page 255

[CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer\[:DATA\]:RATio\[:VALue\]](#) on page 255

## 6.2 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 6.3, "Triggering"](#), on page 60
- See the power sensor user manual for examples on the interplay of the controlling mechanisms.

### 6.2.1 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.

## 6.3 Triggering

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

### 6.3.1 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.

### 6.3.2 Trigger Sources

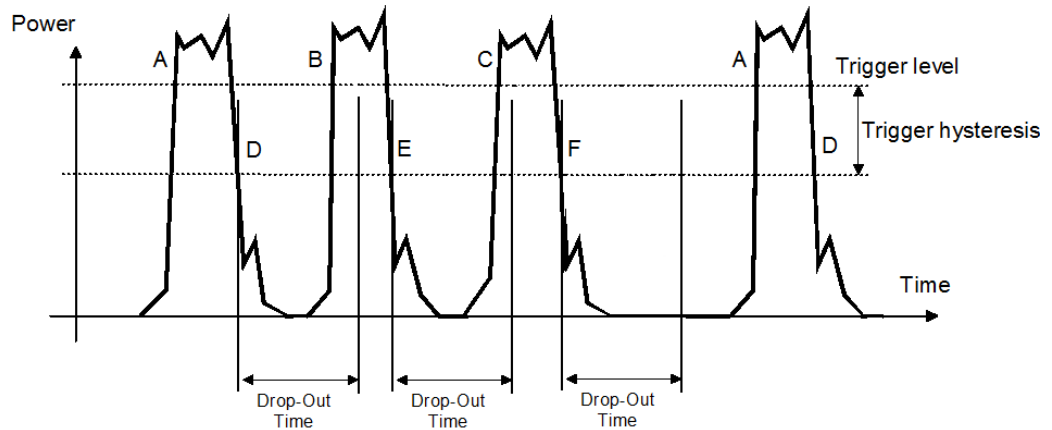
The possible trigger conditions and the execution of a trigger depend on the selected trigger mode and trigger source.

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.	TRIGger<Measurement>[:IMMediate]
"Immediate"	Measures immediately, does not wait for trigger condition.	-
"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 65.	TRIGger<Measurement>[:IMMediate]
"External"	Uses the external trigger signal that is supplied at the Trig In / Out 2 connector. See <a href="#">Chapter 3.2.2.1, "Trig In / Out 2 and Out 1 / Trig Out Connectors"</a> , on page 28.	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 145.	*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]

### 6.3.3 Dropout Time

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



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

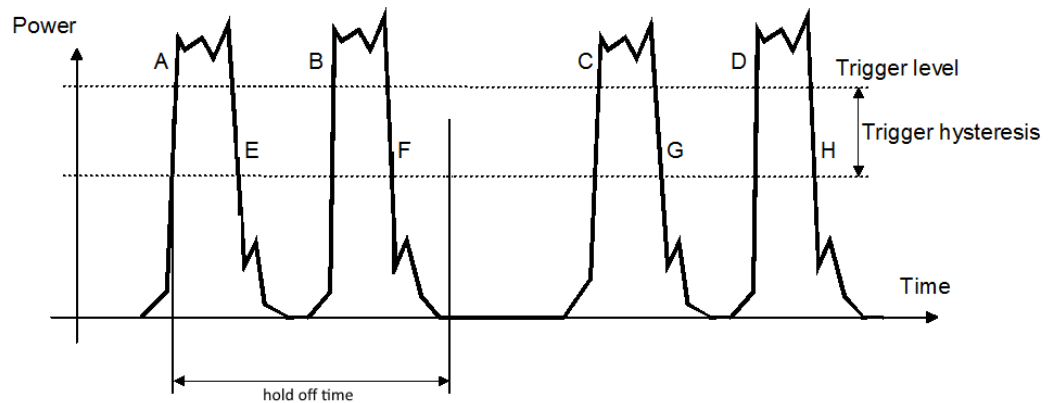
The RF power between the slots is below the threshold defined by the trigger level and the trigger hysteresis. Therefore, the trigger hysteresis alone cannot prevent triggering at B or at C. Therefore, set the dropout time greater than the time elapsed between points D and B and between E and C, but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

### 6.3.4 Hold-Off Time

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



### 6.3.5 Trigger Settings

Access: Main measurement dialog > "Trigger"

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

Trigger Mode.....	63
Trigger Source.....	64
Trigger Level.....	64
Trigger Advanced.....	64
L Source.....	64
L Slope.....	64
L Level.....	64
L Delay.....	64
L Dropout.....	65
L Holdoff.....	65
L Hysteresis.....	65
Specific Trigger.....	65
L Jitter Suppression.....	65
L Trigger Master State.....	65
L Trigger Master Port.....	66
L Trigger Synchronize State.....	66
L Trigger Synchronize Port.....	66
L Trigger 2 Input Impedance.....	66

#### Trigger Mode

Controls the trigger execution depending on the settings under "Trigger Source" on page 64.

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

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

Remote command:

[TRIGger<undef>:ALL:MODE](#) on page 264

[TRIGger<Measurement>:MODE](#) on page 264

### Trigger Source

For primary and secondary power sensors.

Sets the source for the trigger event. See [Chapter 6.3.2, "Trigger Sources"](#), on page 61.

Remote command:

[TRIGger<undef>:ALL:SOURce](#) on page 266

[TRIGger<Measurement>\[:CHANnel<Channel>\]:SOURce](#) on page 266

### Trigger Level

For primary and secondary power sensors.

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 263

[TRIGger<Measurement>\[:CHANnel<Channel>\]:LEVel](#) on page 263

### Trigger Advanced

For primary and secondary power sensors.

Groups further trigger settings.

#### Source ← Trigger Advanced

See ["Trigger Source"](#) on page 64.

#### Slope ← Trigger Advanced

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

"Positive" Rising edge

"Negative" Falling edge

Remote command:

[TRIGger<undef>:ALL:SLOPe](#) on page 265

[TRIGger<Measurement>\[:CHANnel<Channel>\]:SLOPe](#) on page 265

#### Level ← Trigger Advanced

See ["Trigger Level"](#) on page 64-

#### 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 260

`TRIGger<Measurement>[:CHANnel<Channel>]:DELay[:VALue]` on page 260

### 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 6.3.3, "Dropout Time"](#), on page 62.

Remote command:

`TRIGger<undef>:ALL:DTIME` on page 261

`TRIGger<Measurement>[:CHANnel<Channel>]:DTIME` on page 261

### Holdoff ← Trigger Advanced

Sets the hold-off time, see [Chapter 6.3.4, "Hold-Off Time"](#), on page 62.

Remote command:

`TRIGger<undef>:ALL:HOLDoff` on page 262

`TRIGger<Measurement>[:CHANnel<Channel>]:HOLDoff` on page 262

### 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 262

`TRIGger<Measurement>[:CHANnel<Channel>]:HYSTeresis` on page 262

### 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 263

### Trigger Master State ← Specific Trigger

Enables or disables the power sensor as trigger master. 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 66.

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]", also to the trigger output.

Remote command:

`TRIGger<Measurement>[:CHANnel<Channel>]:MASter[:STATe]` on page 265

#### **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 264

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

Usually used if "On" is set under "[Trigger Master State](#)" on page 65.

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

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

Remote command:

`TRIGger<undef>:ALL:SYNChronize[:STATe]` on page 266

`TRIGger<Measurement>[:CHANnel<Channel>]:SYNChronize[:STATe]`  
on page 266

#### **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 66.

Remote command:

`TRIGger<Measurement>[:CHANnel<Channel>]:SYNChronize:PORT`  
on page 266

#### **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 261

## 6.4 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 33.

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 7.7.3, "Measurement Settings Dialog"](#), on page 103
- NRT: [Chapter 7.8.3, "Measurement Main Configuration Dialog"](#), on page 112

For configuring the assigned power sensors, see:

- [Quick Setup](#)
- [Chapter 8, "Sensor Configuration"](#), on page 114

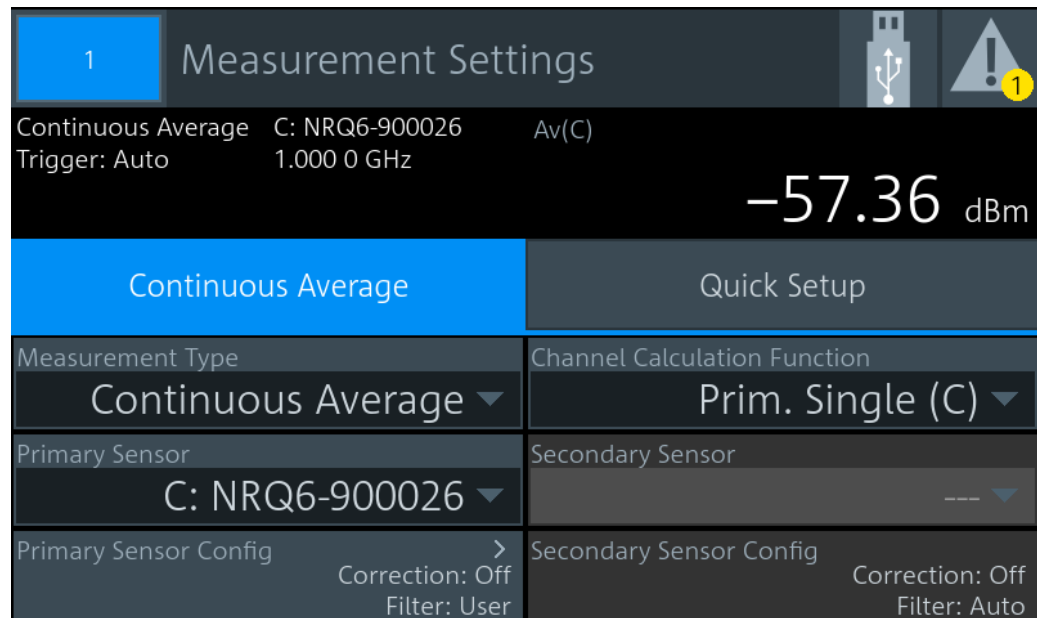


Figure 6-3: Example: continuous average

Measurement Type.....	68
Primary Sensor, Secondary Sensor.....	68
Primary Sensor Config, Secondary Sensor Config.....	68
Channel Calculation Function.....	68
Quick Setup.....	69
L Parameter Set.....	69
L Auto Set.....	69
L Preserve Window Settings.....	69
L Recall Parameter Set.....	70

**Measurement Type**

Sets the measurement type.

Remote command:

`CALCulate<Measurement>:TYPE` on page 269

**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 5.5, "Settings Conflict"](#), on page 48.

Remote command:

`CALCulate<Measurement>[:CHANnel<Channel>]:SENSe:INDeX` on page 271  
`[SENSe<Sensor>:]CATalog?` on page 270

**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 8, "Sensor Configuration"](#), on page 114.

**Channel Calculation Function**

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

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

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

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

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

Remote command:

[CALCulate<Measurement>:MATH\[:EXPRession\]](#) on page 323

[CALCulate<Measurement>:MATH\[:EXPRession\]:CATalog?](#) on page 324

#### Quick Setup

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

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

#### Parameter Set ← Quick Setup

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

See [Chapter 14.8.6.2, "Preconfigured Settings"](#), on page 348.

Remote command:

[SYSTem:STANdard:PRESet](#) on page 346

#### Auto Set ← Quick Setup

Configures the power sensor automatically.

#### Preserve Window Settings ← Quick Setup

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

- Off                      Configures the power sensor and the display settings of the R&S NRX. See [Chapter 14.8.6.3, "Display Configuration"](#), on page 358.
- On                        Only configures the power sensor.

Remote command:

[SYSTem:STANdard:PWSettings](#) on page 347

**Recall Parameter Set ← Quick Setup**

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

Remote command:

[SYSTem:STANdard:PRESet](#) on page 346

## 7 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 6, "Configuration for All Measurement Types"](#), on page 50.

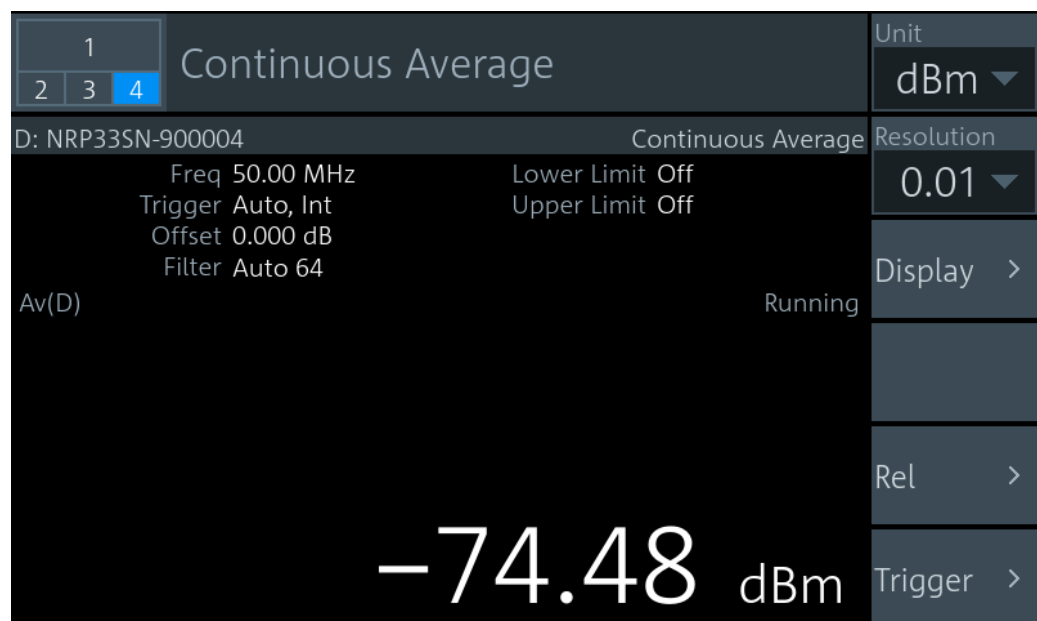
• <a href="#">Continuous Average</a> .....	71
• <a href="#">Burst Average</a> .....	73
• <a href="#">Trace</a> .....	75
• <a href="#">Pulse Analysis</a> .....	80
• <a href="#">Time Gate</a> .....	89
• <a href="#">Timeslot</a> .....	94
• <a href="#">Statistics</a> .....	100
• <a href="#">NRT</a> .....	107

### 7.1 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.

#### 7.1.1 Continuous Average Result Display



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

## 7.1.2 Continuous Average Settings

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

Unit.....	72
Resolution.....	72
Display.....	72
Rel.....	72
L Reference Value.....	72
L Relative Measurements.....	73
Trigger.....	73

### Unit

See "Unit" on page 51.

### Resolution

See "Resolution" on page 51.

### Display

See Chapter 6.1, "Display Settings", on page 50.

### Rel

Groups the settings for relative measurements.

### Reference Value ← Rel

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

Sets the reference value.

Remote command:

`CALCulate<Measurement>:RELative<DirectionalChannel>[:MAGNitude]`  
on page 272

`CALCulate<Measurement>:RELative<DirectionalChannel>:CCDF`  
on page 315

`CALCulate<Measurement>:RELative<DirectionalChannel>:POWer[:MAGNitude]` on page 315

`CALCulate<Measurement>:RELative<DirectionalChannel>:RATio:RCoefficient` on page 316

`CALCulate<Measurement>:RELative<DirectionalChannel>:RATio:RFRatio` on page 316

`CALCulate<Measurement>:RELative<DirectionalChannel>:RATio:RLOS`  
on page 316

`CALCulate<Measurement>:RELative<DirectionalChannel>:RATio:SWR`  
on page 317

`CALCulate<Measurement>:RELative<DirectionalChannel>:RATio[:MAGNitude]` on page 317

`[SENSe<Sensor>:] POWer:REFerence` on page 273



**Relative Measurements ← Rel**

Allows you to relate measured power or a power ratio 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 68.

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

Remote command:

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

on page 272

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

`AUTO` on page 272

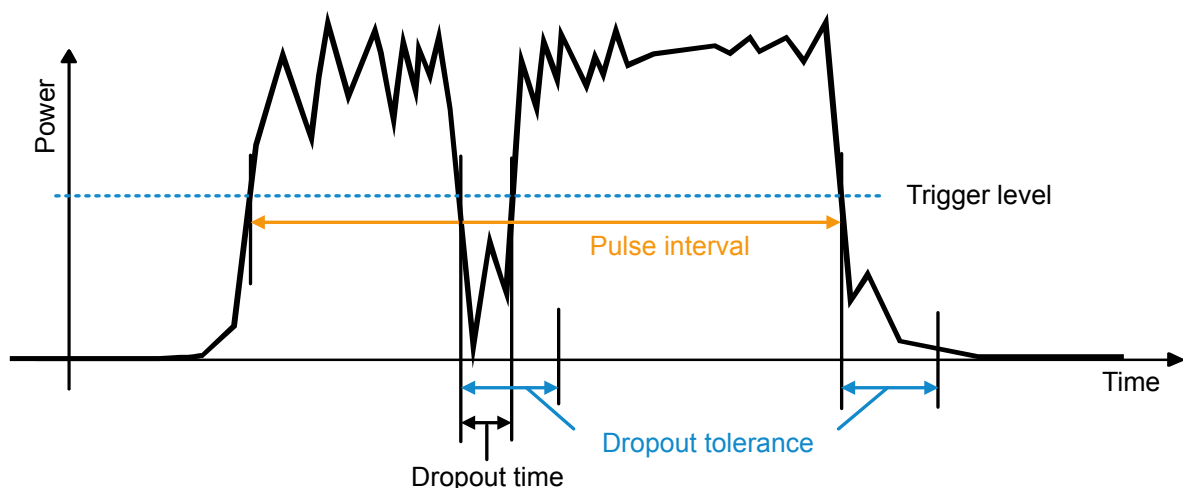
**Trigger**

See [Chapter 6.3, "Triggering"](#), on page 60.

## 7.2 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 7-1: Burst average measurement parameters*

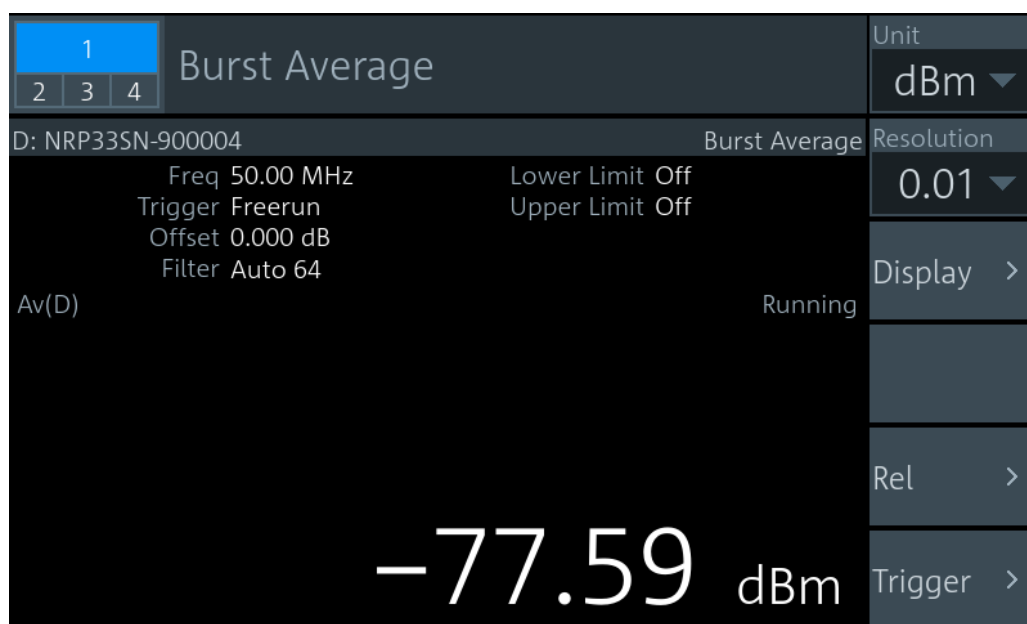
To prevent power drops due to modulation from being erroneously interpreted as the end of a pulse, you must define the dropout tolerance. The dropout tolerance is a time

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 64
- "Dropout" on page 65
- "Dropout Tolerance" on page 117
- "Exclude from Start, Exclude from End" on page 117

### 7.2.1 Burst Average Result Display



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

### 7.2.2 Burst Average Settings

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

Unit.....	74
Resolution.....	74
Display.....	75
Rel.....	75
Trigger.....	75

**Unit**

See "Unit" on page 51.

**Resolution**

See "Resolution" on page 51.

**Display**

See [Chapter 6.1, "Display Settings"](#), on page 50.

**Rel**

See ["Rel"](#) on page 72.

**Trigger**

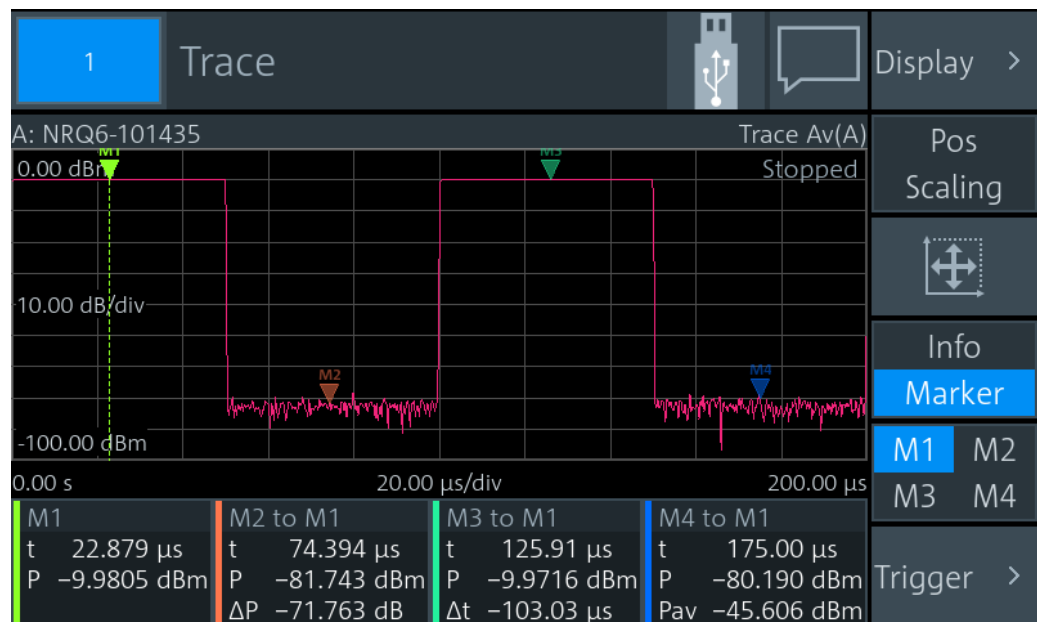
See [Chapter 6.3, "Triggering"](#), on page 60.

## 7.3 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](#)..... 75
- [Trace Settings](#)..... 76
- [Trace Marker Dialog](#)..... 77

### 7.3.1 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 76.

## 7.3.2 Trace Settings

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

Display.....	76
Pos / Scaling.....	76
Autoscale.....	76
Info / Marker.....	76
M1 / M2 / M3 / M4.....	76
Trigger.....	77
L Display.....	77
L Trig Mode.....	77
L Trig Source.....	77
L Trig Slope.....	77
L Level.....	77
L Sensor Trigger.....	77

### Display

See [Chapter 6.1, "Display Settings"](#), on page 50.

### 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 80. If you tap here, the "Trace Marker" dialog opens, see <a href="#">Chapter 7.3.3, "Trace Marker Dialog"</a> , on page 77. Shows buttons to select a marker, see <a href="#">"M1 / M2 / M3 / M4"</a> on page 76.

Remote command:

`CALCulate<Measurement>:DMODE` on page 226

### M1 / M2 / M3 / M4

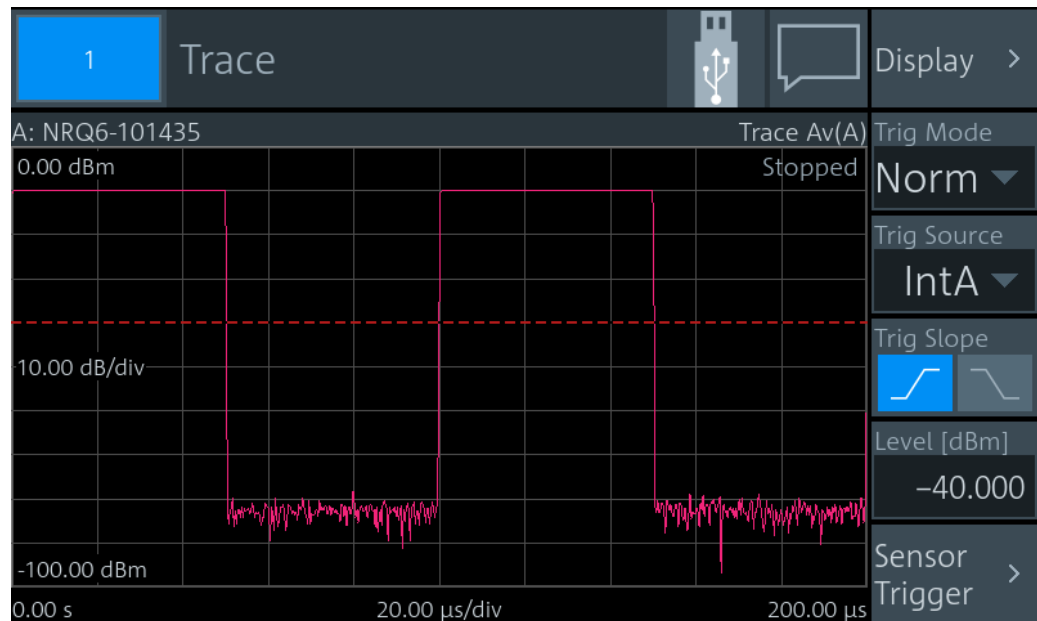
Shows the selected marker in the trace.

Remote command:

`DISPlay[:WINDow<Window>]:TRACe:MARKer<Undef>:SELection` on page 284

**Trigger**

Gives quick access to selected trigger settings.



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

**Display ← Trigger**

See [Chapter 6.1, "Display Settings"](#), on page 50.

**Trig Mode ← Trigger**

See ["Trigger Mode"](#) on page 63.

**Trig Source ← Trigger**

See ["Trigger Source"](#) on page 64.

**Trig Slope ← Trigger**

See ["Slope"](#) on page 64.

**Level ← Trigger**

See ["Trigger Level"](#) on page 64.

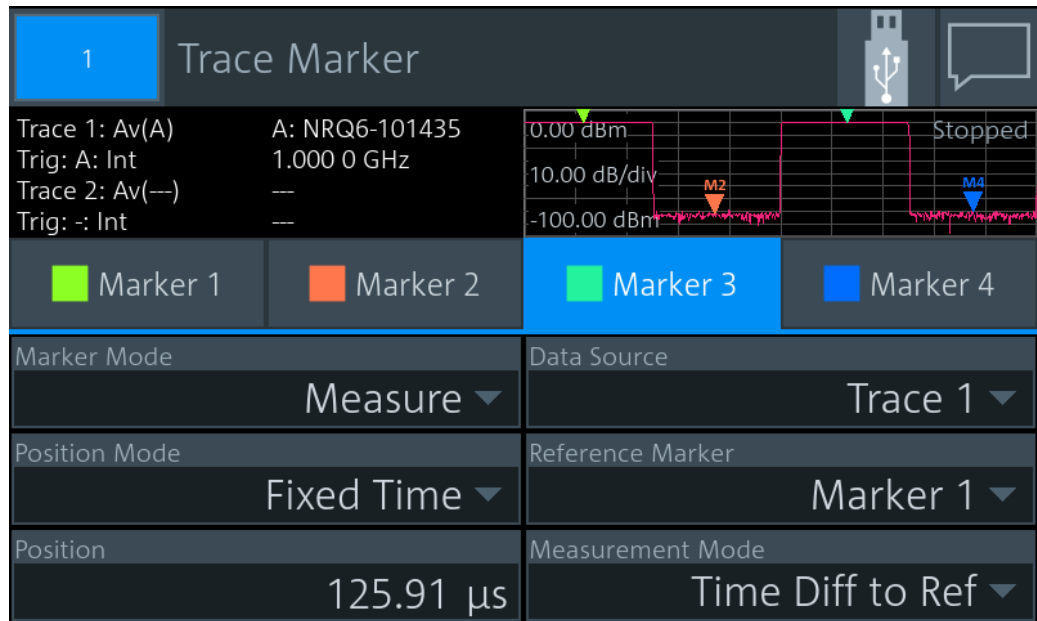
**Sensor Trigger ← Trigger**

See [Chapter 6.3, "Triggering"](#), on page 60.

**7.3.3 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..... 78  
 Position Mode..... 78  
 Position..... 79  
 Data Source..... 80  
 Reference Marker..... 80  
 Measurement Mode..... 80

**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 279

**Position Mode**

Defines where the marker is placed.

- "Fixed Time" At a fixed time, set by [Position](#).
- "Fixed Power" At a fixed power value, set by [Position](#).
- "Relative to Ref Position" At a time difference of [Position](#) to the x-position of the [Reference Marker](#).
- "Relative to Ref Power" At a power difference of [Position](#) to the y-position of the [Reference Marker](#).

"From Ref Power <-"

Starting from the right border, at a power difference of **Position** to the y-position of the **Reference Marker**.

"From Ref Power ->"

Starting from the left border, at a power difference of **Position** to the y-position of the **Reference Marker**.

"Peak Search" Measured maximum power

"Min Search" Measured minimum power

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

Maximum or minimum power measured left from the **Reference Marker**.

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

Maximum or minimum power measured right from the **Reference Marker**.

Remote command:

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

on page 279

### 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 283

`DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:RELative:TIME` on page 283

`DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:POWer:DBM` on page 280

`DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:POWer:DBUV` on page 281

`DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:POWer:WATT` on page 282

`DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:RELative:POWer:DB` on page 281

`DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:RELative:POWer:DPCT` on page 282

`DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:RELative:POWer:O` on page 282

`DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:RELative:POWer:WATT` on page 282

`DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:POWer:RATio:DB` on page 281

`DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:POWer:RATio:DPCT` on page 282

`DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:POWer:RATio:O` on page 282

**Data Source**

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

Selects the trace.

Remote command:

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

on page 278

**Reference Marker**

Defines a marker as reference marker.

Remote command:

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

on page 283

**Measurement Mode**

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

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

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

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

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

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

Remote command:

`DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:FUNction` on page 278

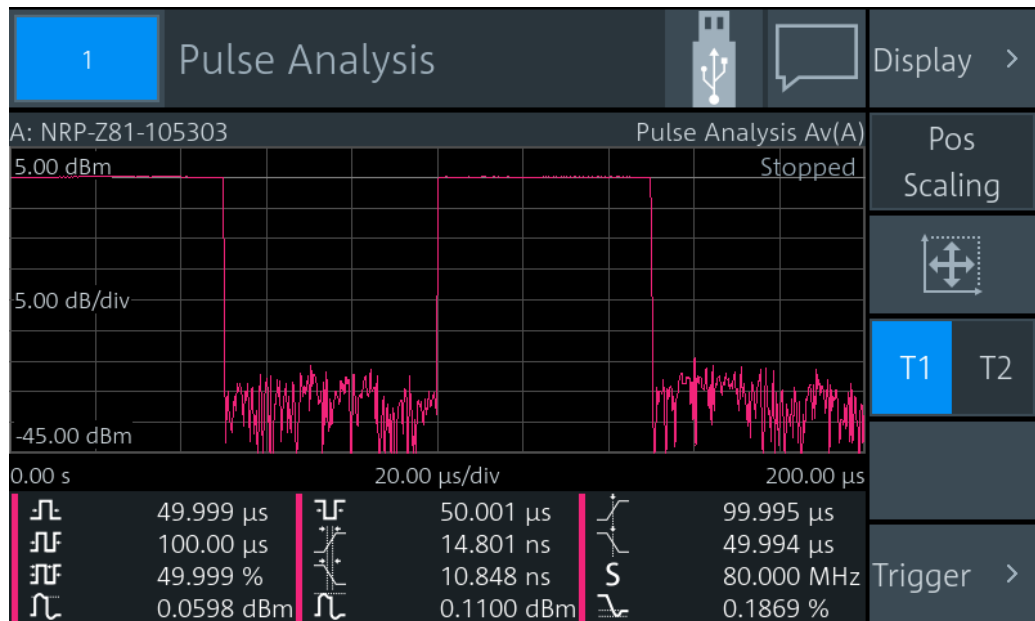
## 7.4 Pulse Analysis

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](#).....81
- [Pulse Analysis Settings](#).....81
- [Pulse Analysis Dialog](#).....82



### 7.4.1 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 7.4.3, "Pulse Analysis Dialog"](#), on page 82.

### 7.4.2 Pulse Analysis Settings

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

Display.....	81
Pos / Scaling.....	81
Autoscale.....	81
T1 / T2.....	81
Trigger.....	82

#### Display

See [Chapter 6.1, "Display Settings"](#), on page 50.

#### Pos / Scaling

See ["Pos / Scaling"](#) on page 76.



#### Autoscale

See ["Autoscale"](#) on page 76.

#### T1 / T2

Selects the displayed trace.

Remote command:

`DISPlay[:WINDow<Window>]:TRACe:MEASurement:SELECTION` on page 298

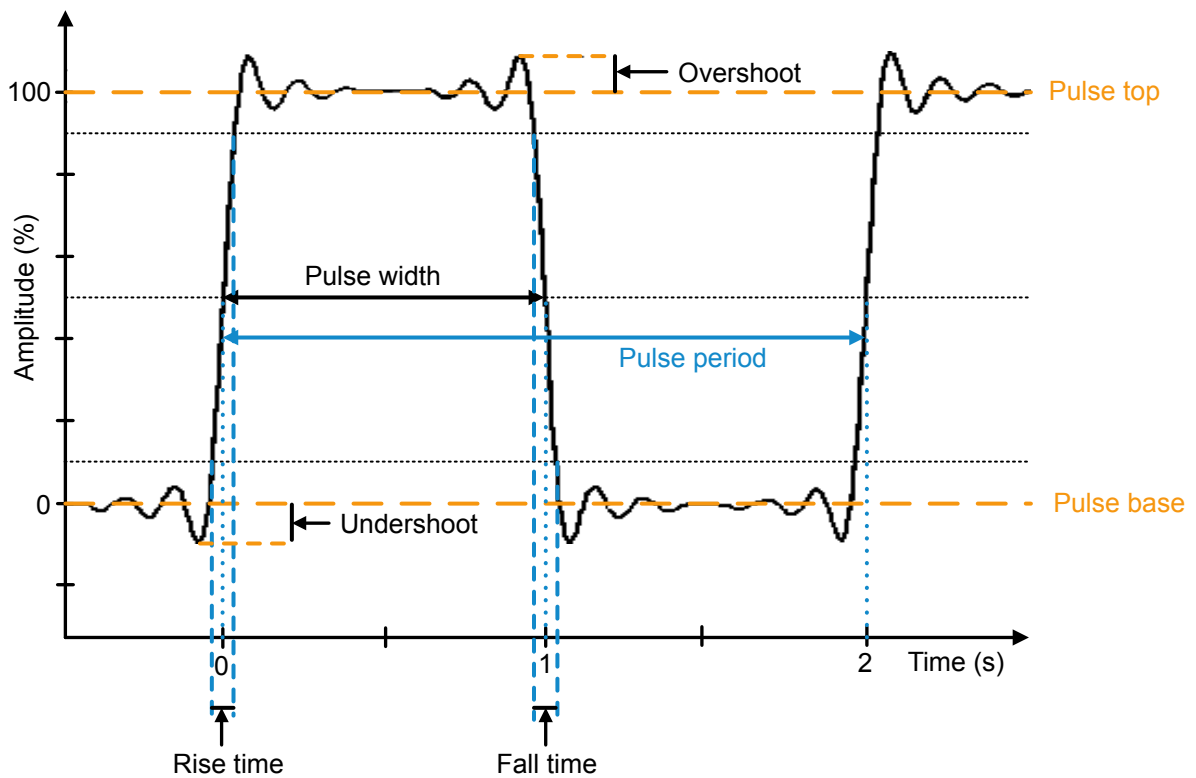
**Trigger**

Gives quick access to selected trigger settings. See ["Trigger"](#) on page 77.

**7.4.3 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 7-2: Main pulse analysis parameters and characteristic values*

Time tab.....	83
L Pulse Width.....	83
L Pulse Period.....	84
L Duty Cycle.....	84
L Pulse Off Time.....	84
L Rise Time.....	84
L Fall Time.....	84
L Start Time.....	85
L Stop Time.....	85
L Sampling Rate.....	85
Power tab.....	85
L Pulse Top.....	86
L Trace Peak.....	86

L Neg. Overshoot.....	86
L Pulse Base.....	87
L Trace Min.....	87
L High Ref.....	87
L Trace Avg.....	87
L Pos. Overshoot.....	87
L Low Ref.....	88
Configuration tab.....	88
L Reference Levels relate to.....	88
L Algorithm.....	88
L High Reference Level.....	89
L Reference Level.....	89
L Low Reference Level.....	89
L Reset to Defaults.....	89

### Time tab

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

1 Pulse Analysis (all Traces)

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

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

Time Power Configuration



### Pulse Width ← Time tab

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

Remote command:

`DISPlay[:WINDow<Window>]:TRACe:MEASurement:PULSe:DURation[:STATE]` on page 296

`CALCulate<Measurement>:TRACe:MEASurement:PULSe:DURation?` on page 290

**Pulse Period ← Time tab**

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

Remote command:

`DISPlay[:WINDow<Window>]:TRACe:MEASurement:PULSe:PERiod[:STATe]`  
on page 297

`CALCulate<Measurement>:TRACe:MEASurement:PULSe:PERiod?` on page 291

**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 296

`CALCulate<Measurement>:TRACe:MEASurement:PULSe:DCYClE?` on page 290

**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 297

`CALCulate<Measurement>:TRACe:MEASurement:PULSe:SEParation?`  
on page 291

**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 299

`CALCulate<Measurement>:TRACe:MEASurement:TRANSition:POSitive:DUration?`  
on page 292

**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 298

`CALCulate<Measurement>:TRACe:MEASurement:TRANSition:NEGative:DUration?`  
on page 291

**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 299  
`CALCulate<Measurement>:TRACe:MEASurement:TRANSition:POSitive:OCCurrence?` on page 293

**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 298  
`CALCulate<Measurement>:TRACe:MEASurement:TRANSition:NEGative:OCCurrence?` on page 292

**S****Sampling Rate ← Time tab**

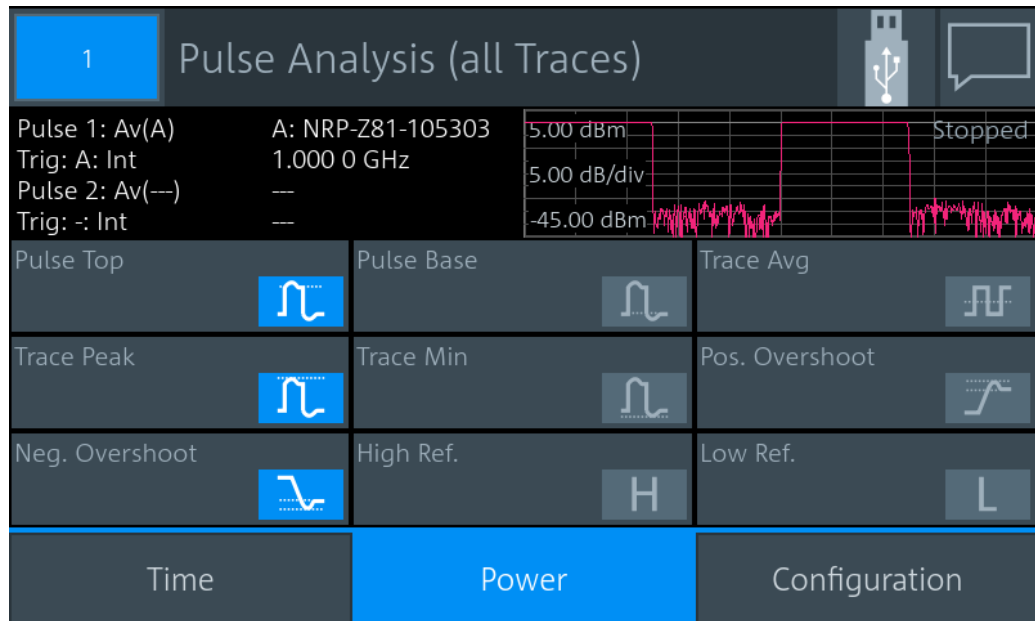
Number of samples per second.

Remote command:

`DISPlay[:WINDow<Window>]:TRACe:MEASurement:PULSe:RESolution[:STATe]` on page 297  
`CALCulate<Measurement>:TRACe:MEASurement:TRANSition:SPERiod?` on page 293

**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 296

`CALCulate<Measurement>:TRACe:MEASurement:POWer:PULSe:TOP?` on page 290



#### Trace Peak ← Power tab

Maximum power measured within the analysis window.

Remote command:

`DISPlay[:WINDow<Window>]:TRACe:MEASurement:POWer:MAXimum[:STATE]` on page 294

`CALCulate<Measurement>:TRACe:MEASurement:POWer:MAX?` on page 289



#### 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 299

`CALCulate<Measurement>:TRACe:MEASurement:TRANSition:NEGative:OVERshoot?` on page 292

**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 295

`CALCulate<Measurement>:TRACe:MEASurement:POWer:PULSe:BASE?` on page 289

**Trace Min ← Power tab**

Minimum power measured within the analysis window.

Remote command:

`DISPlay[:WINDow<Window>]:TRACe:MEASurement:POWer:MINimum[:STATe]` on page 294

`CALCulate<Measurement>:TRACe:MEASurement:POWer:MIN?` on page 289

**High Ref. ← Power tab**

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

Remote command:

`DISPlay[:WINDow<Window>]:TRACe:MEASurement:POWer:PULSe:HREFerence[:STATe]` on page 295

`CALCulate<Measurement>:TRACe:MEASurement:POWer:HREFerence?` on page 288

**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 294

`CALCulate<Measurement>:TRACe:MEASurement:POWer:AVG?` on page 288

**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 300

`CALCulate<Measurement>:TRACe:MEASurement:TRANSition:POSitive:OVERshoot?` on page 293

**Low Ref. ← Power tab**

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

Remote command:

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

`LREference[:STATe]` on page 295

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

on page 289

**Configuration tab**

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

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

Time      Power      Configuration

**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 298

**Algorithm ← Configuration tab**

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

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



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

This algorithm is recommended for:

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

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

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

Remote command:

`CALCulate<Measurement>:TRACe:MEASurement:ALGorithm` on page 287

#### High Reference Level ← Configuration tab

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

Remote command:

`CALCulate<Measurement>:TRACe:MEASurement:DEFine:TRANSition: HREFerence` on page 287

#### Reference Level ← Configuration tab

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

Remote command:

`CALCulate<Measurement>:TRACe:MEASurement:DEFine:DURation: REFerence` on page 287

#### Low Reference Level ← Configuration tab

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

Remote command:

`CALCulate<Measurement>:TRACe:MEASurement:DEFine:TRANSition: LREFerence` on page 288

#### Reset to Defaults ← Configuration tab

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

## 7.5 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](#)..... 90
- [Time Gate Settings](#)..... 91
- [Gate Configuration Dialog](#)..... 93

### 7.5.1 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

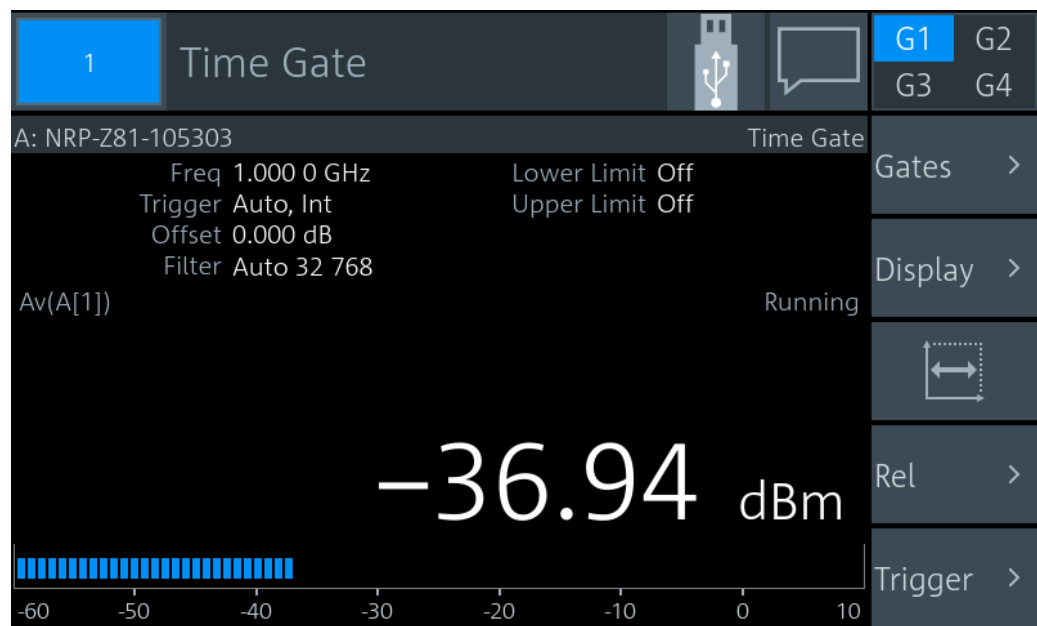


Figure 7-3: Time gate, scalar digital display

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

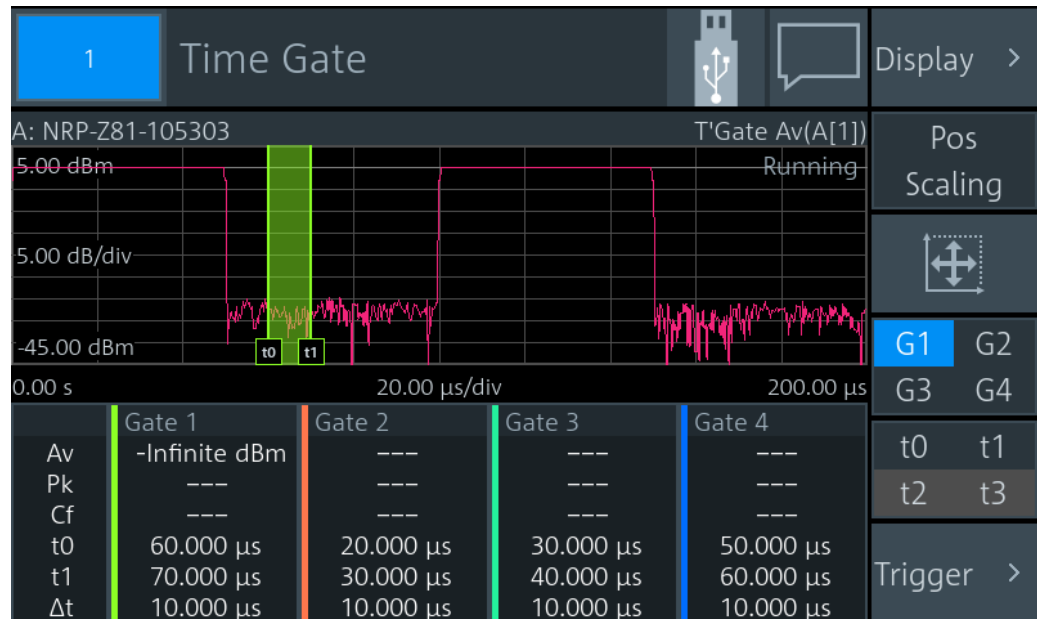


Figure 7-4: Time gate, graphical display

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 Δt

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

## 7.5.2 Time Gate Settings

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

The available settings depend on the selected result display.

G1 / G2 / G3 / G4.....	92
Gates.....	92
Display.....	92
Resolution.....	92
Pos / Scaling.....	92
Autoscale.....	92
t0 / t1 / t2 / t3.....	92
Rel.....	93
Trigger.....	93

### **G1 / G2 / G3 / G4**

Selects the active gate for the measurement.

Remote command:

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

on page 302

### **Gates**

Available for the scalar displays.

Opens the "Gate Configuration" dialog, see [Chapter 7.5.3, "Gate Configuration Dialog"](#), on page 93.

### **Display**

See [Chapter 6.1, "Display Settings"](#), on page 50.

### **Resolution**

Available for the scalar displays.

See ["Resolution"](#) on page 51.

### **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 72.

**Trigger**

See Chapter 6.3, "Triggering", on page 60.

### 7.5.3 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.

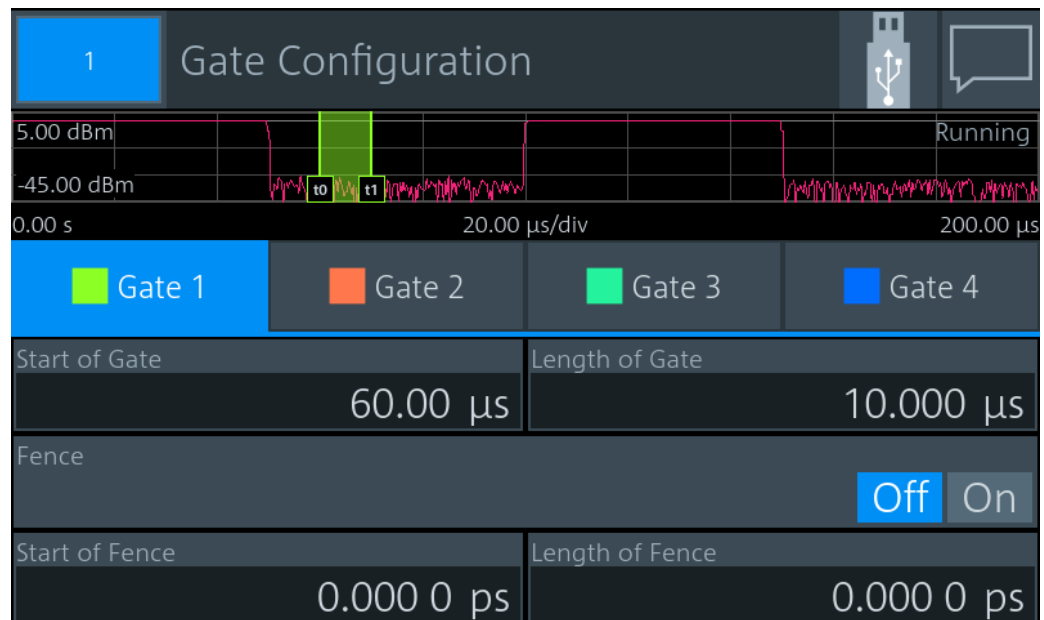


Figure 7-5: Example for time gate measurement type

Start of Gate.....	94
Length of Gate.....	94
Fence.....	94
Start of Fence.....	94
Length of Fence.....	94

**Start of Gate**

Sets the start time of the gate.

Remote command:

`CALCulate<Measurement>[:POWer]:TGATe<Gate>[:AVG]:TIME` on page 301

**Length of Gate**

Sets the length of the gate.

Remote command:

`CALCulate<Measurement>[:POWer]:TGATe<Gate>[:AVG]:OFFSet[:TIME]`  
on page 300

**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 302

**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 301

**Length of Fence**

Sets the length of the fence.

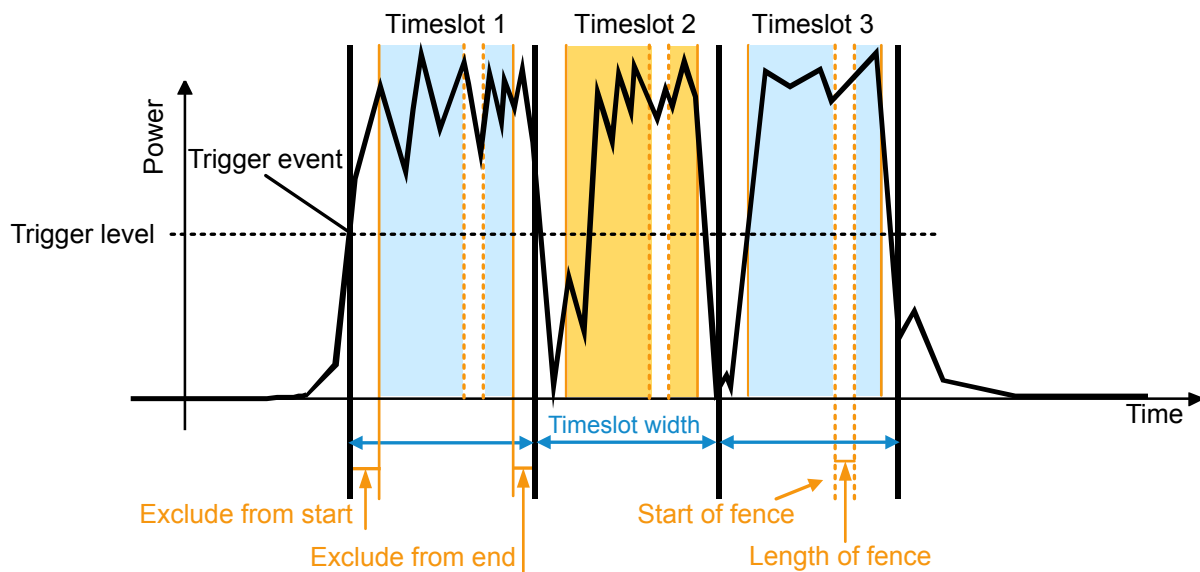
Remote command:

`CALCulate<Measurement>[:POWer]:TGATe<Gate>[:AVG][:EXCLude]:MID:OFFSet[:TIME]` on page 301

## 7.6 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 7-6: 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](#).....95
- [Timeslot Settings](#).....97
- [Timeslot Configuration Dialog](#).....98

### 7.6.1 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

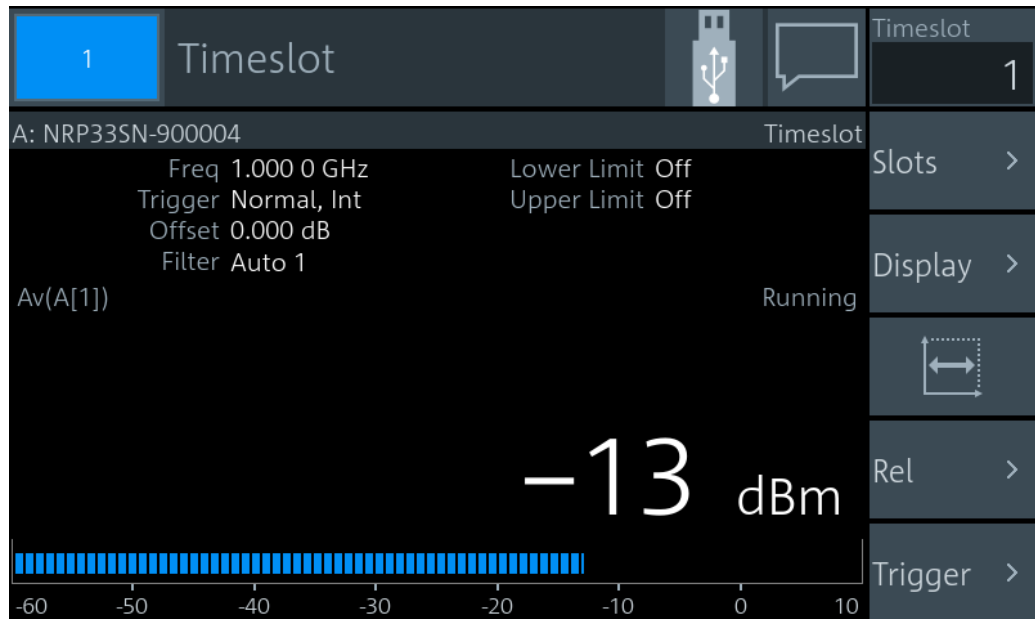


Figure 7-7: Timeslot, scalar digital display

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

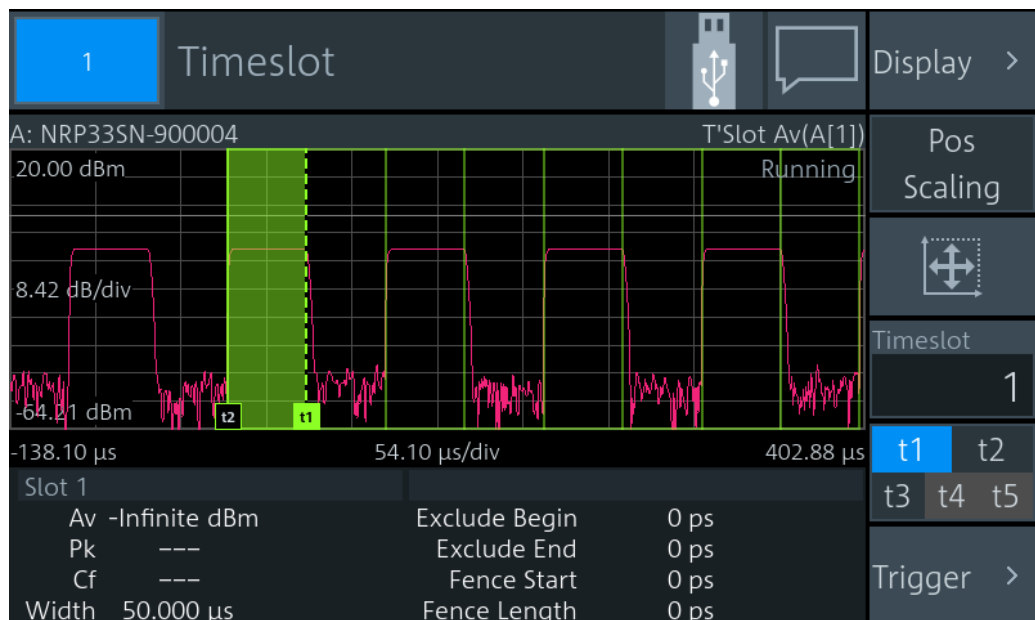


Figure 7-8: Timeslot, graphical display



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.

## 7.6.2 Timeslot Settings

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

The available settings depend on the selected result display.

<a href="#">Timeslot</a> .....	97
<a href="#">Slots</a> .....	97
<a href="#">Display</a> .....	97
<a href="#">Resolution</a> .....	98
<a href="#">Pos / Scaling</a> .....	98
<a href="#">Autoscale</a> .....	98
<a href="#">t1, t2, t3, t4, t5</a> .....	98
<a href="#">Rel</a> .....	98
<a href="#">Trigger</a> .....	98

### Timeslot

Selects a timeslot for the measurement.

Remote command:

[CALCulate<Measurement>\[:POWER\]:TSlot\[:AVG\]:SElection](#) on page 304

### Slots

Available for the scalar displays.

Opens the "Timeslot Configuration" dialog, see [Chapter 7.6.3, "Timeslot Configuration Dialog"](#), on page 98.

### Display

See [Chapter 6.1, "Display Settings"](#), on page 50.

**Resolution**

Available for the scalar displays.

See ["Resolution"](#) on page 51.

**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 72.

**Trigger**

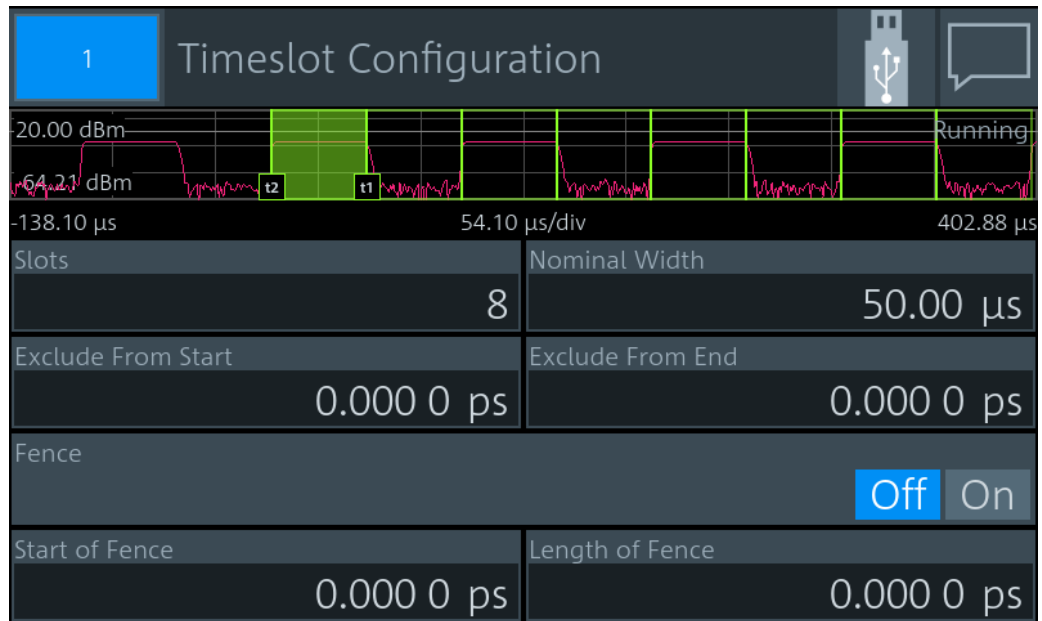
See [Chapter 6.3, "Triggering"](#), on page 60.

### 7.6.3 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.....	99
Nominal Width.....	99
Exclude from Start.....	99
Exclude from End.....	99
Fence.....	100
Start of Fence.....	100
Length of Fence.....	100

### Slots

Sets the number of simultaneously measured timeslots.

Remote command:

[CALCulate<Measurement>\[:POWER\]:TSLot\[:AVG\]:COUNT](#) on page 303

### Nominal Width

Sets the length of the timeslot.

Remote command:

[CALCulate<Measurement>\[:POWER\]:TSLot\[:AVG\]:WIDTH](#) on page 304

### 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 303

### 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 303

**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 305

**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 304

**Length of Fence**

Sets the length of the fence.

Remote command:

`CALCulate<Measurement>[:POWER]:TSLot[:AVG][:EXCLude]:MID:OFFSet[:TIME]` on page 304

## 7.7 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](#)..... 100
- [Statistics Settings](#)..... 102
- [Measurement Settings Dialog](#)..... 103
- [Scale Configuration Dialog](#)..... 104
- [Statistics Timing Dialog](#)..... 106

### 7.7.1 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.

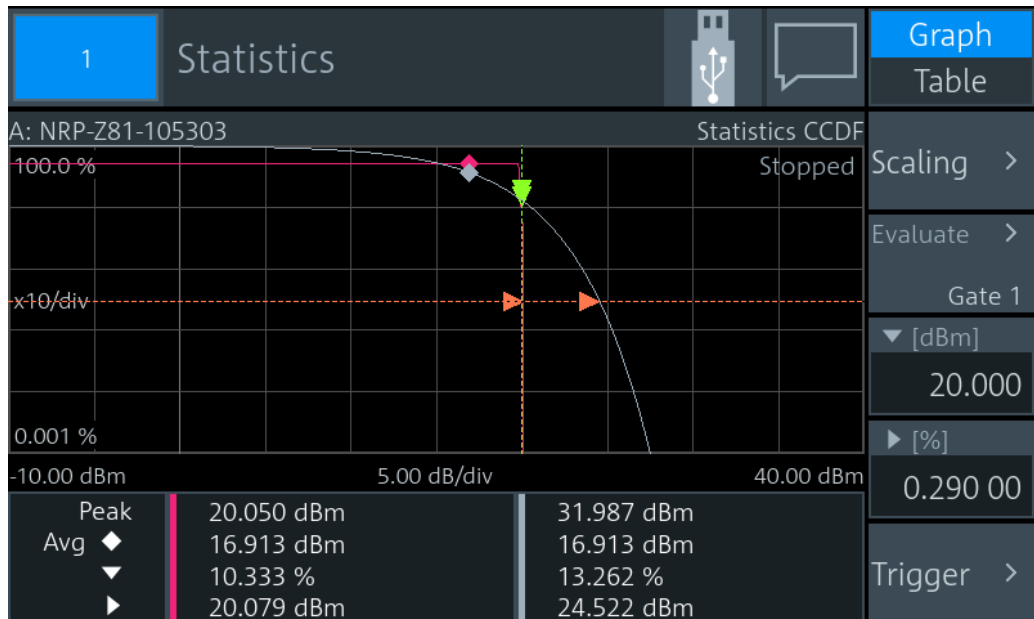


Figure 7-9: Statistics, graphical display

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.

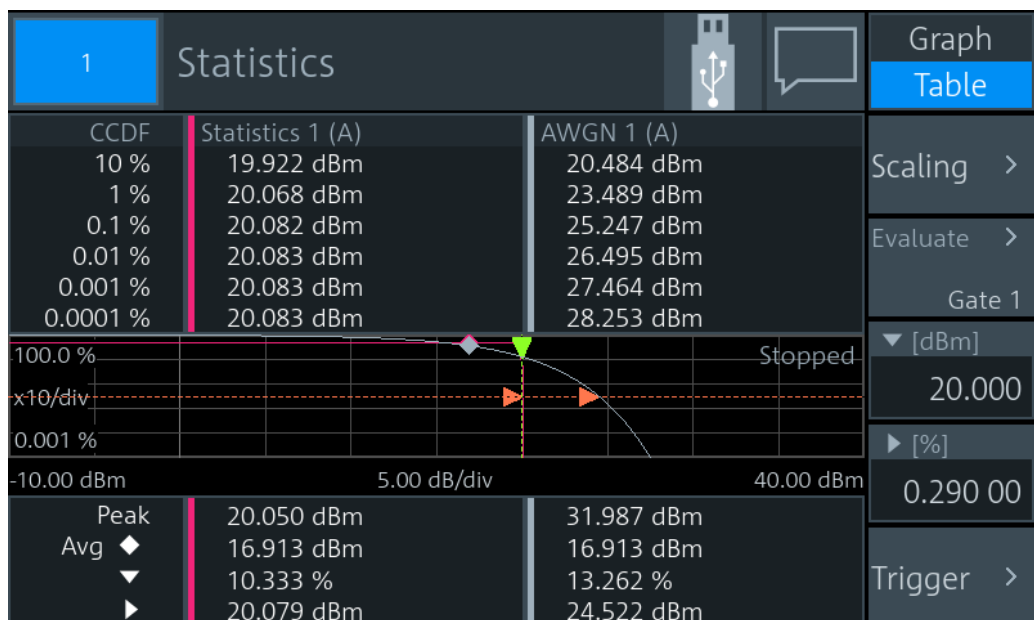


Figure 7-10: Statistics, tabular display

## 7.7.2 Statistics Settings

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

Graph / Table.....	102
Scaling.....	102
Evaluate.....	102
[dBm] / [dB] marker.....	102
[%] marker.....	102
Trigger.....	102

### Graph / Table

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

Shows or hides the measurement results table.

Remote command:

`CALCulate<Measurement>:DMODE` on page 226

### Scaling

Opens the "Scale Configuration" dialog, see [Chapter 7.7.4, "Scale Configuration Dialog"](#), on page 104.

### Evaluate

Opens the "Statistics Timing" dialog, see [Chapter 7.7.5, "Statistics Timing Dialog"](#), on page 106.

### [dBm] / [dB] marker

Positions the x-marker to a power value. The associated measurement result is displayed in the lower pane, see [Figure 7-10](#).

Remote command:

`CALCulate<Measurement>:STATistics:MARKer:X:POSition:RELative`  
on page 313

`CALCulate<Measurement>:STATistics:MARKer:X:POSition[:ABSolute]`  
on page 313

### [%] marker

Positions the y-marker to a measurement value. The associated power value is displayed in the lower pane, see [Figure 7-10](#).

Remote command:

`CALCulate<Measurement>:STATistics:PDF:MARKer:Y:POSition`  
on page 314

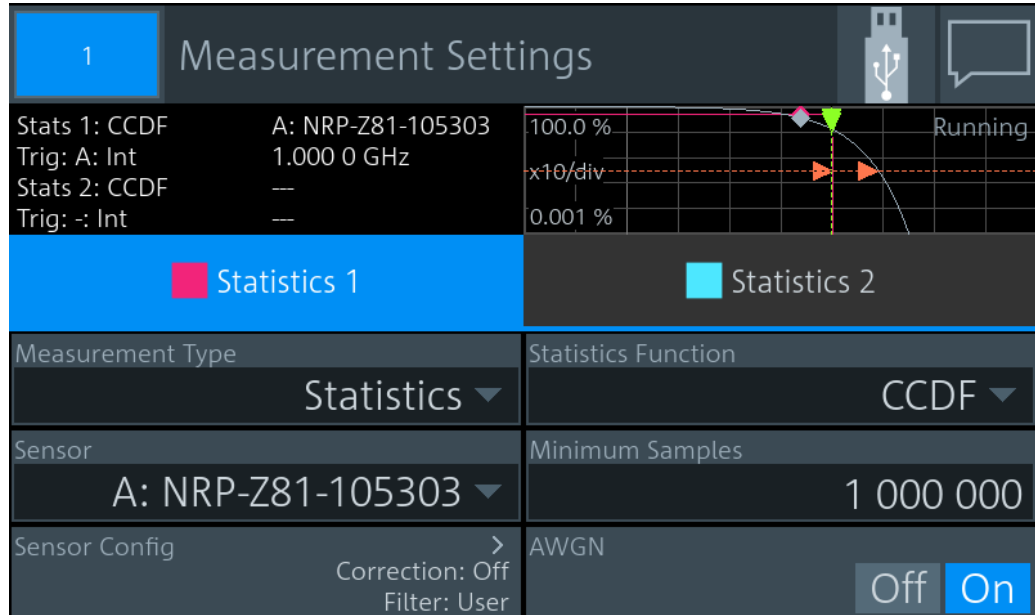
`CALCulate<Measurement>:STATistics[:CDF]:MARKer:Y:POSition`  
on page 312

### Trigger

See [Chapter 6.3, "Triggering"](#), on page 60.

### 7.7.3 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 68.
- "Sensor", see ["Primary Sensor, Secondary Sensor"](#) on page 68.
- "Sensor Config" > "Aperture"  
See ["Aperture"](#) on page 116.

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

<a href="#">Statistics Function</a> .....	103
<a href="#">Minimum Samples</a> .....	104
<a href="#">AWGN</a> .....	104

#### Statistics Function

Sets the function used for analyzing the statistical distribution of the envelope power.

"CCDF"	Complementary cumulative distribution function Probability that the envelope power is higher than the corresponding x-axis power value. Linear or logarithmic scale.
"CDF"	Cumulative distribution function Probability that the envelope power is lower than the corresponding x-axis power value. Linear or logarithmic scale.
"PDF"	Probability density function Normalized distribution density of the envelope power. The measurement results are dimensionless and independent of the magnitude of the average power value ( $A_v$ ). Only linear scale is available.

Remote command:

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

on page 267

**Minimum Samples**

Sets the minimum number of samples.

Remote command:

`CALCulate<Measurement>:STATistics:SAMPles[:MINimum]` on page 307

**AWGN**

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

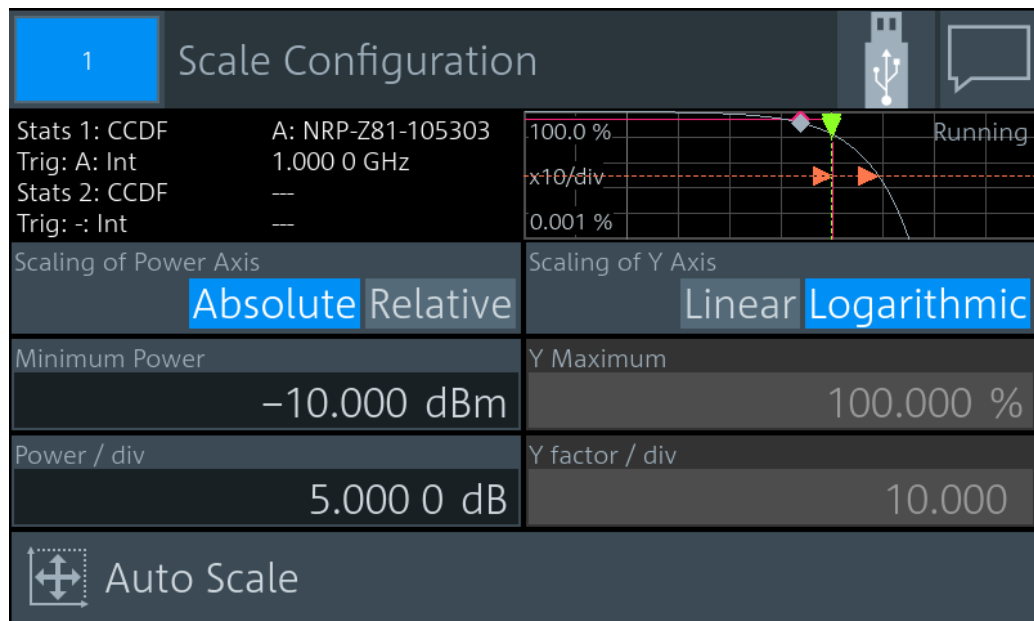
Remote command:

`CALCulate<Measurement>:STATistics:AWGN[:STATe]` on page 307

**7.7.4 Scale Configuration Dialog**

Access: "Statistics" > "Scaling"

Used for configuring the axes of the display.



Scaling of Power Axis..... 105

Minimum Power..... 105

Power / div..... 105

Scaling of Y Axis..... 105

Y Maximum..... 105

Y / div..... 105

Auto Scale..... 105



**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 310

**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 311

`CALCulate<Measurement>:STATistics[:SCALE]:X:RLEVel:RELative`  
on page 311

**Power / div**

Sets the scaling of the power axis.

Remote command:

`CALCulate<Measurement>:STATistics[:SCALE]:X:POINts` on page 310

`CALCulate<Measurement>:STATistics[:SCALE]:X:RANGE` on page 311

**Scaling of Y Axis**

Sets linear or logarithmic scaling for the y-axis.

Remote command:

`CALCulate<Measurement>:STATistics[:SCALE]:Y:SPACing` on page 312

**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 309

`CALCulate<Measurement>:STATistics[:CDF][:SCALE]:Y[:LINear]:TOP`  
on page 309

**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 308

`CALCulate<Measurement>:STATistics[:CDF][:SCALE]:Y[:LINear]:  
PDIVision` on page 309

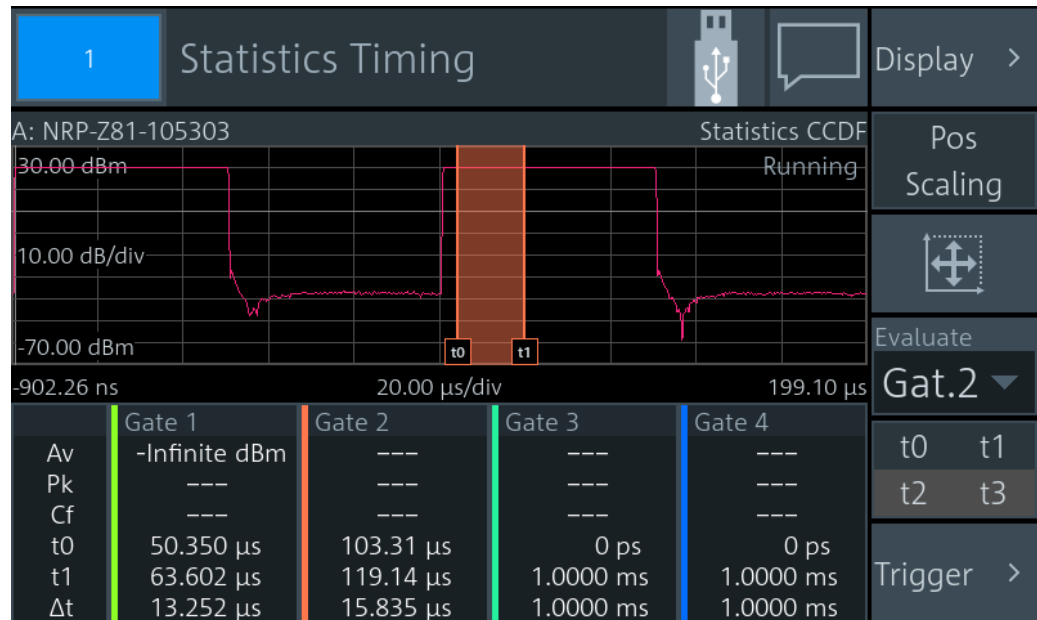
**Auto Scale**

Adapts the scaling of the power axis to the trace.

### 7.7.5 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 7.5.3, "Gate Configuration Dialog"](#), on page 93.

<a href="#">Display</a> .....	106
<a href="#">Pos / Scaling</a> .....	106
<a href="#">Autoscale</a> .....	106
<a href="#">Evaluate</a> .....	107
<a href="#">t0 / t1 / t2 / t3</a> .....	107

#### Display

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

- "Start Time" on page 54
- "Time / Div" on page 54
- "Power Reference" on page 55
- "Power / Div" on page 55
- "Unit" on page 55

#### 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 307

**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 92.

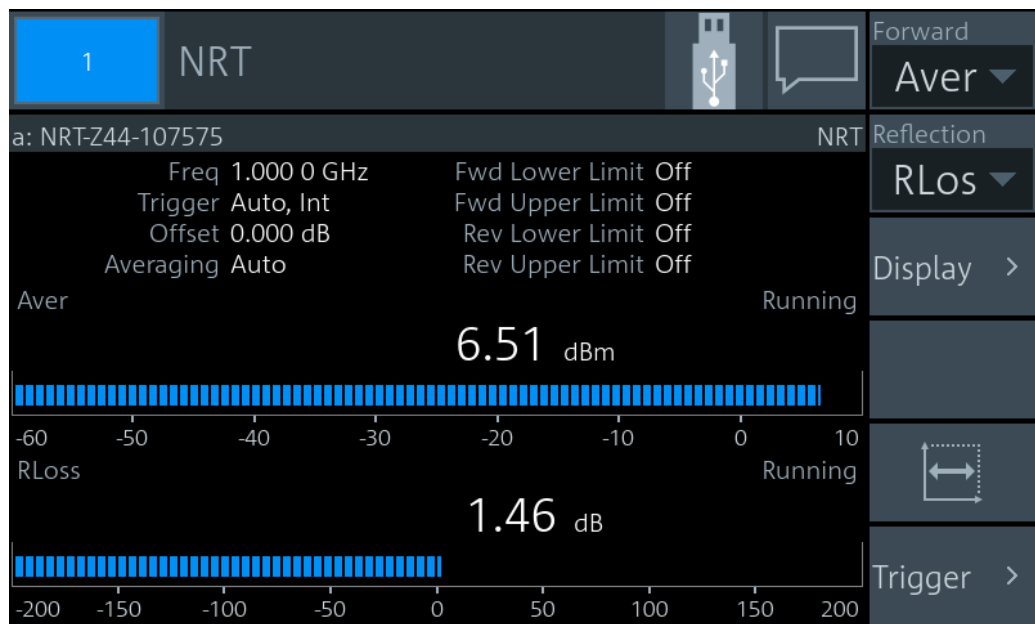
## 7.8 NRT

Requires the sensor interface for R&S NRT (R&S NRX-B9), see [Chapter 3.2.1.2, "Module Bay"](#), on page 24.

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 8.5, "NRT Measurement Type"](#), on page 127.

### 7.8.1 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.

## 7.8.2 NRT Settings

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

Forward.....	108
L Average.....	109
L CCDF.....	109
L Peak Envelope Power (PEP).....	109
L Absorption Average.....	109
L Crest Factor (CF).....	110
L Absorption PEP.....	110
L Burst Average.....	110
L Absorption Burst.....	110
Reflection.....	111
L Off.....	111
L Reverse Power.....	111
L Standing Wave Ratio (SWR).....	111
L Return Loss.....	111
L Reflection Coefficient.....	111
L Reflection Ratio.....	112
Display.....	112
Autoscale.....	112
Trigger.....	112

### Forward

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

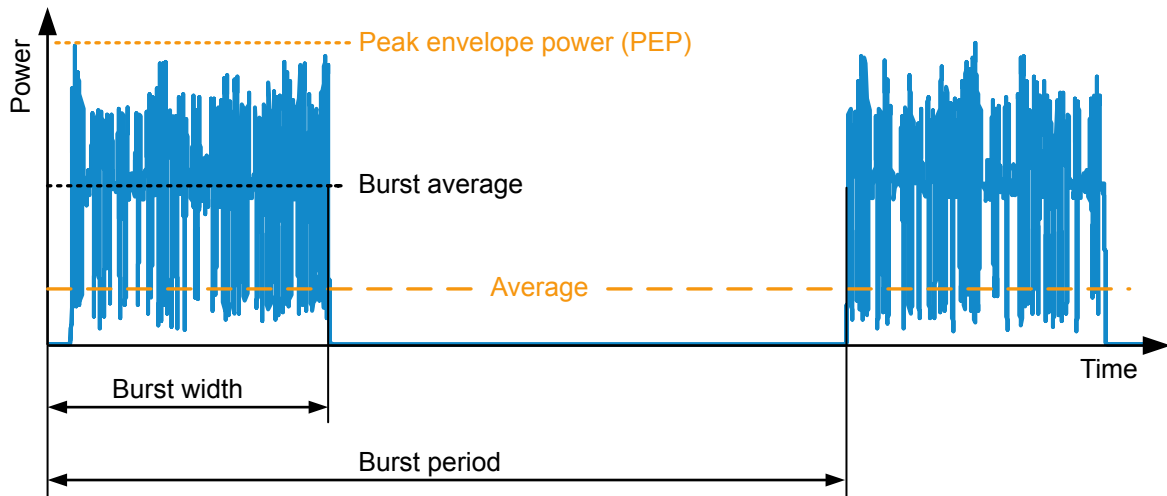


Figure 7-11: Forward power measurement parameters

#### 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 129.

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 128.

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 111.

Remote command:

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

**Return Loss ← Reflection**

$$\text{Return loss} = 10 \times \log \frac{\text{Forward power}}{\text{Reverse power}}$$

Remote command:

```
CALCulate<Measurement>[:CHANnel<Channel>]:FEED<Channel>
"POWer:RLOSs"
UNIT<Measurement>:POWer:REFlection
```

**Reflection Coefficient ← Reflection**

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

Remote command:

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

**Reflection Ratio ← Reflection**

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

Remote command:

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

**Display**

See [Chapter 6.1, "Display Settings"](#), on page 50.

**Autoscale**

Adapts the scaling of the graphical display.

Remote command:

```
[SENSe<Sensor>:]POWer:REFLection:RANGe:AUTO on page 319
[SENSe<Sensor>:]POWer[:POWer]:RANGe:AUTO on page 319
```

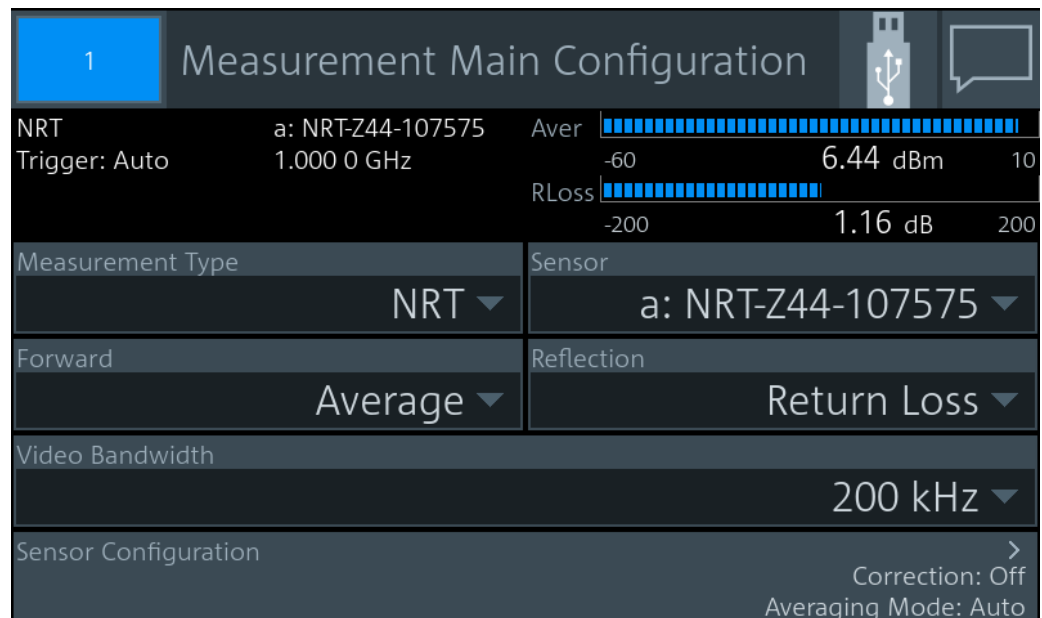
**Trigger**

Opens the "Measurement Trigger Configuration" dialog:

- ["Trigger Mode"](#) on page 63
- ["Trigger Source"](#) on page 64

**7.8.3 Measurement Main Configuration Dialog**

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



**Figure 7-12: Measurement Main Configuration dialog**



**Measurement Type**

See ["Measurement Type"](#) on page 68.

**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 68.

**Trigger Mode**

See ["Trigger Mode"](#) on page 63.

**Trigger Source**

See ["Trigger Source"](#) on page 64.

**Forward**

See ["Forward"](#) on page 108.

**Reflection**

See ["Reflection"](#) on page 111.

**Video Bandwidth**

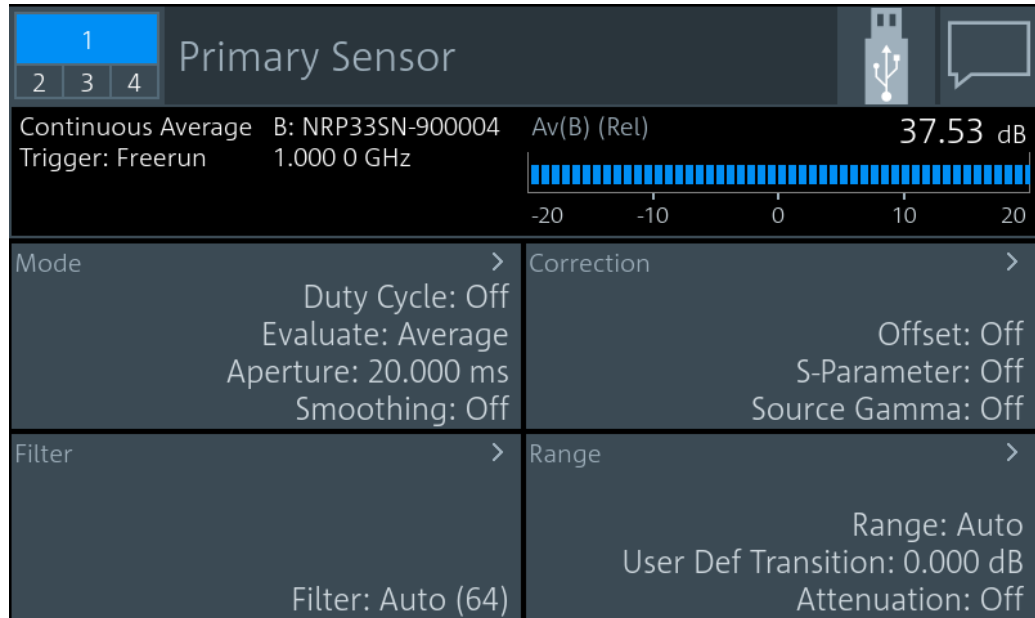
See ["Video Bandwidth"](#) on page 132.

**Sensor Configuration**

See [Chapter 8.5, "NRT Measurement Type"](#), on page 127.

## 8 Sensor Configuration

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



You can define two sensor configurations in parallel, a primary and a secondary sensor configuration. To these configurations, you can assign a sensor that is connected to one of the sensor ports of the R&S NRX. These sensors are called primary sensor and secondary sensor.

Further information:

- ["Primary Sensor, Secondary Sensor"](#) on page 68
- [Chapter 7, "Measurement Types and Result Displays"](#), on page 71
- [Chapter 14.8.6, "Standardized Signals"](#), on page 346
- [Mode Settings](#)..... 114
- [Correction Settings](#)..... 118
- [Filter Settings](#)..... 121
- [Range Settings](#)..... 125
- [NRT Measurement Type](#)..... 127

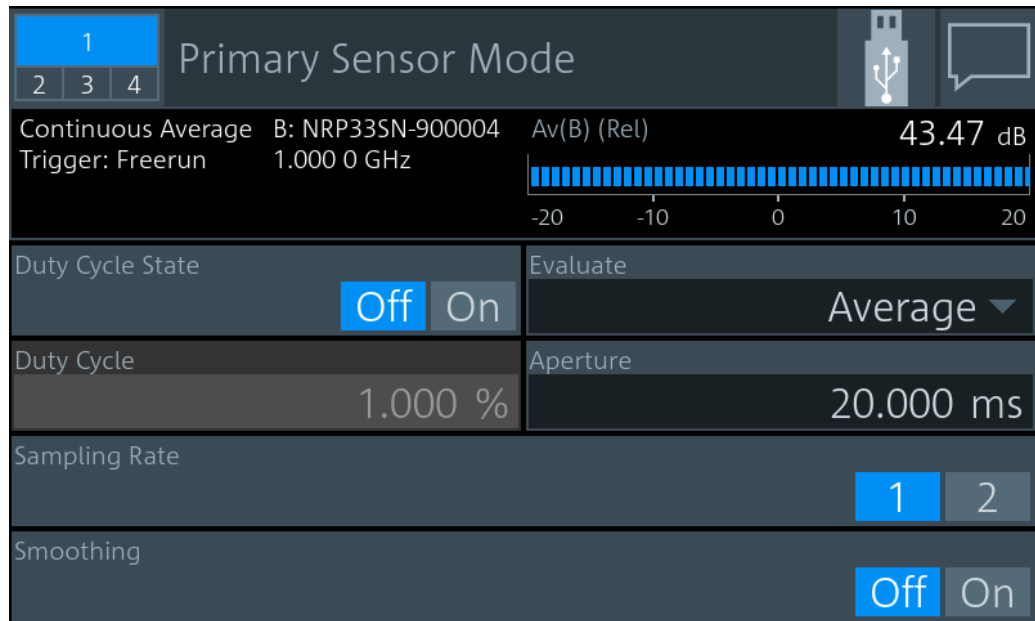
### 8.1 Mode Settings

Access:

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

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

Available for all measurement types.



Duty Cycle State.....	115
Duty Cycle.....	115
Equivalent Time Sampling.....	116
Evaluate.....	116
Aperture.....	116
Sampling Rate.....	116
Smoothing.....	117
Dropout Tolerance.....	117
Exclude from Start, Exclude from End.....	117

### 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 327

### 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 327

**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 328

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

`AUTO[:STATe]` on page 330

**Evaluate**

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

Sets the display type.

"Average" Average power value, resulting in a flicker-free display and smooth trace.

"Random" Power of a randomly selected sample, i.e. a realistic display with signal details.

"Peak" Highest power measured (peak power).

Remote command:

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

on page 267

**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 329

`CALCulate<Measurement>:STATistics:APERture` on page 307

**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 328

### 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 330

### Dropout Tolerance

Available for burst average measurements.

Detects the falling edge of a burst. If the power keeps low for at least the set time, the end of the burst is assumed. Modulation-specific power drops that are shorter than the set value are ignored.

Remote command:

[CALCulate<Measurement>\[:CHANnel<Channel>\]\[:POWer\]:BURSt:DTOLerance](#) on page 329

### 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 326

[CALCulate<Measurement>\[:CHANnel<Channel>\]:BURSt:TIMing:EXCLude:STOP](#) on page 327

## 8.2 Correction Settings

Access:

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

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

Available for all measurement types.

### Offset corrections

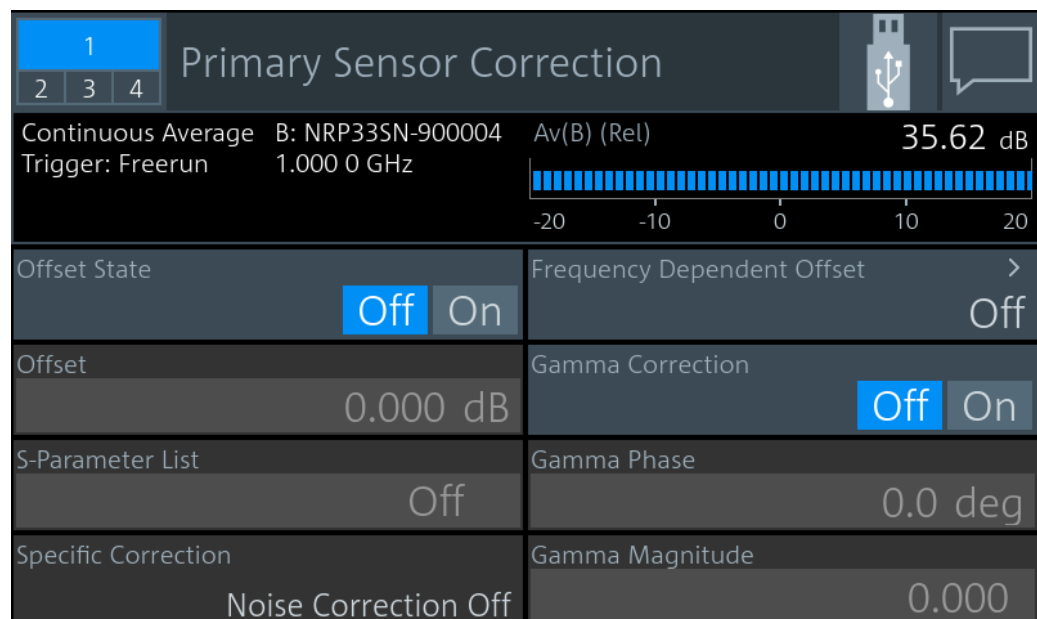
Add a fixed level offset in dB to compensate for external losses or gains. If you take the attenuation of an attenuator located ahead of the power sensor or the coupling attenuation of a directional coupler into account, use a positive offset. That means the power sensor calculates the power at the input 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.



Offset State.....	119
Offset.....	119
S-Parameter List.....	119
Frequency Dependent Offset.....	119
L Primary Sensor Offsets, Secondary Sensor Offsets dialogs.....	119
L Frequency dependent offset active.....	120
L Frequency dependent offset table.....	120
L Edit table name.....	120
L Edit table "<table name>".....	120
L Export file name, Import file name.....	120
L Export table to file, Import table from file.....	120
Gamma Correction.....	120
Gamma Phase.....	121
Gamma Magnitude.....	121

### Offset State

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

Remote command:

`CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:OFFSet:STATE` on page 332

### Offset

Sets a fixed offset for compensating external signal losses or gains. See also "[Offset corrections](#)" on page 118.

Remote command:

`CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:OFFSet[:MAGNitude]` on page 334

### 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 118.

Remote command:

`[SENSe<Sensor>:]CORRection:SPDevice:STATE` on page 331  
`[SENSe<Sensor>:]CORRection:SPDevice:SELEct` on page 331  
`[SENSe<Sensor>:]CORRection:SPDevice:LIST?` on page 331

### 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 14.13, "Managing Setups and Correction Tables"](#), on page 386.

**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 333

**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 333  
`MEMory:TABLE:SElect` on page 393

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

Enter the table name.

Remote command:

`MEMory:TABLE:MAP` on page 392

**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 391  
`MEMory:TABLE:FREQuency:POINTs?` on page 391  
`MEMory:TABLE:GAIN:POINTs?` on page 391  
`MEMory:TABLE:GAIN[:MAGNitude]` on page 392

**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 118.



Remote command:

`CALCulate<Measurement>[:CHANnel<Channel>]:SGAMma:CORRection:STATE` on page 334

#### **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 334

#### **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 335

## **8.3 Filter Settings**

Access:

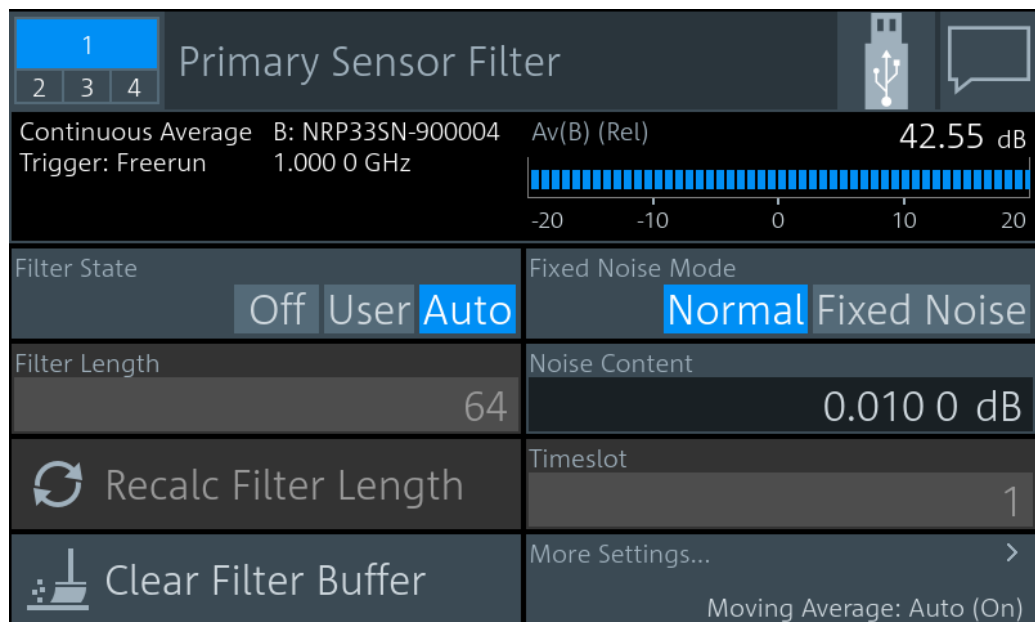
"Measurement Settings" > "Primary Sensor Config" > "Filter"

"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.



Filter State.....	122
Filter Length.....	122
Recalc Filter Length.....	123
Clear Filter Buffer.....	123
Fixed Noise Mode.....	123
Noise Content.....	123
Maximum Settling Time.....	123
Timeslot.....	124
Moving Average State.....	124
Moving Average.....	124
Averaging Domain.....	124
Video Bandwidth.....	125

### 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 340

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

on page 342

### Filter Length

Sets the number of readings that are averaged for one measured value. The higher the count, the lower the noise, and the longer it takes to obtain a measured value.

If [Filter State](#) is set to "Auto", this parameter is read-only.

Remote command:

`CALCulate<Measurement>[:CHANnel<Channel>]:AVERage:COUNT[:VALue]`  
on page 369

`CALCulate<Measurement>[:CHANnel<Channel>]:TRACe:AVERage:COUNT[:VALue]` on page 340

### Recalc Filter Length

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

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

Remote command:

`CALCulate<Measurement>[:CHANnel<Channel>]:AVERage:COUNT:AUTO[:STATE]` on page 368

### Clear Filter Buffer

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

Clears the filter buffer.

Remote command:

`[SENSe<Sensor>:]AVERage:RESet` on page 336

### Fixed Noise Mode

Available for continuous average, burst average 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 123.

"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 338

### Noise Content

If [Fixed Noise Mode](#) is set to "Normal", available for continuous average, burst average 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 337

### Maximum Settling Time

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

Sets an upper time limit, a maximum time, that is never exceeded.

Remote command:

`CALCulate<Measurement>[:CHANnel<Channel>]:AVERage:COUNT:AUTO:MTIME` on page 337

### Timeslot

Available for continuous average, burst average measurements.

Sets a timeslot from which the measured value is used to determine the filter length automatically. The timeslot number must not exceed the number of the currently set timeslots.

Remote command:

`CALCulate<Measurement>[:CHANnel<Channel>]:AVERage:COUNT:AUTO:SLOT` on page 337

### 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 338

`CALCulate<Measurement>[:CHANnel<Channel>]:TRACe:AVERage:TCONTROL:AUTO` on page 341

### 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 339

`CALCulate<Measurement>[:CHANnel<Channel>]:TRACe:AVERage:TCONTROL[:ENUM]` on page 341

### 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 340

#### **Video Bandwidth**

Requires a wideband power sensor.

Sets the video filter bandwidth. Reducing the video bandwidth also increases the trigger sensitivity.

**Note:** The video bandwidth must never be smaller than the RF bandwidth of the signal.

Remote command:

`CALCulate<Measurement>[:CHANnel<Channel>][:POWer]:VBWidth:ENUM`  
on page 343

## **8.4 Range Settings**

Access:

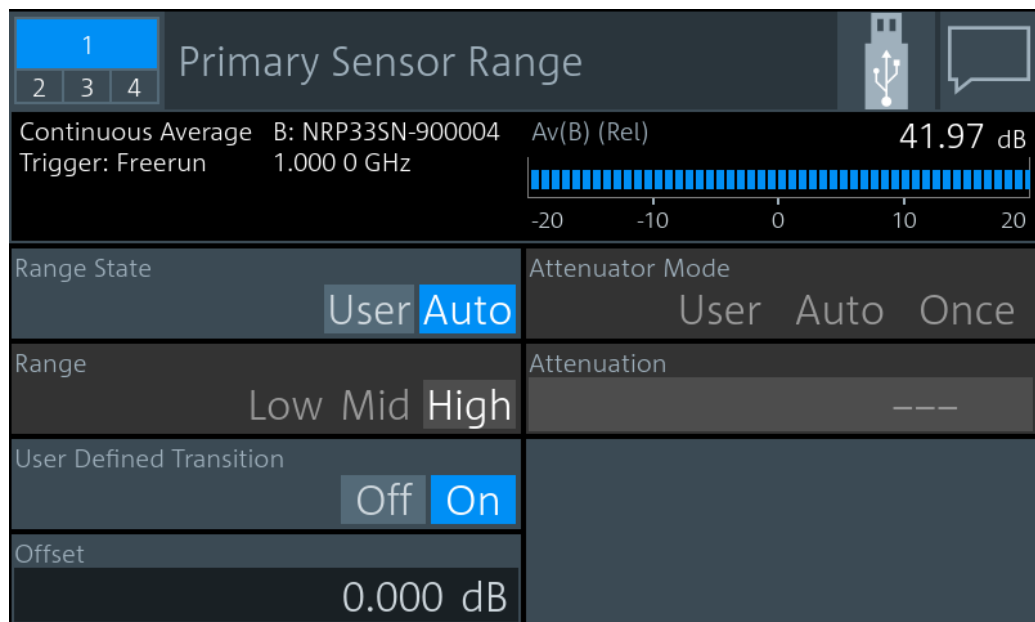
"Measurement Settings" > "Primary Sensor Config" > "Range"

"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.



Range State.....	126
Range.....	126
User Defined Transition.....	126
Offset.....	127
Attenuator Mode.....	127
Attenuation.....	127

### Range State

Enables or disables the automatic measurement path selection.

Remote command:

`CALCulate<Measurement>[:CHANnel<Channel>][:POWer][:AVG]:RANGe:  
AUTO` on page 344

### 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 345

### 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 345

**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 345

**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 343

**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 344

## 8.5 NRT Measurement Type

Requirements:

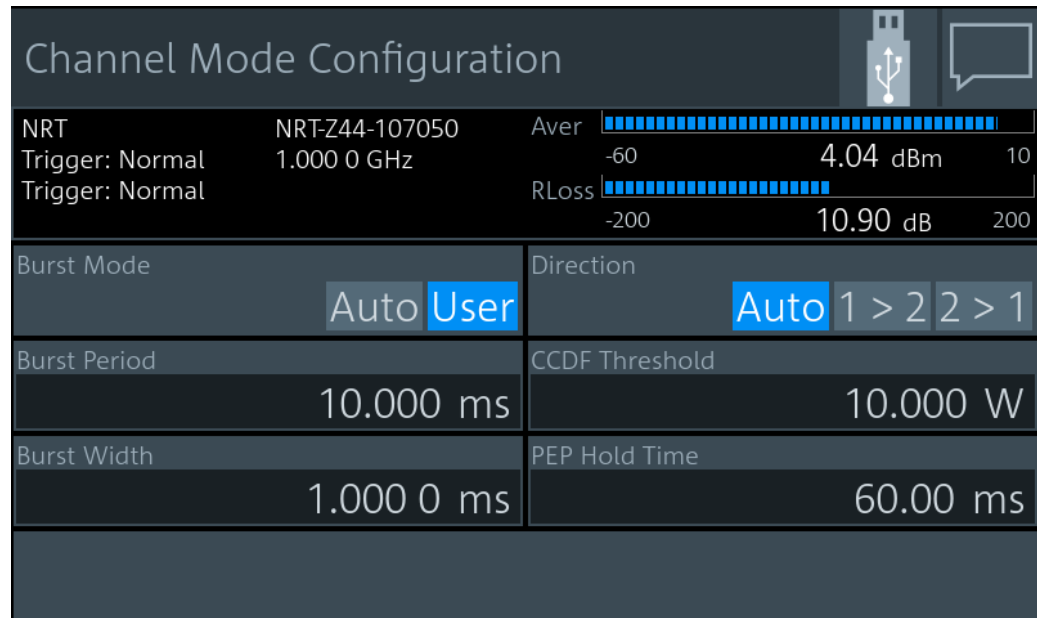
- "Measurement Settings" > "Measurement Type" > "NRT"
- Sensor interface for R&S NRT (R&S NRX-B9), see [Chapter 3.2.1.2, "Module Bay"](#), on page 24.
- R&S directional power sensors

Further information:

- [Chapter 7.8, "NRT"](#), on page 107
- [NRT Mode Settings](#)..... 128
- [NRT Correction Settings](#)..... 129
- [NRT Filter Settings](#)..... 131

### 8.5.1 NRT Mode Settings

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



Burst Mode.....	128
Burst Period.....	128
Burst Width.....	129
Direction.....	129
CCDF Threshold.....	129
PEP Hold Time.....	129

#### 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 362

#### Burst Period

Available if "User" is set under "[Burst Mode](#)" on page 128.

Sets the burst period.



Remote command:

`CALCulate<Measurement>[:CHANnel<Channel>]:NRT:BURSt:PERiod`  
on page 362

### Burst Width

Available if "User" is set under "[Burst Mode](#)" on page 128.

Sets the burst width.

Remote command:

`CALCulate<Measurement>[:CHANnel<Channel>]:NRT:BURSt:WIDTh`  
on page 363

### Direction

Defines how the forward power is determined.

- |                  |  |
|------------------|--|
| "Auto"           | Determines the power flow direction automatically. The greater value of two measured values is automatically assigned as forward power.                              |
| "1 > 2", "2 > 1" | Sets a fixed direction of the forward power, either from port 1 to port 2, or from port 2 to port 1.<br>The two ports are indicated on the directional power sensor. |

Remote command:

`CALCulate<Measurement>[:CHANnel<Channel>]:NRT:DIRection`  
on page 363

`INPut<Sensor>:PORT:SOURce:AUTO` on page 364

`INPut<Sensor>:PORT:SOURce[:VALue]` on page 365

### CCDF Threshold

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

Remote command:

`CALCulate<Measurement>[:CHANnel<Channel>]:NRT:CCDF:THReshold`  
on page 363

### PEP Hold Time

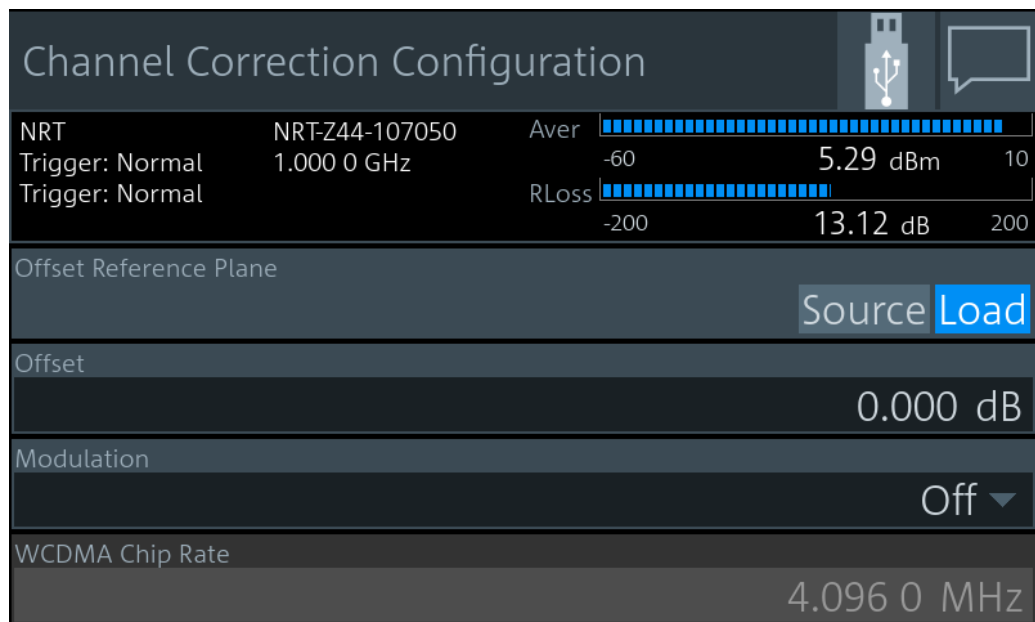
Sets the hold time of the peak hold circuit of the power sensor. See also [Peak Envelope Power \(PEP\)](#).

Remote command:

`CALCulate<Measurement>[:CHANnel<Channel>]:NRT:PEP:HOLD:TIME`  
on page 364

## 8.5.2 NRT Correction Settings

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



Offset Reference Plane.....	130
Offset.....	130
Modulation.....	130
WCDMA Chip Rate.....	131

### Offset Reference Plane

Selects the power sensor port to which the measurement results are referred to.

"Source" Source connector of the R&S NRT-Zxx power sensor

"Load" Load connector of the R&S NRT-Zxx power sensor

Remote command:

`CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:OFFSet:`

`RPLane` on page 366

`INPut<Sensor>:PORT:POSition` on page 367

### Offset

Considers the transmission loss in a cable that connects the desired measurement point, set by [Offset Reference Plane](#), and the power sensor.

Remote command:

`CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:OFFSet:`

`STATe` on page 332

`CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:OFFSet[:MAGNitude]` on page 334

`INPut<Sensor>:PORT:OFFSet` on page 367

### 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 366

`[SENSe<Sensor>:]DM:STATe` on page 365

`[SENSe<Sensor>:]DM:STANdard` on page 366

**WCDMA Chip Rate**

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

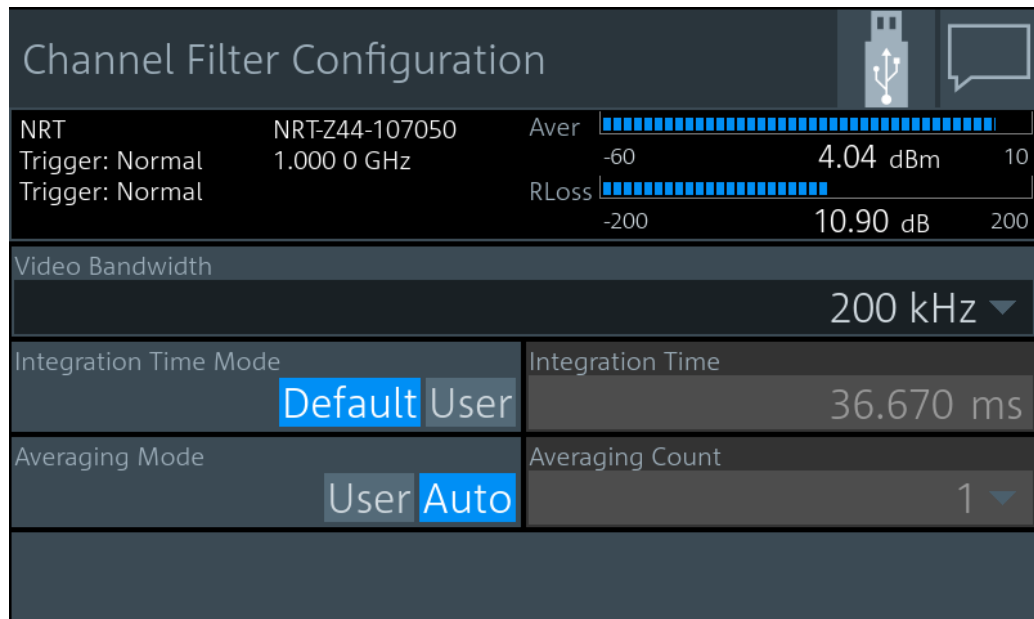
Sets the chip rate for the WCDMA communication standard.

Remote command:

`CALCulate<Measurement>[:CHANnel<Channel>]:NRT:DMODulation:WCDMa:CRATe` on page 367

**8.5.3 NRT Filter Settings**

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



[Video Bandwidth](#)..... 132

[Integration Time Mode](#)..... 132

[Integration Time](#)..... 132

[Averaging Mode](#)..... 132

[Averaging Count](#)..... 132

**Video Bandwidth**

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

"4 kHz" | "200 kHz" | "Full"

"Full" means that the maximum bandwidth of the power sensor is used.

Remote command:

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

on page 370

`[SENSe<Sensor>:]BANDwidth:VIDeo:FNUMber` on page 371

`[SENSe<Sensor>:]BWIDth:VIDeo:FNUMber` on page 371

**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 369

**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 370

**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 368

**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 369

## 9 Saving and Recalling Settings

When shutting down, the R&S NRX saves the measurement settings. When booting the next time, the R&S NRX uses the settings from the last session. See also [Chapter 3.1.7, "Switching On or Off"](#), on page 20.

If you want to return to a defined initial state, perform a preset. See "[Preset](#)" on page 134.

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

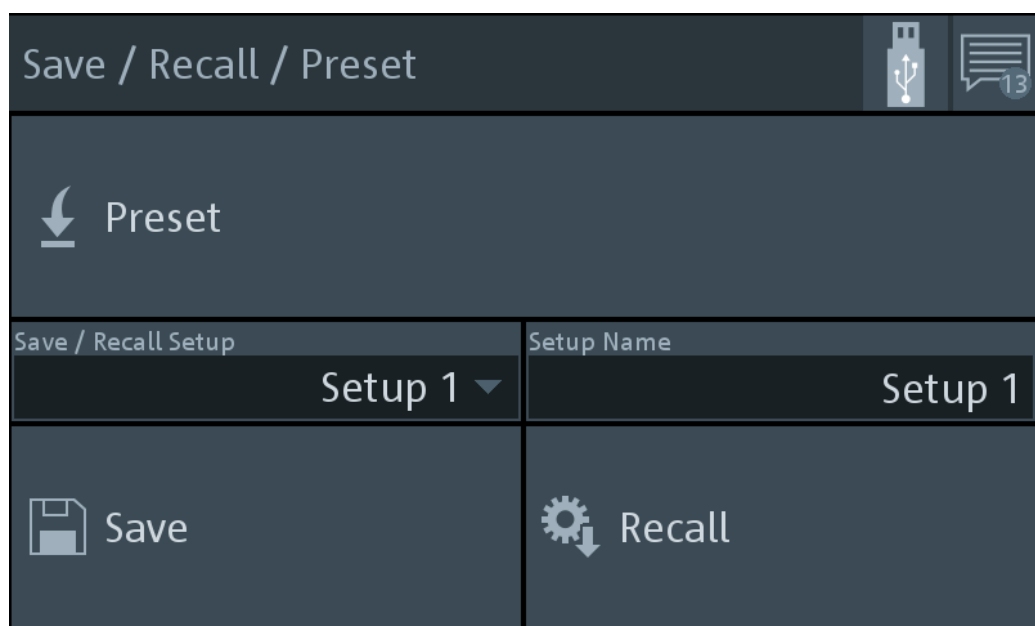


Figure 9-1: Save / Recall / Preset dialog

### 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.....	134
Save / Recall Setup.....	134
Save.....	134
Setup Name.....	134
Recall.....	134

### **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 5.5, "Settings Conflict"](#), on page 48.

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

Remote command:

[SYSTem:PRESet](#) on page 394

[\\*RST](#) on page 183

### **Save / Recall Setup**

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

Remote command:

[MEMory:STATe:DEFine](#) on page 390

[MEMory:STATe:MAP](#) on page 390

### **Save**

Saves the current instrument settings in the selected setup file.

Remote command:

[\\*SAV](#) on page 183

### **Setup Name**

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

Remote command:

[MEMory:STATe:DEFine](#) on page 390

[MEMory:STATe:MAP](#) on page 390

### **Recall**

Restores the selected instrument settings.

Remote command:

[\\*RCL](#) on page 183

## 10 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

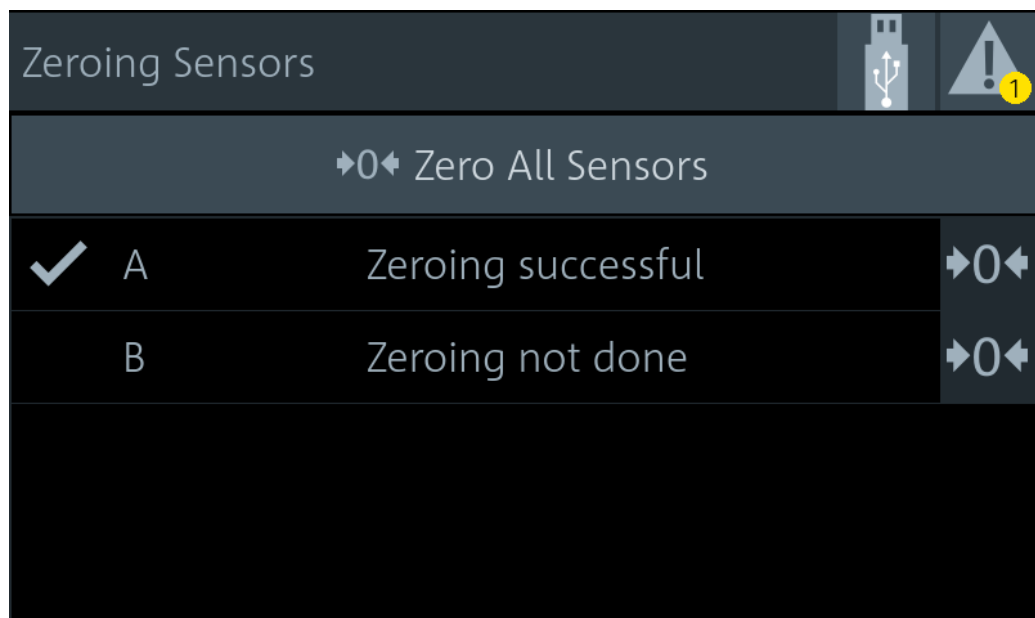


Figure 10-1: Zeroing Sensors dialog

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 14.11, "Zeroing"](#), on page 382.



# 11 System Settings

The system settings do not affect the measurements directly.

Access: [System]

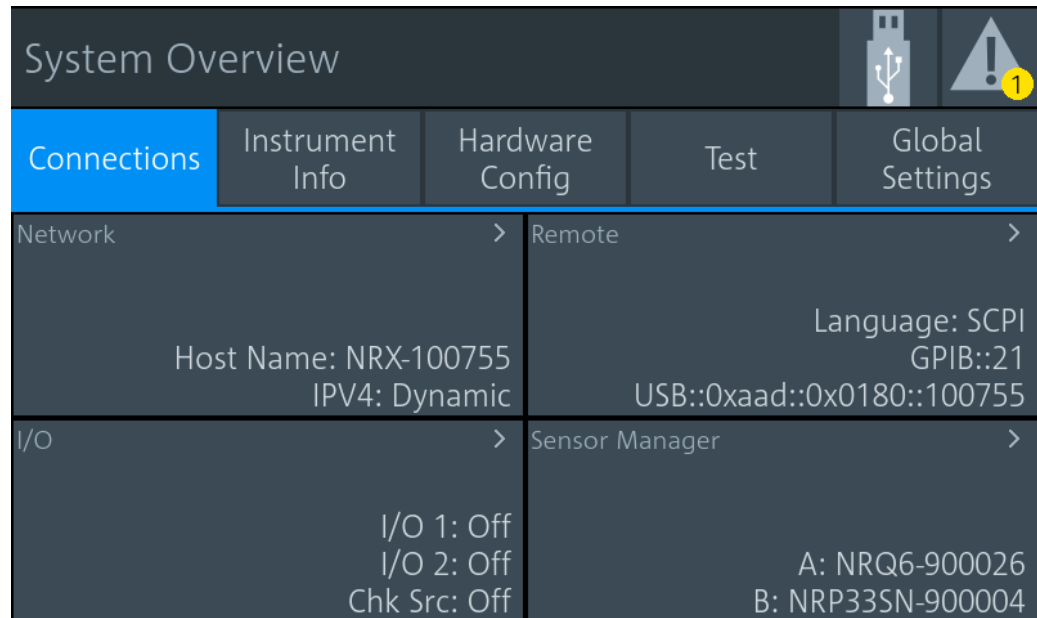


Figure 11-1: System Overview dialog

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

- [Connections](#)..... 137
- [Instrument Info](#)..... 153
- [Hardware Configuration](#)..... 165
- [Test](#)..... 166
- [Global Settings](#)..... 167

## 11.1 Connections

Access: [System] > "Connections"

See [Figure 11-1](#).

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

- [Network Settings](#)..... 138
- [Remote Settings](#)..... 141
- [Input/Output Settings \(I/O\)](#)..... 144
- [Sensor Manager](#)..... 150

### 11.1.1 Network Settings

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

Contains the settings for integrating the R&S NRX in a network. There are two methods to establish a network connection between R&S NRX and computer:

- ▶ Connect both to a common network (infrastructure network).
- ▶ Connect R&S NRX and computer only over the switch (peer-to-peer network).  
In this case, the use of a static IP address is recommended.

Connection errors can affect the entire network. If your network does not support DHCP, or if you choose to disable dynamic TCP/IP configuration, assign a valid address information before connecting the R&S NRX to the LAN. Contact your network administrator to obtain valid IP addresses.

After integrating the R&S NRX into a network, you can set up the following connections:

- Remote control connection to control the R&S NRX using SCPI commands.  
See [Chapter 4.3, "Remote Control"](#), on page 42.
- Remote desktop connection for remote operation or file transfer.  
See [Chapter 4.2, "Remote Operation"](#), on page 41.

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

Overview tab.....	139
L Host Name.....	139
L IP Address.....	139
L Default Gateway.....	139
L DNS Server.....	140
IPv4 tab.....	140
L Address Mode.....	140
L DNS Suffix.....	140
L IPv4 Address.....	140
L Subnet Mask.....	141
L Default Gateway.....	141
L DNS Server.....	141

## 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 140.

**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 398

**IP Address ← Overview tab**

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

Set the parameters under:

- ["Address Mode"](#) on page 140
- ["IPv4 Address"](#) on page 140

**Default Gateway ← Overview tab**

Displays the IP address of the default gateway of the local subnet. Set the parameter under ["Default Gateway"](#) on page 141.

**DNS Server** ← Overview tab

Displays the IP address of the DNS server of the local subnet. Set the parameter under "DNS Server" on page 141.

**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 is assigned.

"Dynamic" Assigns the IP address automatically, provided the network supports the dynamic host configuration protocol (DHCP).

"Static" Enables assigning the IP address manually.

Remote command:

`SYSTEM:COMMunicate:NETWork[:IPAddress]:MODE` on page 398

`SYSTEM:COMMunicate:INET[:SELF]:MODE` on page 398

**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 397

`SYSTEM:COMMunicate:INET[:SELF]:DNS:SUFFIX` on page 397

**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 397

`SYSTem:COMMunicate:INET[:SELF]:ADDRESS` on page 397

#### **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 398

`SYSTem:COMMunicate:INET[:SELF]:SUBNetmask:ADDRESS` on page 398

#### **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 398

`SYSTem:COMMunicate:INET[:SELF]:GATeway:ADDRESS` on page 398

#### **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 397

`SYSTem:COMMunicate:INET[:SELF]:DNS:ADDRESS` on page 397

## **11.1.2 Remote Settings**

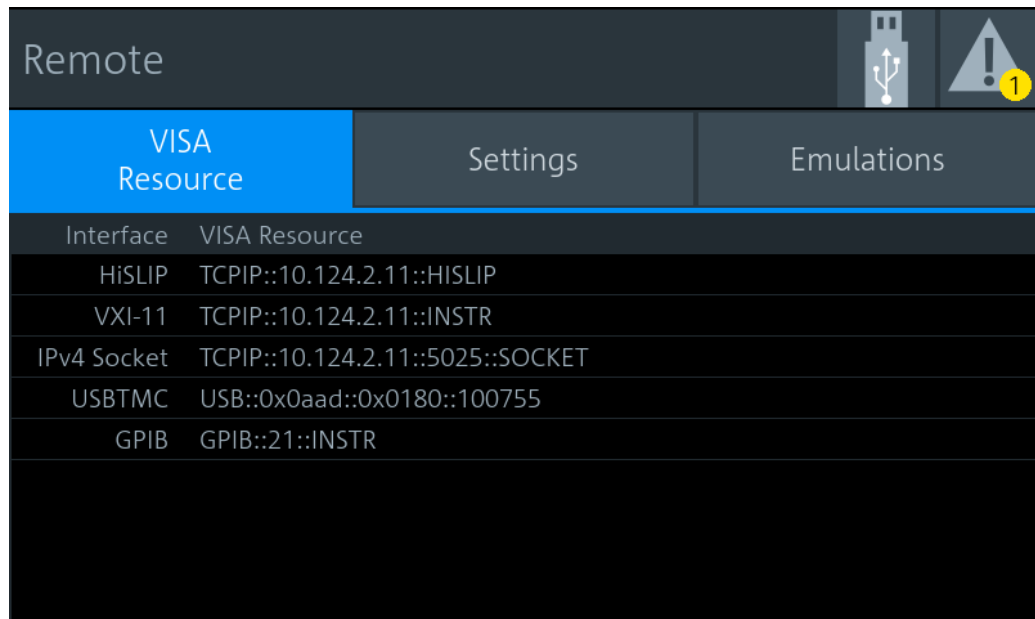
Access: [System] > "Connections" > "Remote"

Contains the settings for remote control.

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

VISA Resource tab.....	142
L Interface - VISA Resource table.....	142
Settings tab.....	142
L GPIB Address.....	143
Emulations tab.....	143
L Language.....	143
L Customization of *IDN?.....	143
L Customization of *OPT?.....	144
L Custom IDN String.....	144
L Custom OPT String.....	144

## VISA Resource tab



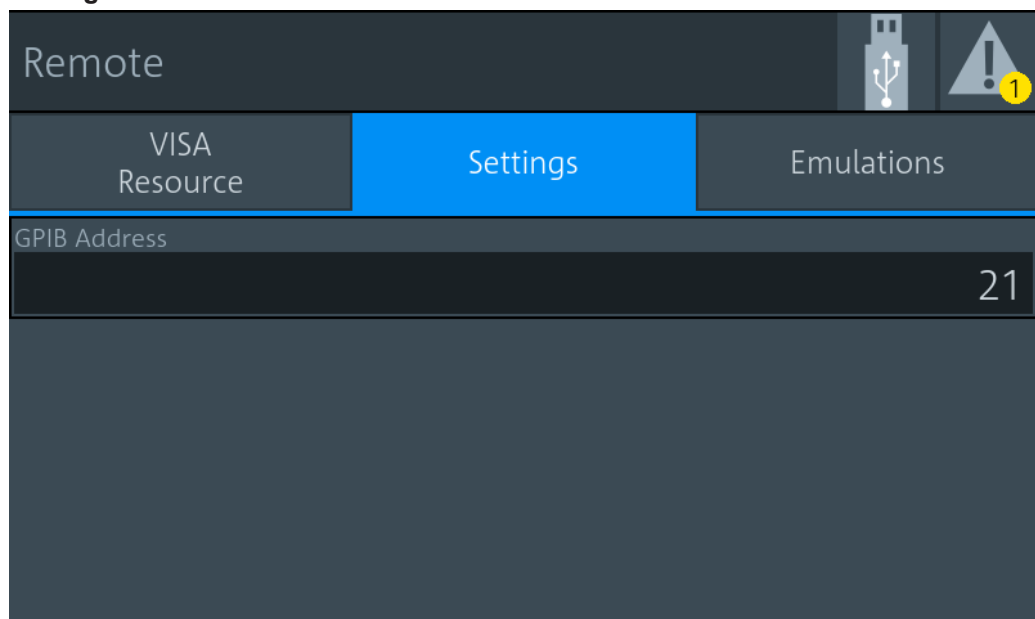
Interface	VISA Resource
HiSLIP	TCPIP::10.124.2.11::HISLIP
VXI-11	TCPIP::10.124.2.11::INSTR
IPv4 Socket	TCPIP::10.124.2.11::5025::SOCKET
USBTMC	USB::0x0aad::0x0180::100755
GPIB	GPIB::21::INSTR

## 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



GPIB Address
21

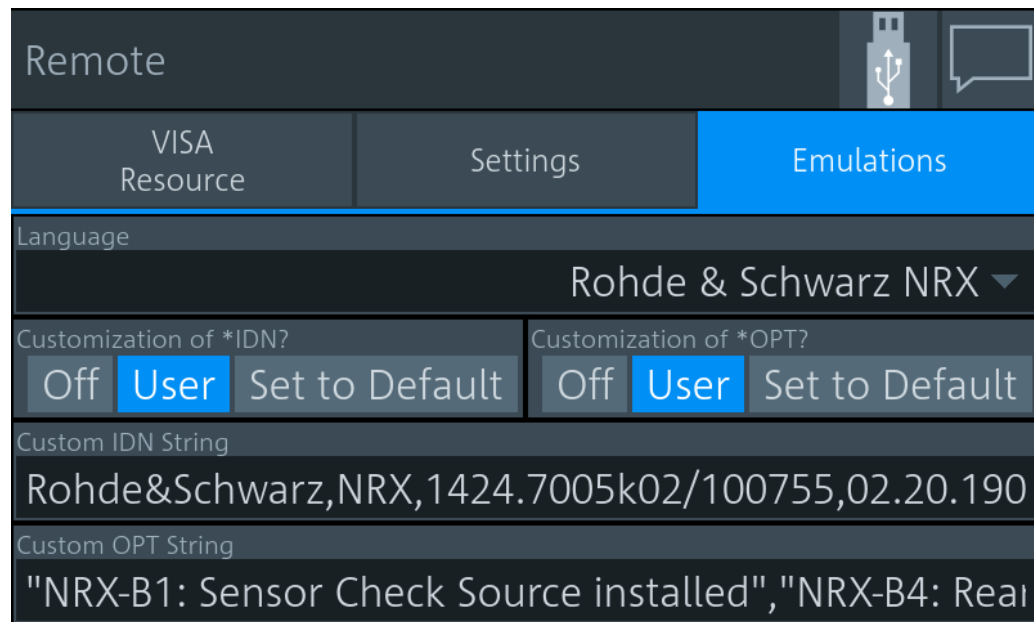
**GPIB Address ← Settings tab**

Sets the GPIB address. See also [Chapter 15.1.3, "GPIB Interface"](#), on page 461.

"1" to "30" Channel address

Remote command:

`SYSTem:COMMunicate:GPIB[:SELF]:ADDRess` on page 399

**Emulations tab****Language ← Emulations tab**

Sets the language for the remote commands. See also [Chapter 14.16, "Remote Emulation"](#), on page 417.

"Rohde & Schwarz NRX"

Native remote command set of the R&S NRX, based on the standard commands for programmable instruments (SCPI-99).

"Rohde & Schwarz NRP2", "Rohde & Schwarz NRP"

Emulation for a predecessor

"Keysight N432A", "Keysight 1911A", "Keysight N1912A", "Keysight E4418B", "Keysight E4419B"

Requires the NRX KS emulation mode (R&S NRX-K301) option.  
Emulation of a Keysight power meter.

Remote command:

`SYSTem:LANGuage` on page 401

**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 401

[SYSTem:IDN:AUTO](#) on page 401

#### **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 402

[SYSTem:OPT:AUTO](#) on page 402

#### **Custom IDN String ← Emulations tab**

Available if [Customization of \\*IDN?](#) is set to "User".

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

Remote command:

[SYSTem:IDN:ANSWer](#) on page 400

#### **Custom OPT String ← Emulations tab**

Available if [Customization of \\*OPT?](#) is set to "User".

Sets the customized option identification string.

Remote command:

[SYSTem:OPT:ANSWer](#) on page 402

### 11.1.3 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> .....	145
L <a href="#">Signal Output</a> .....	145
L <a href="#">Frequency</a> .....	145
L <a href="#">Measurement for Preview</a> .....	145
L <a href="#">Power Level</a> .....	146
L <a href="#">Sensor Check Source Info</a> .....	146
<a href="#">I/O 1, I/O 2 tabs</a> .....	146
L <a href="#">Mode</a> .....	147
L <a href="#">Measurement for Recorder Output</a> .....	148
L <a href="#">0 V Equivalent</a> .....	148
L <a href="#">2.5 V Equivalent</a> .....	148



L Measurement for Limit Output.....	149
L Fail Voltage.....	149
L Trigger Source for Trigger Output.....	149
L Impedance for Trigger Input.....	149

### 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 24.

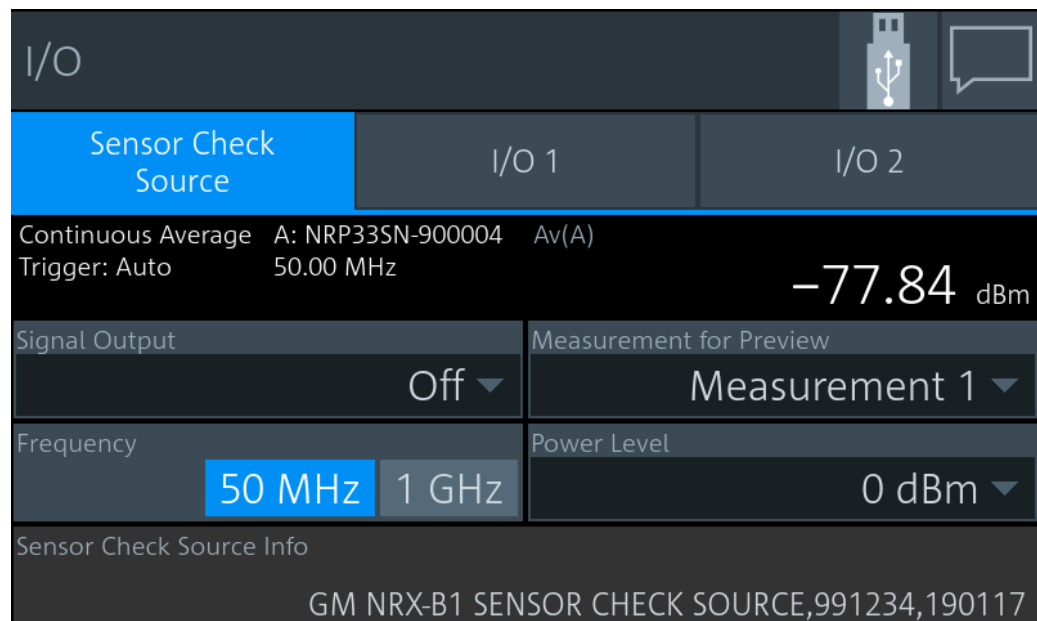


Figure 11-2: Sensor Check Source tab

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 371

[OUTPut:SOURce:STATe](#) on page 371

[SOURce:PULM:STATe](#) on page 372

### Frequency ← Sensor Check Source tab

Sets the frequency of the output signal.

Remote command:

[SOURce\[:RF\]:FREQuency\[:VALue\]](#) on page 372

### 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.

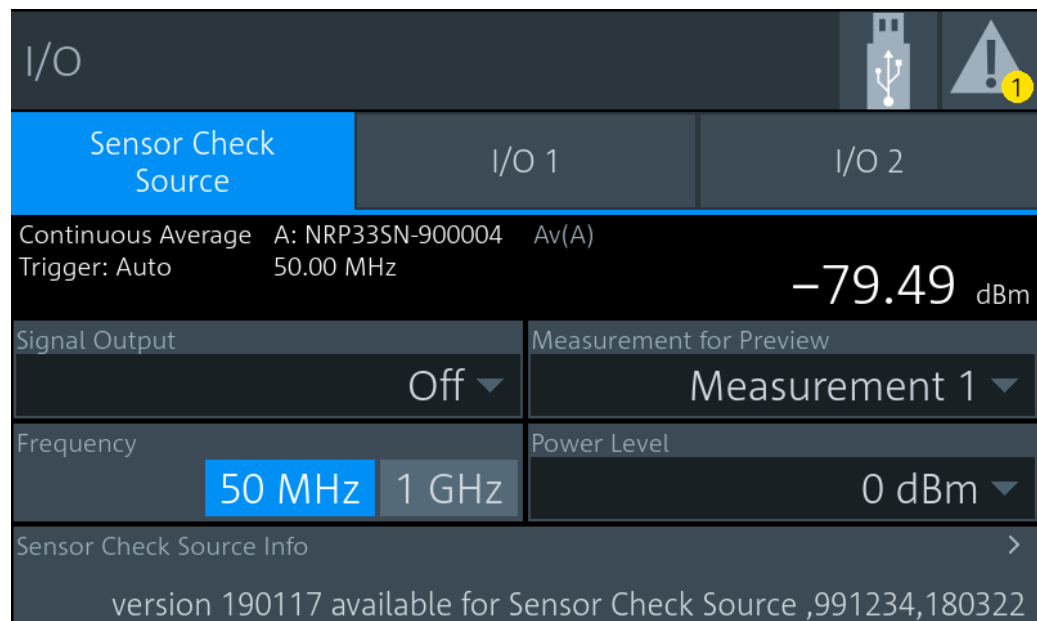
Remote command:

`SOURce:POWer[:VALue]` on page 372

`SOURce:UNIT:POWer` on page 246

**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 11-3](#). Tap the info field to update the sensor check source (R&S NRX-B1).



*Figure 11-3: New version available for installation*

**I/O 1, I/O 2 tabs**

Configures the two multifunctional BNC connectors at the rear of the R&S NRX, see [Chapter 3.2.2.1, "Trig In / Out 2 and Out 1 / Trig Out Connectors"](#), on page 28.

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

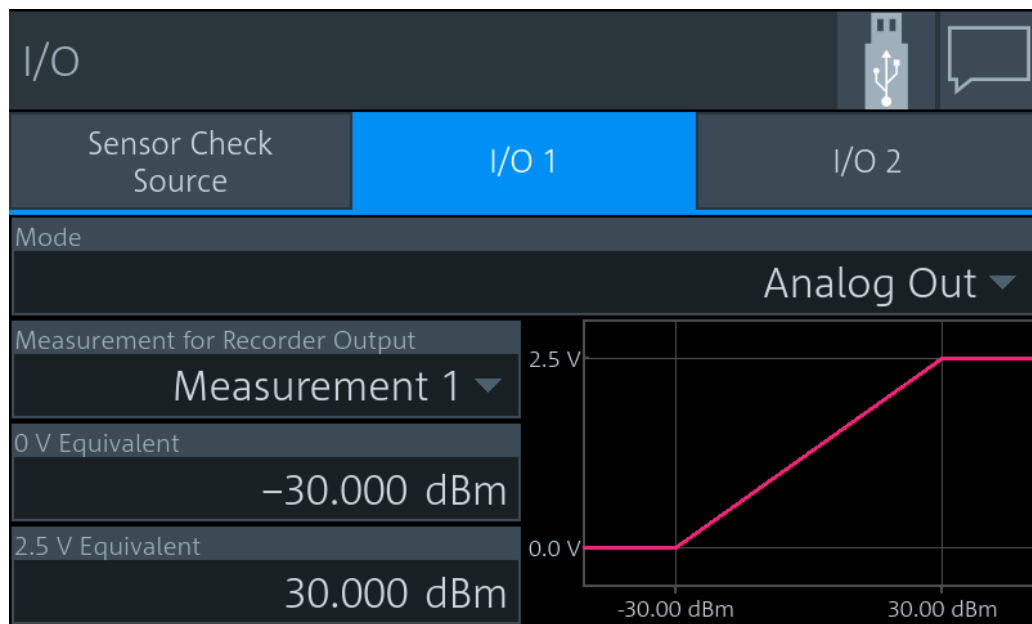


Figure 11-4: Example

#### 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.

"Fow 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.

"Fow 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:

[\[SENSe<Sensor>:\] POWer:REFLection:RANGe:LIMit\[:STATe\]](#) on page 320

[\[SENSe<Sensor>:\] POWer\[:POWer\]:RANGe:LIMit\[:STATe\]](#) on page 320

[OUTPut:MODE<output>](#) on page 374

### 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:RECOOrder<output>:FEED:INDEX](#) on page 375

### 0 V Equivalent ← I/O 1, I/O 2 tabs

Available if [Mode](#) is set to:

- "Analog Out"
- "Forw Analog Out"
- "Refl Analog Out"

Enter the measurement value that corresponds to 0 V output voltage.

Remote command:

[OUTPut:RECOOrder<output>:LIMit:LOWer:CCDF](#) on page 375

[OUTPut:RECOOrder<output>:LIMit:LOWer:POWer](#) on page 376

[OUTPut:RECOOrder<output>:LIMit:LOWer:RATio:RCoefficient](#) on page 376

[OUTPut:RECOOrder<output>:LIMit:LOWer:RATio:RFRatio](#) on page 377

[OUTPut:RECOOrder<output>:LIMit:LOWer:RATio:RLOSs](#) on page 377

[OUTPut:RECOOrder<output>:LIMit:LOWer:RATio:SWR](#) on page 377

[OUTPut:RECOOrder<output>:LIMit:LOWer:RATio\[:VALue\]](#) on page 378

[OUTPut:RECOOrder<output>:LIMit:LOWer\[:VALue\]](#) on page 376

### 2.5 V Equivalent ← I/O 1, I/O 2 tabs

Available if [Mode](#) is set to:

- "Analog Out"
- "Forw Analog Out"
- "Refl Analog Out"

Enter the measurement value that corresponds to 2.5 V output voltage.

Remote command:

[OUTPut:RECOOrder<output>:LIMit:UPPer:CCDF](#) on page 378

[OUTPut:RECOOrder<output>:LIMit:UPPer:POWer](#) on page 379

[OUTPut:RECOOrder<output>:LIMit:UPPer:RATio:RCoefficient](#) on page 379

[OUTPut:RECOOrder<output>:LIMit:UPPer:RATio:RFRatio](#) on page 380

[OUTPut:REcorder<output>:LIMit:UPPer:RATio:RLOsS](#) on page 380

[OUTPut:REcorder<output>:LIMit:UPPer:RATio:SWR](#) on page 381

[OUTPut:REcorder<output>:LIMit:UPPer:RATio\[:VALue\]](#) on page 381

[OUTPut:REcorder<output>:LIMit:UPPer\[:VALue\]](#) on page 379

### Measurement for Limit Output ← I/O 1, I/O 2 tabs

Available if **Mode** is set to:

- "Limit Violation"
- "Forw Limit Violation"
- "Refl Limit Violation"

Sets the measurement that is monitored.

Remote command:

[\[SENSe<Sensor>:\]POWer:REFLection:RANGe:LOWer](#) on page 320

[\[SENSe<Sensor>:\]POWer\[:POWer\]:RANGe:LOWer](#) on page 320

[\[SENSe<Sensor>:\]POWer:REFLection:RANGe\[:UPPer\]](#) on page 320

[\[SENSe<Sensor>:\]POWer\[:POWer\]:RANGe\[:UPPer\]](#) on page 320

[OUTPut:LIMit:FEED:INDEX](#) on page 374

### Fail Voltage ← I/O 1, I/O 2 tabs

Available if **Mode** is set to:

- "Limit Violation"
- "Forw Limit Violation"
- "Refl Limit Violation"

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

"Low"            0 V

"High"           3.3 V

Remote command:

[\[SENSe<Sensor>:\]POWer:REFLection:RANGe:AUTO](#) on page 319

[\[SENSe<Sensor>:\]POWer\[:POWer\]:RANGe:LIMit:DETECT](#) on page 319

[OUTPut:LIMit:FAIL](#) on page 374

### 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 381

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

Available if **Mode** is set to "Trigger In".

Sets the termination resistance of the external trigger signal that is supplied at the Trig In / Out 2 connector. Choose a setting that fits the impedance of the trigger source to minimize reflections on the trigger signals.

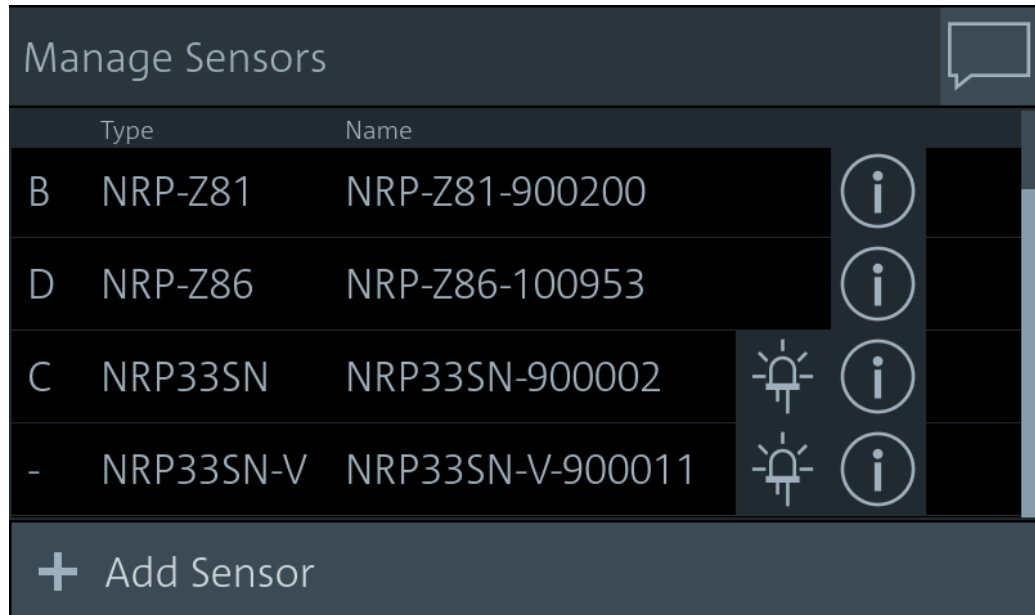
Remote command:

[INPut<undef>:TRIGger:IMPedance](#) on page 373

### 11.1.4 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 150.

Symbol	Description
	LED icon Tap to identify a connected power sensor. If the power sensor has a status LED, it flashes yellow for 5 seconds.
	Info icon Tap to open the "Sensor Info" dialog, see <a href="#">"Sensor Info"</a> on page 151.

#### 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> .....	151
<a href="#">Sensor Info</a> .....	151
L <a href="#">Sensor Test</a> .....	152

### Add Sensor

Adds a LAN power sensor. See "[To add a LAN power sensor](#)" on page 150.

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

Remote command:

[\[SENSe<Sensor>:\]ADD](#) on page 403

### Sensor Info

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

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

Sensor Info			
Connector	ID	Cal. Abs.	2015-07-08
Sensor A	A	Cal. Due Date	2017-07
Type	NRP33SN		
Serial	Firmware Version	Cal. Lin.	not applicable
900004	18.06.14.01	Cal. Misc.	2015-07-08
Sensor Name	NRP33SN-900004		
Sensor Test	>		
		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 403

### Sensor Test ← Sensor Info

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

Sensor Test			
Type	NRP33SN		
Serial	900004		
Firmware Version	18.06.14.01		
Test Verdict	FAIL		
Sensor Name	NRP33SN-900004		
		▶ Start Test	
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_L_PRRP0_C0PE: PASS (+1.88 V)			

"Test Verdict" Shows the status of the selftest.

Remote command:

[SYSTem: SENSor<Sensor>: TEST?](#) on page 386

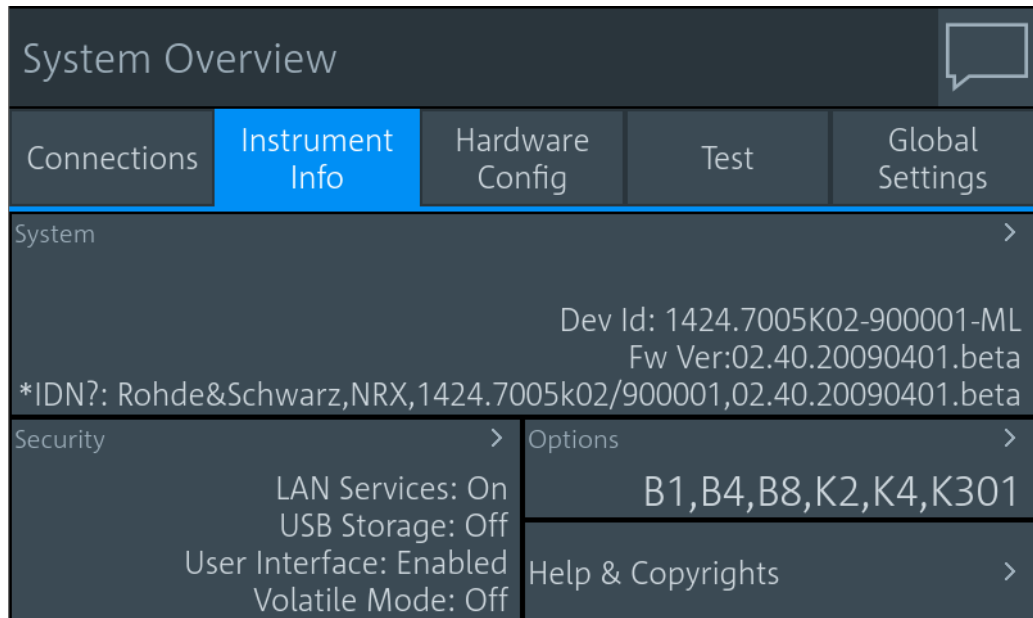
[TEST: SENSor<Sensor>?](#) on page 386



## 11.2 Instrument Info

Access: [System] > "Instrument Info"

For displaying information on a connected power sensor, see "[Sensor Info](#)" on page 151.



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

- [System Info](#)..... 153
- [Security Settings](#)..... 156
- [Option Settings](#)..... 161
- [Help & Copyrights](#)..... 164

### 11.2.1 System Info

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

Displays a list of instrument-specific parameters.

System Info	
Manufacturer	Rohde&Schwarz
Type	NRX
Stock Number	1424.7005K02
HW Version	06.00
CPLD Version	2
Serial	100755
Device ID	1424.7005K02-100755-qy
SW Build	02.00.18092001.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.....	154
Date and Time Settings.....	155
L Date.....	155
L Time.....	155
L Time Zone Region.....	155
L Time Zone.....	156

### 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 405

[SYSTem:DID?](#) on page 404

[SYSTem:DEVIce:ID?](#) on page 404

### Date and Time Settings

Opens the "Date and Time" dialog.



#### Date ← Date and Time Settings

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

Remote command:

[SYSTem:DATE](#) on page 406

[SYSTem:DATE:UTC](#) on page 406

[SYSTem:DATE:LOCAl](#) on page 406

#### Time ← Date and Time Settings

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

Remote command:

[SYSTem:TIME](#) on page 407

[SYSTem:TIME:UTC](#) on page 407

[SYSTem:TIME:LOCAl](#) on page 407

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

Sets the time zone region.

Remote command:

[SYSTem:TIME:DSTime:RULE](#) on page 407

[SYSTem:TIME:DSTime:RULE:CATAlog?](#) on page 408

**Time Zone ← Date and Time Settings**

Sets the time zone.

Remote command:

[SYSTem:TIME:DSTime:RULE](#) on page 407

[SYSTem:TIME:DSTime:RULE:CATalog?](#) on page 408

**11.2.2 Security Settings**

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

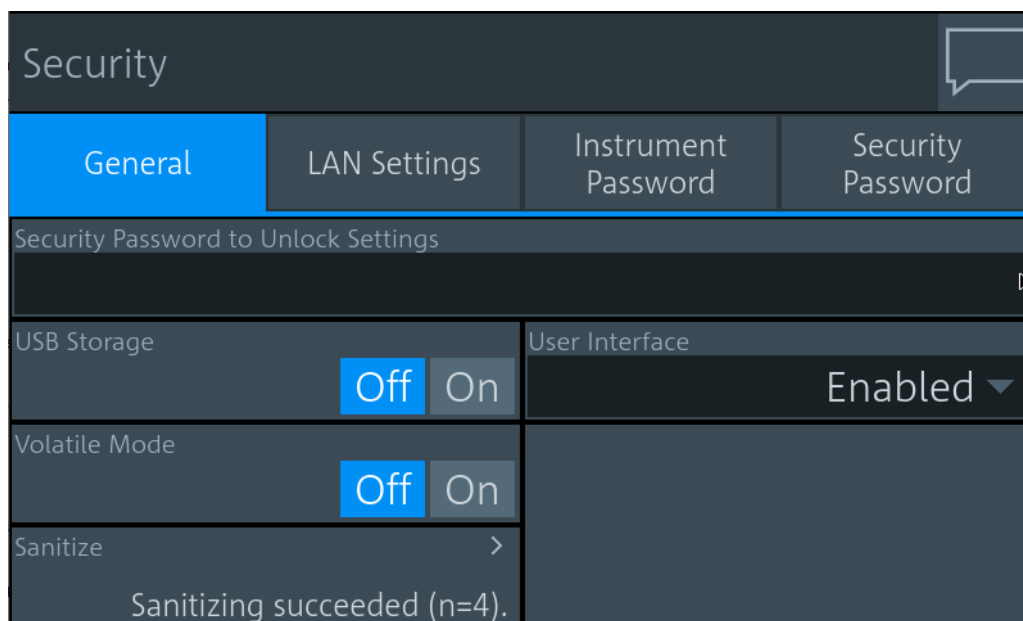
Contains the settings for access rights, LAN security and passwords.

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

General tab.....	156
L Security Password to Unlock Settings.....	157
L USB Storage.....	157
L Volatile Mode.....	157
L Sanitize.....	157
L User Interface.....	157
LAN Settings tab.....	158
L LAN Services.....	158
L SCPI over LAN.....	158
L Web Server.....	158
L VNC.....	159
L Avahi (Zeroconf).....	159
L SSH.....	159
L Software Update.....	159
Instrument Password tab.....	159
L Old Password.....	159
L New Password.....	159
L Confirm Password.....	160
L Change Password.....	160
Security Password tab.....	160
L Old Password.....	160
L New Password.....	160
L Confirm Password.....	160
L Change Password.....	160

**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 preconfigured value and further information, see "[Security Password tab](#)" on page 160.

#### USB Storage ← General tab

Enables or disables the file transfer via USB storage.

#### Volatile Mode ← General tab

If enabled, the R&S NRX does not save changed settings in the non-volatile memory. After a reboot, the R&S NRX has the same configuration as at the time when you enabled the volatile mode.

Use the volatile mode if you want to reboot with a defined configuration for a measurement setup, regardless of any settings made manually or by remote control.


Enabling the volatile mode requires the security password. If you change into the volatile mode or back, a reboot is required.

#### Sanitize ← General tab

Sanitizes the internal memory. Sanitization requires the security password. For details, see the [Instrument Security Procedures](#).

#### User Interface ← General tab

Opens a dialog to restrict the manual and remote operation allowed at the R&S NRX. See also [Chapter 4, "Operating Concepts"](#), on page 31.

To lift the restrictions indicated by , tap the touchscreen and enter the security password. See also "[Security Password to Unlock Settings](#)" on page 157.

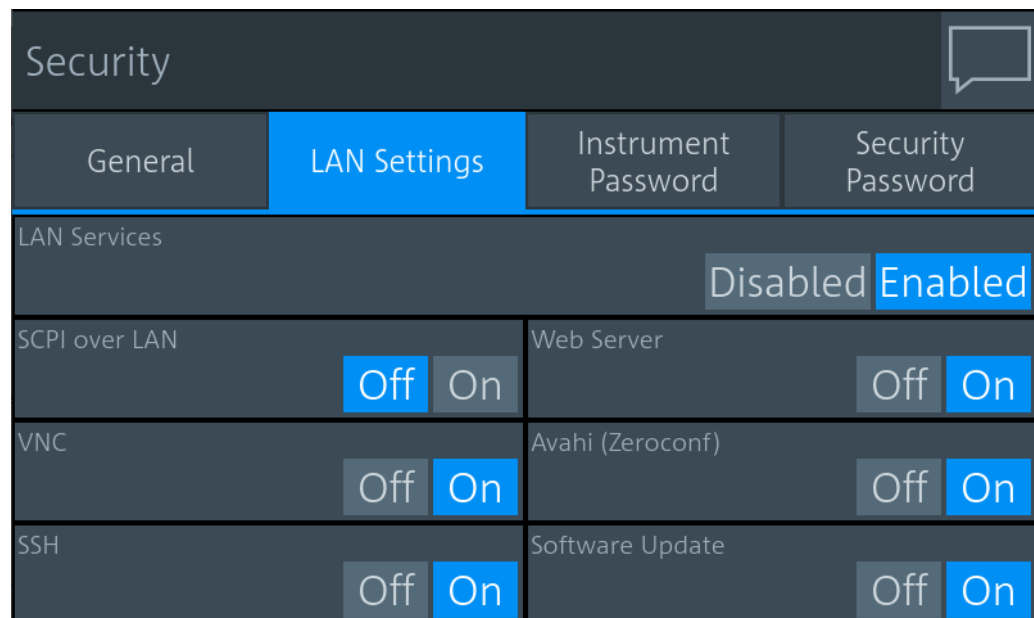
"Enabled"      Enables manual operation. The screen and all manual controls are working. Remote operation is also enabled.

"VNC Only"	Disables manual operation. Remote operation remains enabled. The screen remains on; anyone at the R&S NRX can read the screen contents.
"Display Only"	Disables manual and remote operation. Both remain blocked until you enter the security password. The screen remains on; anyone at the R&S NRX can read the screen contents.
"Disabled"	Disables manual and remote operation. Both remain blocked until you enter the security password. The screen only displays a padlock symbol, thus preventing unauthorized reading.

If you use the R&S NRX in a remote operation session, you can set "Display Only" or "Disabled" to make sure that only authorized persons can interrupt the remote session.

### 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 4.2, "Remote Operation"](#), on page 41.

**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.

**Instrument Password tab**

Used to change the instrument password.

The screenshot shows a 'Security' settings window with four tabs: 'General', 'LAN Settings', 'Instrument Password', and 'Security Password'. The 'Instrument Password' tab is currently selected and highlighted in blue. Below the tabs, there are three input fields labeled 'Old Password', 'New Password', and 'Confirm Password'. At the bottom of the window is a large 'Change Password' button.

**Old Password ← Instrument Password tab**

Currently used instrument password. The preconfigured password is *instrument*.

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

The instrument password is required for logon.

**New Password ← Instrument Password tab**

New instrument password.

**Confirm Password ← Instrument Password tab**

New instrument password for confirmation.

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

**Change Password ← Instrument Password tab**

Sets the new password as instrument password.

**Security Password tab**

Used to change the security password.

The screenshot shows the 'Security' settings screen with the 'Security Password' tab selected. The screen contains the following elements:

- Header: Security
- Navigation tabs: General, LAN Settings, Instrument Password, Security Password (highlighted)
- Input field: Old Password
- Input field: New Password
- Input field: Confirm Password
- Button: Change Password

**Old Password ← Security Password tab**

Currently used security password. The preconfigured password is 123456.

**Note:** We recommend that you change the preconfigured 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.



### 11.2.3 Option Settings

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

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

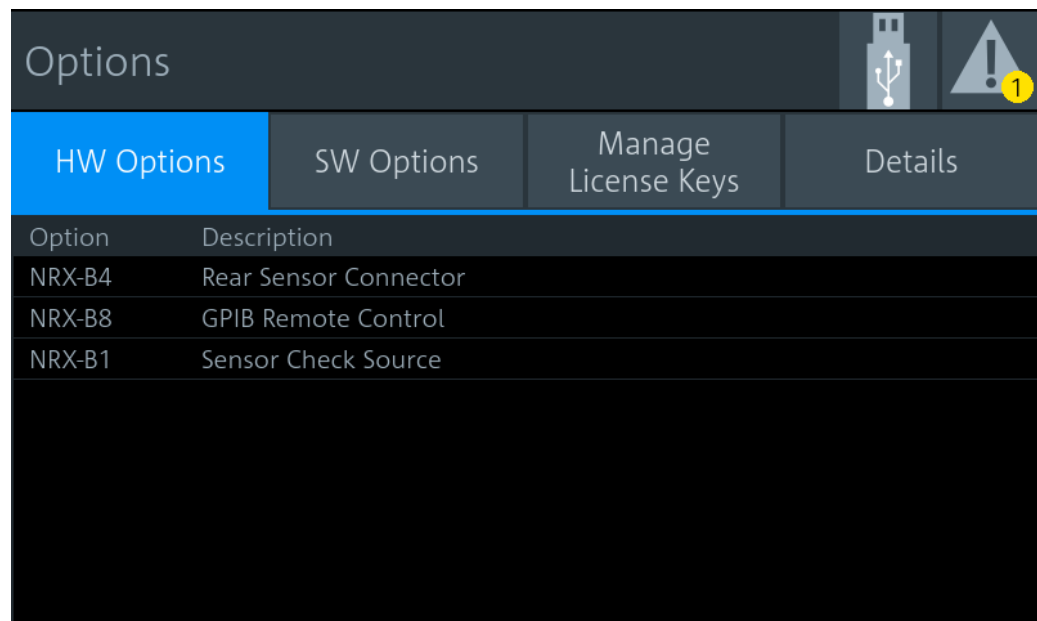
The "Options" dialog contains the following parameters:

HW Options tab.....	161
SW Options tab.....	161
Manage License Keys tab.....	162
L Enter License Key.....	163
L Import.....	163
L Export.....	163
Details tab.....	163

#### HW Options tab

Displays the installed hardware options.

The hardware options on the front panel, you can install yourself. See [Chapter 3.2.1.2, "Module Bay"](#), on page 24.

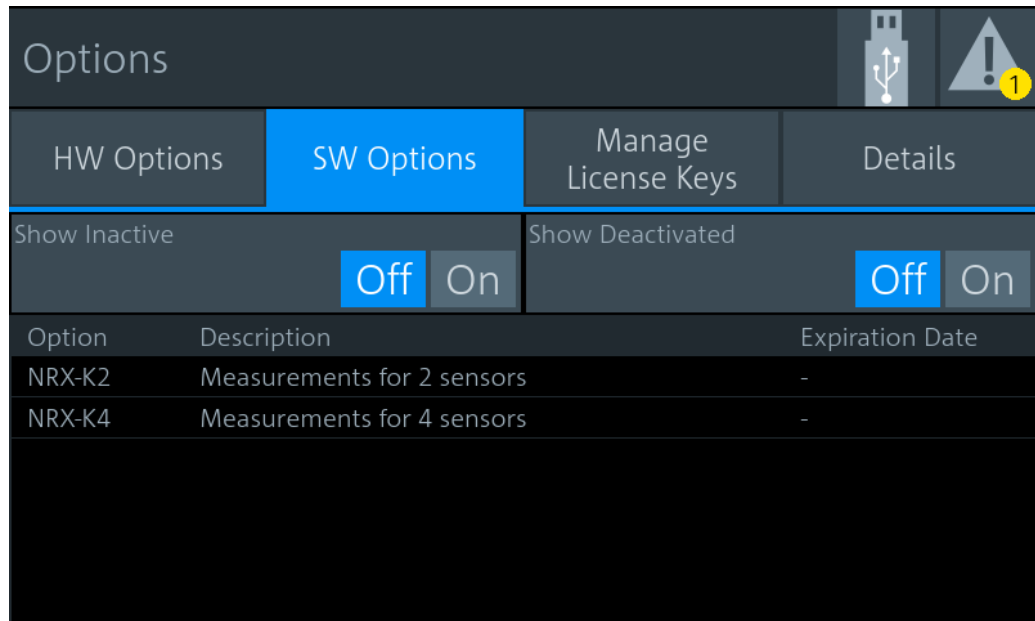


Remote command:

\*OPT? on page 182

#### SW Options tab

Displays all software options and their status. For information on installing options, see [Chapter 12, "Option Management"](#), on page 169.



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.

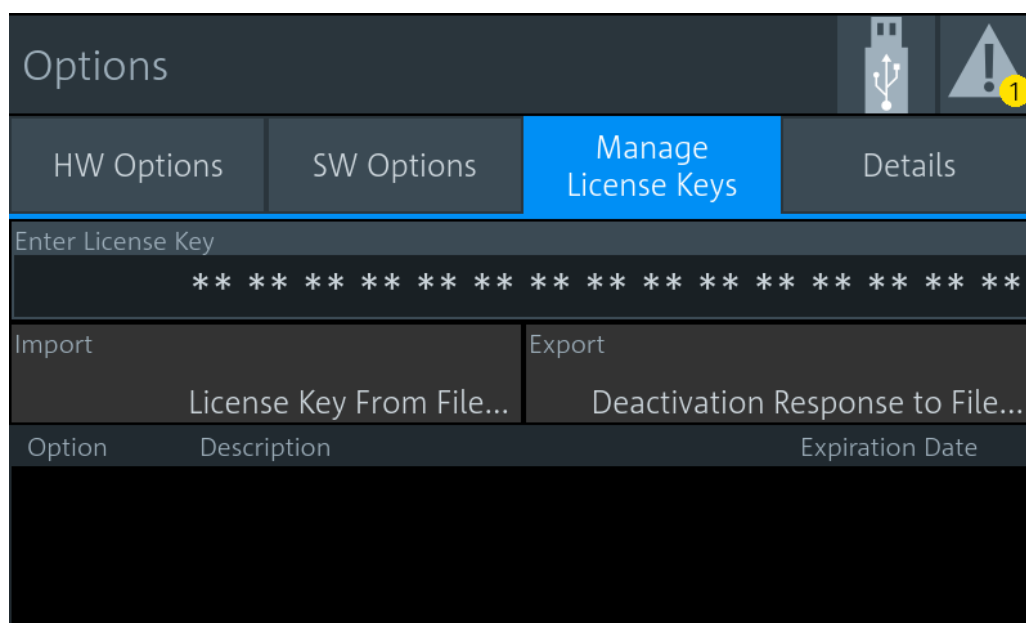
"Show Deactivated On | Off" Shows or hides deactivated software options. These software options have been installed but are not active any more, for example because the license key is expired.

Remote command:

\*OPT? on page 182

#### Manage License Keys tab

Used to install or deinstall software options. See also [Chapter 12.1, "Installing a License Key"](#), on page 169.



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**

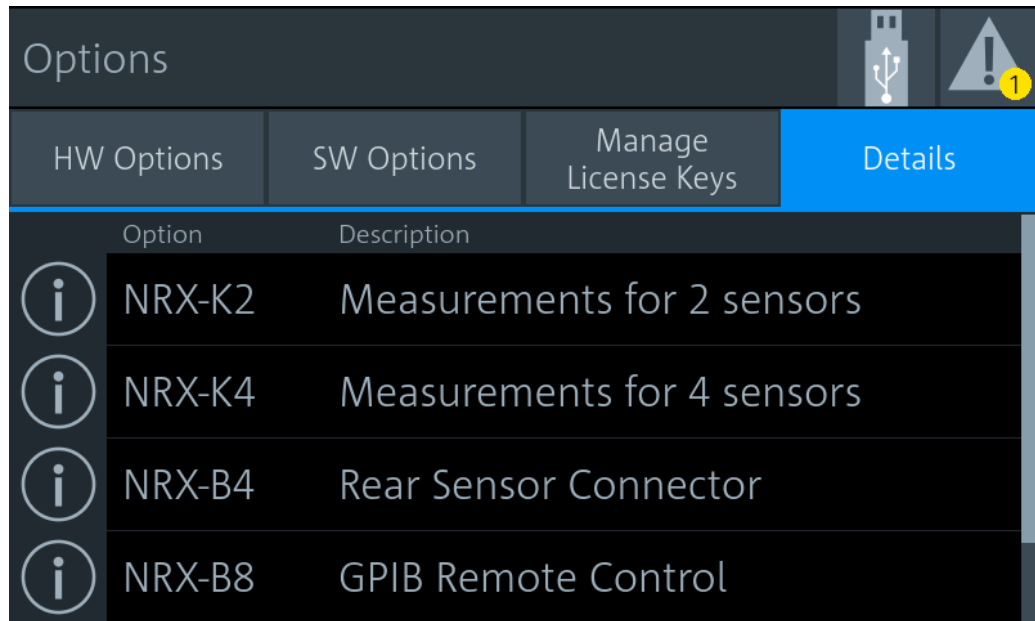
For future use.

**Export ← Manage License Keys tab**

For future use.

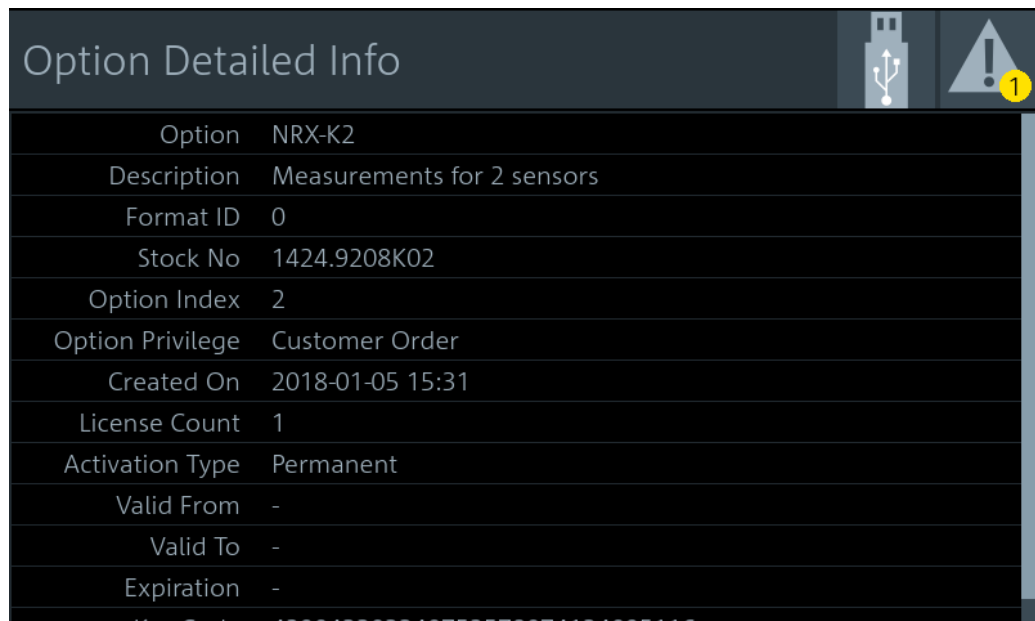
**Details tab**

Displays a list of all installed hardware and software options.



Option	Description
NRX-K2	Measurements for 2 sensors
NRX-K4	Measurements for 4 sensors
NRX-B4	Rear Sensor Connector
NRX-B8	GPIB Remote Control

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

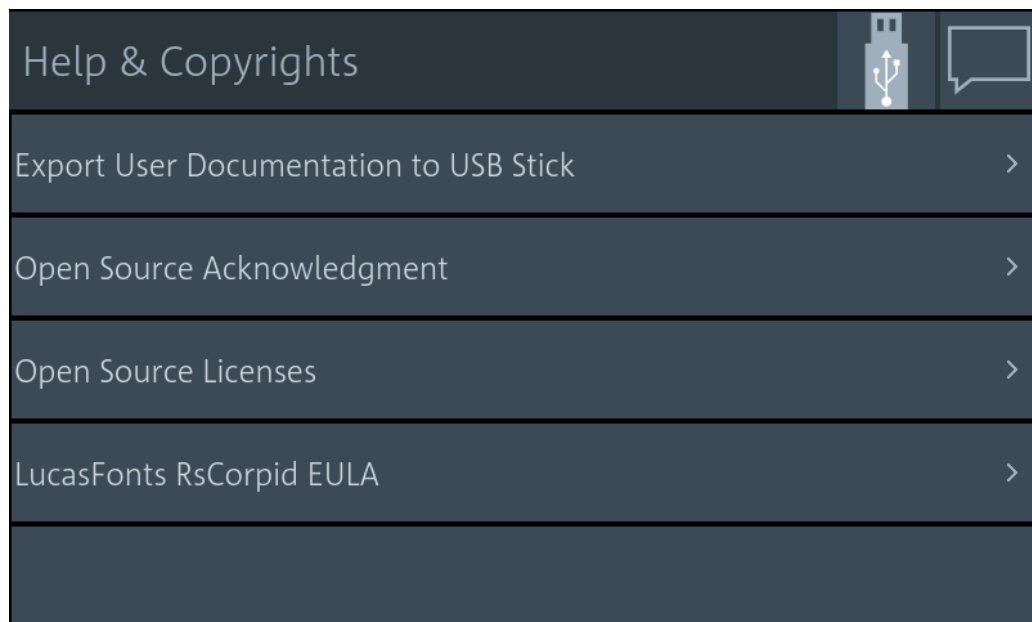


Option	NRX-K2
Description	Measurements for 2 sensors
Format ID	0
Stock No	1424.9208K02
Option Index	2
Option Privilege	Customer Order
Created On	2018-01-05 15:31
License Count	1
Activation Type	Permanent
Valid From	-
Valid To	-
Expiration	-

## 11.2.4 Help & Copyrights

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

Gives access to the user manual, open source acknowledgement and license information.



<a href="#">Export User Documentation to USB Stick</a> .....	165
<a href="#">Open Source Acknowledgment</a> .....	165
<a href="#">Open Source Licenses</a> .....	165
<a href="#">LucasFonts RsCorpid EULA</a> .....	165

#### **Export User Documentation to USB Stick**

Downloads the user manual to a connected USB stick. If no USB stick is connected, the file is saved to the volatile directory of the FTP directory. Information to the download is displayed in the "Notification Center". See also [Chapter 4.1.4, "Notification Center"](#), on page 35.

#### **Open Source Acknowledgement**

Displays the open source acknowledgement.

#### **Open Source Licenses**



Displays the license texts of open source software packages used in the R&S NRX software. Under "Component", select the open source software package you want to display the license text of.

#### **LucasFonts RsCorpid EULA**

Displays the end-user license agreement (EULA) of LucasFonts.

## **11.3 Hardware Configuration**







Access: [System] > "Hardware Config"

System Overview					
Connections	Instrument Info	Hardware Config	Test	Global Settings	
Assembly		Part Number	Serial	Revision	
GM NRX POWER METER		1424.7005.02	100672	06.00	
NJ PSU-0251-02 PSU 1X 75W 12.2V 6.15		1416.0870.00	128972	07.00	
ED MAINBOARD NRX		1424.7405.02	100830	03.09	
ED VERBUNDUNGSBOARD NRX		1424.7511.02	100944	03.01	
ED SENSORBUCHSENEINHEIT		1424.7663.02	101203	03.00	
ED USB CONNECTOR BOARD		1424.8001.02	101311	02.02	
ED TASTENFELD FUER NRX		1424.8101.02	101142	02.01	
ED ADAPTER DISPLAY NRX		1424.8224.02	101086	02.01	
ND TFT 5.0 INCH WVGA RGB I2C TC		3623.4742.00	102035	01.00	

Lists the hardware details of the R&S NRX assemblies. This tab can be useful for looking up the revision of hardware, for example when troubleshooting.

## 11.4 Test

Access: [System] > "Test"

System Overview			
Connections	Instrument Info	Hardware Config	Test
 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 152.

### 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.

**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 385

[TEST:DEVIce:RESult?](#) on page 385

### Creating information for troubleshooting

You can save information for troubleshooting on a memory stick.

1. Connect a memory stick to one of the USB interfaces.
2. Tap "Create R&S Support Information".

The created archive file (\*.tar.gz) contains the following information:

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

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

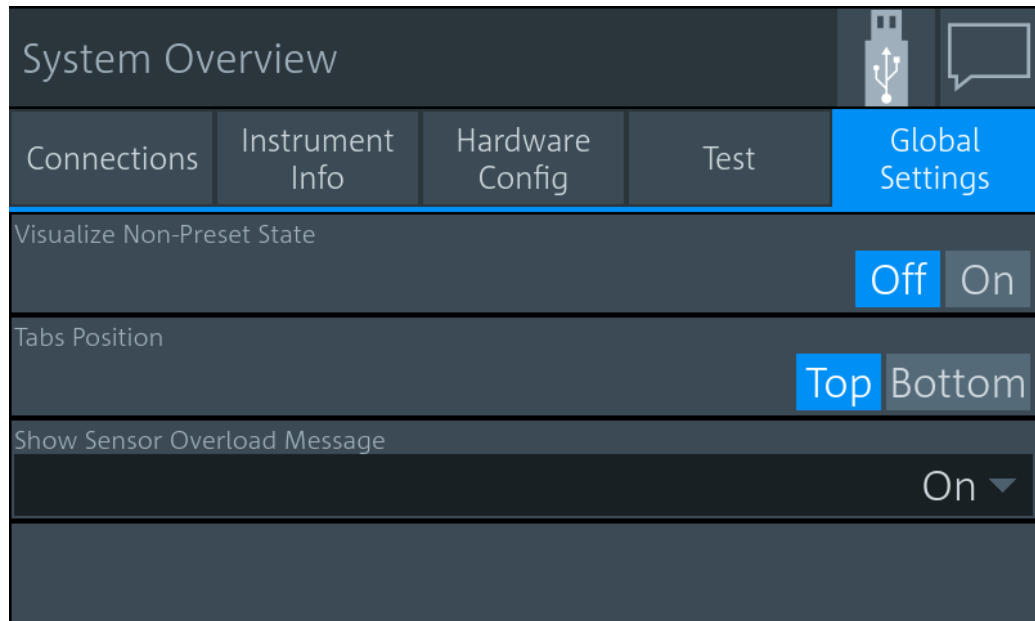
Alternatively, you can transfer the information using secure shell (SSH). See "[SSH](#)" on page 159.

Remote command:

[TEST:USB:STORage?](#) on page 386

## 11.5 Global Settings

Access: [System] > "Global Settings"



On this tab, you configure the following settings:

<a href="#">Visualize Non-Preset State</a> .....	168
<a href="#">Tabs Position</a> .....	168
<a href="#">Hide Sensor Overload Message</a> .....	168

#### 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 the maximum power using `SYSTEM:SENSOR<Sensor>:INFO?`.

Remote command:

`DISPLAY:OVERload[:STATe]` on page 231



## 12 Option Management

Optional features are available as options and are part of the firmware package. If you want to use an optional feature, you buy the option and, in return, receive a license key. Using the license key, you can activate the option as described in [Chapter 12.1, "Installing a License Key"](#), on page 169.

You can also use the license key to deactivate the option but keep in mind that you cannot use the same license key to activate the option again. If you want to reactivate an option, contact the Rohde & Schwarz service center to request a new license key.

For detailed information on available options, see the data sheet or visit:

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

### 12.1 Installing a License Key

#### Preparatory steps

1. Make sure that the most recent firmware version is installed.
2. Check the "License Keys List" whether the license you have purchased is unregistered. If the license is unregistered, you need to register it before installation. See "Supplement A" how to do that.

#### To install the license key

1. Select [System] > "Instrument Info" > "Options".  
The "Options" dialog is displayed.
2. Select the "Manage License Keys" tab.
3. Select "Enter License Key".  
The alphanumeric editor is displayed.
4. Enter the 30-digit license key from "License Keys List" or from the registration print-out, if the license was delivered unregistered.
5. Confirm your entry with the checkmark.
6. Switch the R&S NRX off and on again to reboot it.
7. Check whether the option is active:
  - a) Select [System] > "Instrument Info" > "Options".
  - b) Select the "SW Options" tab.  
If the option is active, it is displayed in the list.

Further information:

- [Chapter 11.2.3, "Option Settings"](#), on page 161

## 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).

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### 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.

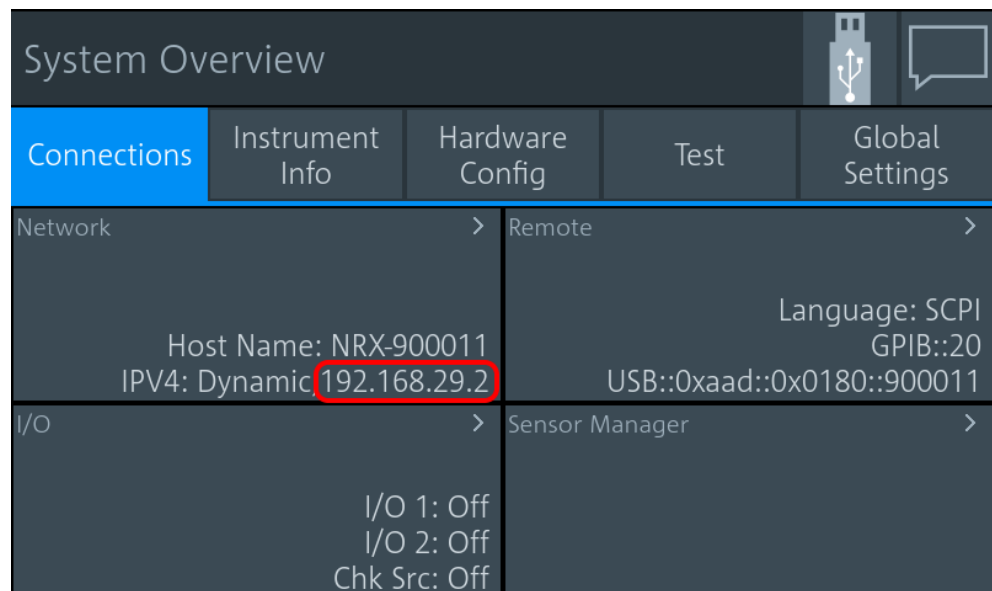
### 13.1.2 Preparing an Update

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. Make sure that the native language for the remote commands is set under:
  - [System] > "Connections" > "Remote" > **Emulations tab** (manual control)
  - **SYSTEM: LANGUAGE** on page 401 (remote control)
3. 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:

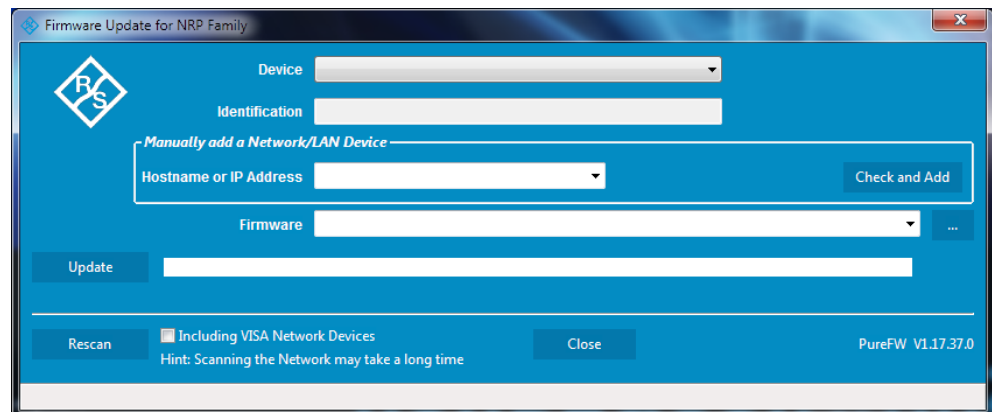
- a) Open the dialog "Network" and check whether the network settings are correct.

- 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

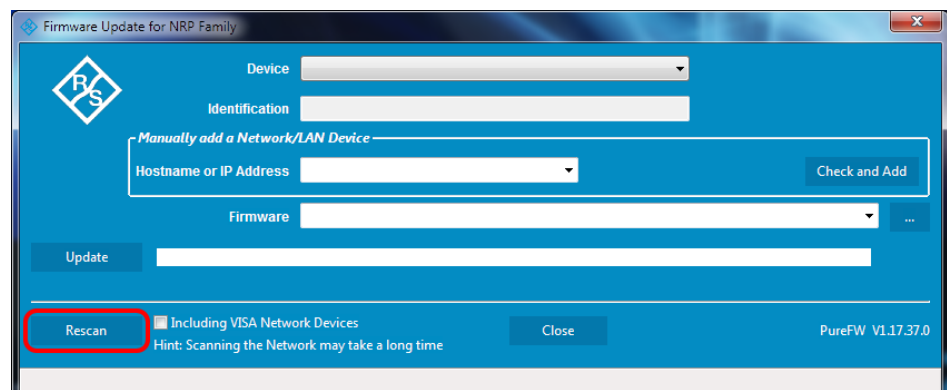
To perform a firmware update:

1. Start the Firmware Update program (PureFW) via "Start menu > NRP-Toolkit > Firmware Update". The following window should appear:



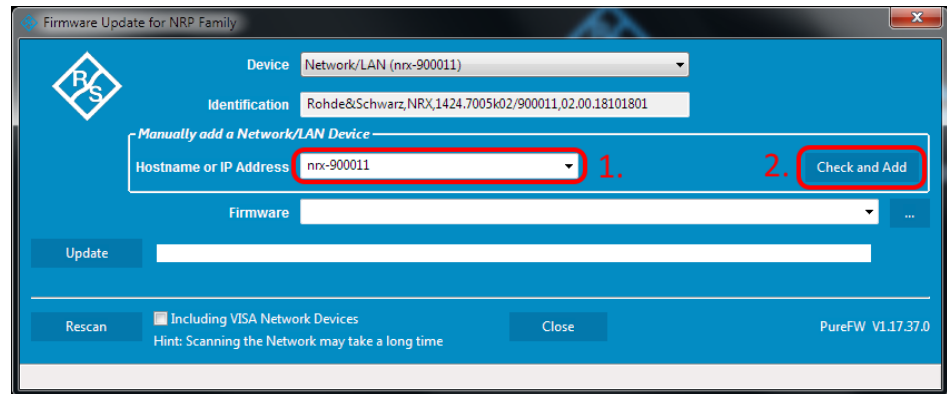
The program automatically starts scanning for R&S power sensors and meters attached via USB. When the scan is completed, all recognized power sensors and meters are listed in the "Device" dropdown control.

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.



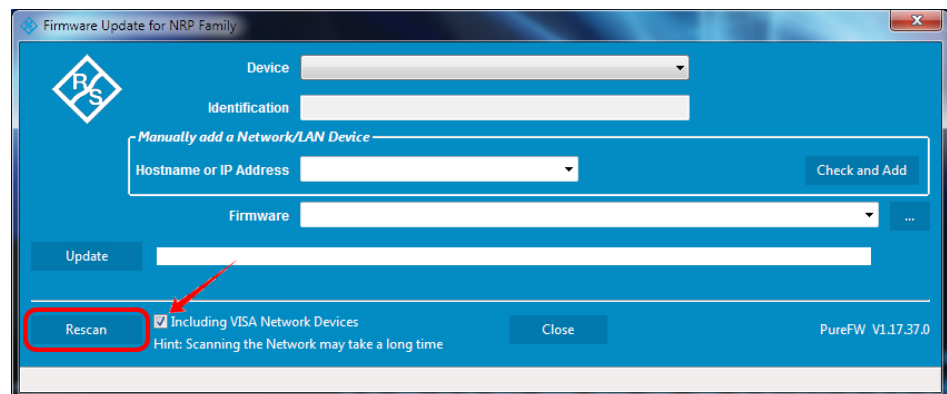
## Firmware Update via PC and USB or Ethernet Connection

- 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**.



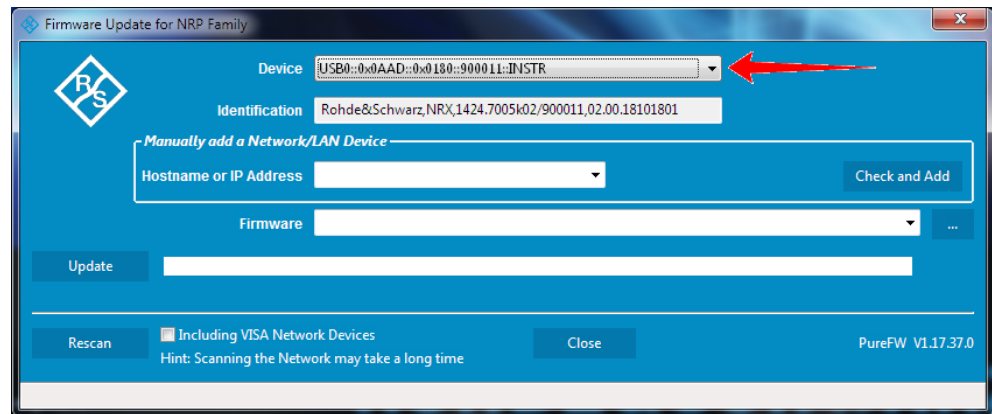
The program searches for the specified instrument on the network and adds it to the "Device" list.

- 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".



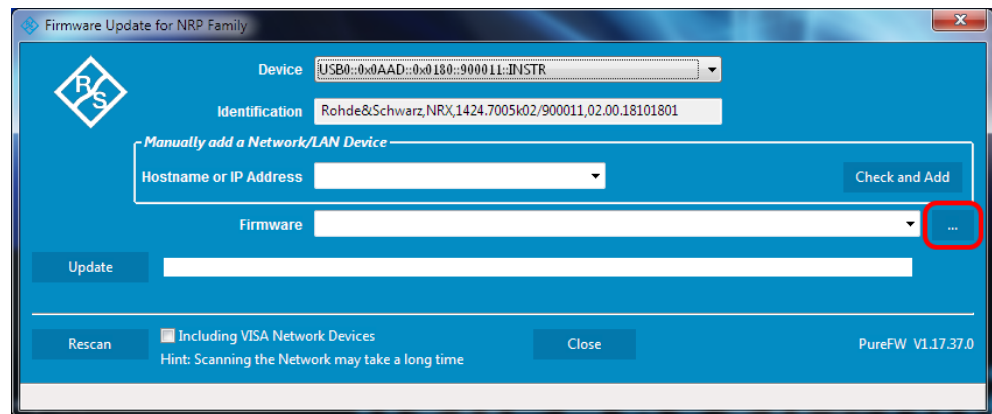
- d) Check whether a VISA library is installed on the computer.  
 If no VISA library is installed on the computer, no VISA instrument will be accessible.  
 If a network connection is used: Check whether the instrument is registered as a VISA device.
3. In the "Device" line select the instrument you want to update.

## Firmware Update via PC and USB or Ethernet Connection

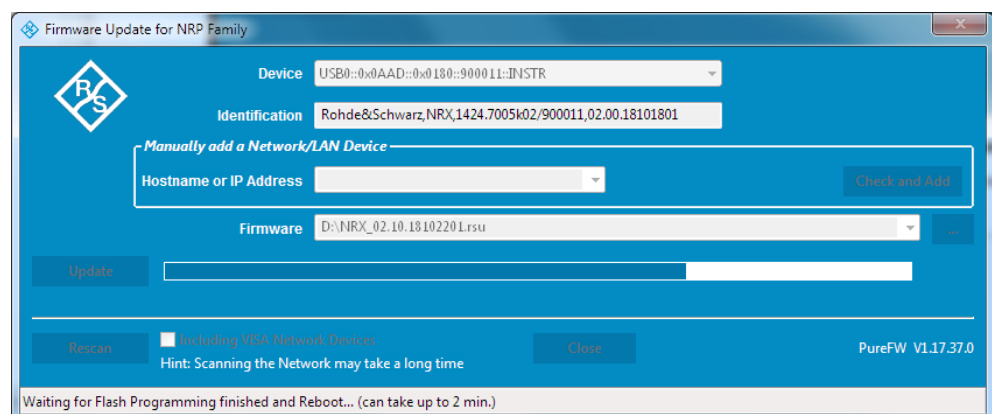


The "Hostname or IP Address" field is not used during this procedure and should therefore be left empty.

- 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.

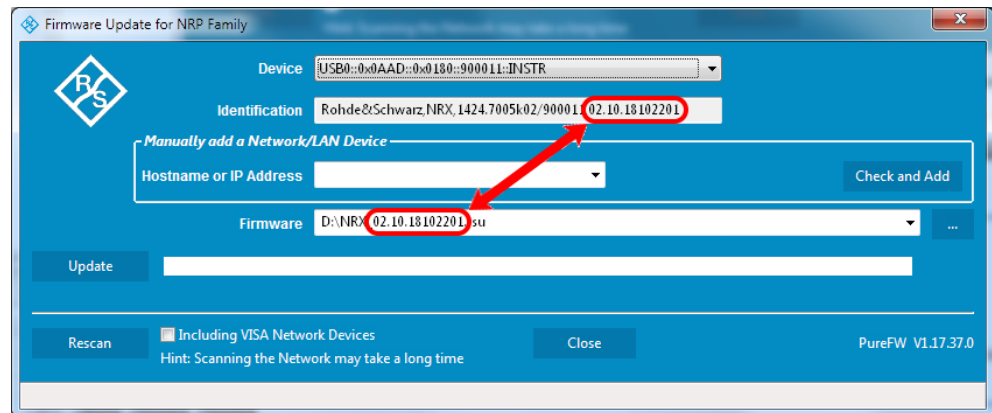


- Select "Update" to download the new firmware and program it into the flash memory of the instrument.



During the update process the progress is shown through a progress bar. The update sequence may take a couple of minutes.

- 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:

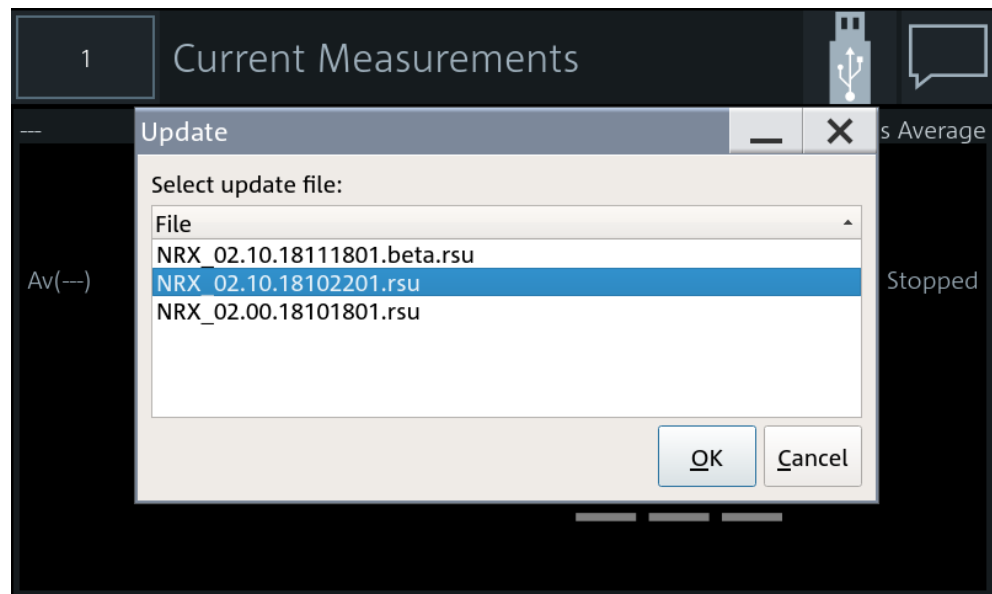
- Make sure that the native language for the remote commands is set under:
  - [System] > "Connections" > "Remote" > [Emulations tab](#) (manual control)
  - [SYSTEM: LANGuage](#) on page 401 (remote control)
- Copy the Rohde & Schwarz update file to the root directory of the USB flash memory stick.
- 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 14.6.1.3, "Units"](#), on page 245.

For further information on units, see also ["Units"](#) on page 464.

## 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> .....	178
<a href="#">&amp;DFC</a> .....	178
<a href="#">&amp;GET</a> .....	179

&GTL.....	179
&GTM.....	179
&GTR.....	179
&HFC.....	179
&LLO.....	179
&NREN.....	179
*CLS.....	179
*DEV.....	180
*DMC.....	180
*EMC.....	180
*ESE.....	180
*ESR?.....	180
*GCLS.....	181
*GMC?.....	181
*GOPC?.....	181
*GWAI.....	181
*IDN?.....	181
*IST?.....	181
*LMC?.....	182
*OPC.....	182
*OPT?.....	182
*PMC.....	182
*PRE.....	182
*PSC.....	183
*RCL.....	183
*RMC.....	183
*RST.....	183
*SAV.....	183
*SRE.....	184
*SRQ?.....	184
*STB?.....	184
*TRG.....	184
*TST?.....	184
*WAI.....	185
*XESE.....	185
*XESR?.....	185
*XPRES.....	185
*XSRE.....	185
*XSTB?.....	186

---

**&ABO**

Device clear

**Usage:**                   Event

---

**&DFC**

Disable flow control

**Usage:** Event

---

#### **&GET**

Group execute trigger

**Usage:** Event

---

#### **&GTL**

Go to local

**Usage:** Event

---

#### **&GTM**

Go to local with remote state

**Usage:** Event

---

#### **&GTR**

Go to remote

**Usage:** Event

---

#### **&HFC**

Hardware flow control

**Usage:** Event

---

#### **&LLO**

Local lockout

**Usage:** Event

---

#### **&NREN**

Not remote enabled (go to local)

**Usage:** Event

---

#### **\*CLS**

Clear status, resets the following:

- Status byte (STB)
- Standard event register (ESR)

- EVENT part of the QUESTIONABLE and the OPERATION register
- Error/event queue

The command does not change the ENABLE and TRANSITION parts of the registers.

**Usage:** Event

---

**\*DEV** [<instrument\_no>]

Fixed value.

**Parameters:**

<instrument\_no> 0

---

**\*DMC** <Label>, <Macro>

**\*DMC?** <Label>

Defines a macro command.

**Parameters:**

<Macro>

**Parameters for setting and query:**

<Label>

---

**\*EMC** <Enable>

Enables macro command.

**Parameters:**

<Enable>

---

**\*ESE** <register>

Event status enable

Sets the event status enable register to the specified value. The query returns the contents of the event status enable register in decimal form.

**Parameters:**

<register>	Range:	0 to 255
	*RST:	0

---

**\*ESR?**

Event status read

Returns the contents of the event status register in decimal form (0 to 255) and 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

---

**\*GWAJ**

Waits for all pending operations in all internal "instruments".

**Usage:** Event

---

**\*IDN?**

Identification

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 status

Returns the current value of the IST flag in decimal form. The IST flag is the status bit which is sent during a parallel poll.

**Usage:** Query only

---

---

**\*LMC?**

List macro commands.

**Return values:**

<Label>

**Usage:** Query only

---

**\*OPC**

Operation complete

Sets bit 0 in the event status register when all preceding commands have been executed. Send this command at the end of a program message. It is important that the read timeout is set sufficiently long.

The query always returns 1 because the query waits until all previous commands are executed.

\*OPC? basically functions like \*WAI, but also returns a response. The response is an advantage, because you can query the execution of commands from a controller program before sending new commands. Thus preventing overflow of the input queue when too many commands are sent that cannot be executed.

---

**\*OPT?**

Option identification

Returns a comma-separated list of installed options.

**Usage:** Query only

**Manual operation:** See "HW Options tab" on page 161  
See "SW Options tab" on page 161

---

**\*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 134

---

**\*RMC** <Label>

Remove macro content.

**Setting parameters:**

<Label>

**Usage:**                      Setting only

---

**\*RST**

Sets the instrument to a defined initial state, a so-called reset. The default settings are indicated in the description of commands as \*RST value.

With the exceptions listed in [Table 14-16](#), this command corresponds to [SYSTEM:PRESet](#).

**Usage:**                      Event

**Manual operation:**    See "[Preset](#)" on page 134

---

**\*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 134

**\*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:**

<timeout>

**Return values:**

<srq>

**Usage:** Query only

**\*STB?**

Status byte

Returns the contents of the status byte in decimal form.

**Usage:** Query only

**\*TRG**

Trigger

Triggers a measurement if the following conditions are met:

- Power sensor is in the waiting for trigger state.
- Trigger source is set to BUS.

See [TRIGger<Measurement>\[:CHANnel<Channel>\]:SOURce](#) on page 266

**Usage:** Event

**\*TST?**

Self-test



Triggers a self-test of the R&S NRX and outputs the result. 0 indicates that no errors have occurred.

**Usage:** Query only

---

#### **\*WAI**

Wait to continue

Prevents the execution of the subsequent commands until all preceding commands have been executed and all signals have settled.

**Usage:** Event

---

#### **\*XESE <xese>**

Specifies the standard event status enable register (ESE). This register determines which events from the standard event status register (ESR) are summarized in bit 5 (the event summary bit ESB) of the status byte.

**Parameters:**

<xese>                      <expr>

---

#### **\*XESR?**

Reads and clears the standard event status register (ESR).

**Return values:**

<xesr>                      <expr>

**Usage:** Query only

---

#### **\*XPRES <xpre>**

Reads or writes the parallel pll enable register (PRE).

**Parameters:**

<xpre>                      <expr>

Parallel poll enable register.

---

#### **\*XSRES <xsre>**

Reads or writes the service request enable register. Used to enable service requests.

**Parameters:**

<xsre>                      <expr>

Service request enable register (SRE).

**\*XSTB?**

Reads the status byte.

**Return values:**

<xstb>                      <expr>  
                                    Status byte (STB).

**Usage:**                      Query only

## 14.3 Addressing Measurements and Sensors

**<Measurement> suffix**

The R&S NRX memorizes sensor assignments. Thus, a sensor type that has been connected before is assigned to the same measurement type when it is connected again. See also [Chapter 5, "Measurement Basics"](#), on page 44.

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

**Example:**

For configuring measurements, the `CALCulate<Measurement>` commands are used.

The first power sensor is connected to port A. It is assigned to the first measurement, addressed by `CALC1`.

The second power sensor is connected to port C. It is assigned to the third measurement, addressed by `CALC3`.

The third power sensor is connected to port B. It is assigned to the second measurement, addressed by `CALC2`.

All three power sensors are the primary sensor in the assigned measurement.

**[ :CHANnel<Channel> ] suffix**

If there is only one power sensor assigned to a measurement, you can omit `[ :CHANnel<Channel> ]`. Otherwise, the primary sensor is always addressed by `CHAN1`, and the secondary sensor is always addressed by `CHAN2`.

If you use calculation functions that process the results of two power sensors, you assign a primary sensor and a secondary sensor. In `CALCulate<Measurement>: MATH[:EXPRession]`, the position of the power sensor in the expression defines the power sensor as primary or secondary sensor.

**Example:**

For calculating the standing wave ratio (SWR), you use `CALC1:MATH:EXPR "SWR (SENS3, SENS1) "`.

Thus, the power sensor at port C from the example above is assigned as primary sensor, and the power sensor at port A as secondary sensor.

This behavior saves you assigning the power sensors using `CALCulate<Measurement>[:CHANnel<Channel>]:SENSe:INDeX`.

Further information:

- ["Primary Sensor, Secondary Sensor"](#) on page 68
- ["Channel Calculation Function"](#) on page 68
- Assigning measurement panes and traces, see [Chapter 14.6, "Measurement Settings and Results"](#), on page 225.

## 14.4 Making Measurements

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.

### 14.4.1 Continuous Average Measurements

Further commands to configure this measurement are describes in [Chapter 14.6.6, "Continuous Average"](#), on page 274.

Further information about the measurement:

- [Chapter 7.1, "Continuous Average"](#), on page 71

**Parameter list**

For continuous average measurements, 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>...]

Measured average power measured by one power sensor.

The `FETCh?` and `READ?` commands send without parameters have a special meaning.

`FETCh?` returns the current measured value if it is valid. If a measured value is not yet available, processing is suspended until a valid result is available.

`READ?` starts a measurement and returns a measured value without checking the current settings.

**Suffix:**

<Measurement>      1 to 8  
                         Measurement

**Query parameters:**

<expected\_value\_or\_source\_list>  
                         <numeric> | <expr>

<resolution\_or\_source\_list>  
                         <numeric> | <expr>

<source\_list>            <expr>  
                         For the parameter descriptions, see "[Parameter list](#)"  
                         on page 188.

**Usage:**                Query only

**CONFigure<Measurement>[:SCALar][:POWer][:AVG]:RELative?**

[&lt;expected\_value\_or\_source\_list&gt;, &lt;resolution\_or\_source\_list&gt;, &lt;source\_list&gt;...]

**FETCh<Measurement>[:SCALar][:POWer][:AVG]:RELative?**

[&lt;expected\_value\_or\_source\_list&gt;, &lt;resolution\_or\_source\_list&gt;, &lt;source\_list&gt;...]

**READ<Measurement>[:SCALar][:POWer][:AVG]:RELative?**

[&lt;expected\_value\_or\_source\_list&gt;, &lt;resolution\_or\_source\_list&gt;, &lt;source\_list&gt;...]

**MEASure<Measurement>[:SCALar][:POWer][:AVG]:RELative?**

[&lt;expected\_value\_or\_source\_list&gt;, &lt;resolution\_or\_source\_list&gt;, &lt;source\_list&gt;...]

Relative power measured by one power sensor.

**Suffix:**

<Measurement>      1 to 8  
                          Measurement

**Query parameters:**

<expected\_value\_or\_source\_list>  
                          <numeric> | <expr>

<resolution\_or\_source\_list>  
                          <numeric> | <expr>

<source\_list>            <expr>

For the parameter descriptions, see "[Parameter list](#)"  
 on page 188.

**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;...]

Difference measured by two power sensors.

**Suffix:**

<Measurement>      1 to 8  
                          Measurement

**Query parameters:**

<expected\_value\_or\_source\_list>  
                          <numeric> | <expr>

<resolution\_or\_source\_list>  
                          <numeric> | <expr>

<source\_list>            <expr>

For the parameter descriptions, see "[Parameter list](#)"  
 on page 188.

**Usage:** Query only

---

**CONFigure**<Measurement>[:SCALar][:POWer][:AVG]:DIFFerence:RELative?  
 [<expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]  
**FETCh**<Measurement>[:SCALar][:POWer][:AVG]:DIFFerence:RELative?  
 [<expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]  
**READ**<Measurement>[:SCALar][:POWer][:AVG]:DIFFerence:RELative?  
 [<expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]  
**MEASure**<Measurement>[:SCALar][:POWer][:AVG]:DIFFerence:RELative?  
 [<expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

Relative difference measured by two power sensors.

**Suffix:**

<Measurement> 1 to 8  
 Measurement

**Query parameters:**

<expected\_value\_or\_source\_list>  
 <numeric> | <expr>

<resolution\_or\_source\_list>  
 <numeric> | <expr>

<source\_list> <expr>

For the parameter descriptions, see ["Parameter list"](#) on page 188.

**Usage:** Query only

---

**CONFigure**<Measurement>[:SCALar][:POWer][:AVG]:SUM?  
 [<expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]  
**FETCh**<Measurement>[:SCALar][:POWer][:AVG]:SUM?  
 [<expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]  
**READ**<Measurement>[:SCALar][:POWer][:AVG]:SUM?  
 [<expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]  
**MEASure**<Measurement>[:SCALar][:POWer][:AVG]:SUM?  
 [<expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

Sum of the values measured by two power sensors.

**Suffix:**

<Measurement> 1 to 8  
 Measurement

**Query parameters:**

<expected\_value\_or\_source\_list>  
 <numeric> | <expr>

<resolution\_or\_source\_list>  
 <numeric> | <expr>

<source\_list>            <expr>  
 For the parameter descriptions, see "[Parameter list](#)"  
 on page 188.

**Usage:**                    Query only

**CONFigure<Measurement>[:SCALar][:POWer][:AVG]:SUM:RELative?**

[<expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

**FETCh<Measurement>[:SCALar][:POWer][:AVG]:SUM:RELative?**

[<expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

**READ<Measurement>[:SCALar][:POWer][:AVG]:SUM:RELative?**

[<expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

**MEASure<Measurement>[:SCALar][:POWer][:AVG]:SUM:RELative?**

[<expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

Relative sum measured by two power sensors.

**Suffix:**

<Measurement>            1 to 8  
 Measurement

**Query parameters:**

<expected\_value\_or\_source\_list>  
                              <numeric> | <expr>

<resolution\_or\_source\_list>  
                              <numeric> | <expr>

<source\_list>            <expr>  
 For the parameter descriptions, see "[Parameter list](#)"  
 on page 188.

**Usage:**                    Query only

**CONFigure<Measurement>[:SCALar][:POWer][:AVG]:RATio?**

[<expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

**FETCh<Measurement>[:SCALar][:POWer][:AVG]:RATio?**

[<expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

**READ<Measurement>[:SCALar][:POWer][:AVG]:RATio?**

[<expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

**MEASure<Measurement>[:SCALar][:POWer][:AVG]:RATio?**

[<expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

Ratio measured by two power sensors.

**Suffix:**

<Measurement>            1 to 8  
 Measurement

**Query parameters:**

<expected\_value\_or\_source\_list>  
                              <numeric> | <expr>

<resolution\_or\_source\_list>  
 <numeric> | <expr>

<source\_list> <expr>

For the parameter descriptions, see ["Parameter list"](#) on page 188.

**Usage:** Query only

---

**CONFigure<Measurement>[:SCALar][:POWer][:AVG]:RATio:RELative?**

[<expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

**FETCh<Measurement>[:SCALar][:POWer][:AVG]:RATio:RELative?**

[<expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

**READ<Measurement>[:SCALar][:POWer][:AVG]:RATio:RELative?**

[<expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

**MEASure<Measurement>[:SCALar][:POWer][:AVG]:RATio:RELative?**

[<expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

Relative ratio measured by two power sensor.

**Suffix:**

<Measurement> 1 to 8  
 Measurement

**Query parameters:**

<expected\_value\_or\_source\_list>  
 <numeric> | <expr>

<resolution\_or\_source\_list>  
 <numeric> | <expr>

<source\_list> <expr>

For the parameter descriptions, see ["Parameter list"](#) on page 188.

**Usage:** Query only

---

**CONFigure<Measurement>[:SCALar][:POWer][:AVG]:SWR?**

[<expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

**FETCh<Measurement>[:SCALar][:POWer][:AVG]:SWR?**

[<expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

**READ<Measurement>[:SCALar][:POWer][:AVG]:SWR?**

[<expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

**MEASure<Measurement>[:SCALar][:POWer][:AVG]:SWR?**

[<expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

Standing wave ratio measurement of two power sensors.

**Suffix:**

<Measurement> 1 to 8  
 Measurement



**Query parameters:**

<expected\_value\_or\_source\_list>  
                                 <numeric> | <expr>

<resolution\_or\_source\_list>  
                                 <numeric> | <expr>

<source\_list>                <expr>

For the parameter descriptions, see ["Parameter list"](#)  
 on page 188.

**Usage:**                    Query only

**CONFigure<Measurement>[:SCALar][:POWer][:AVG]:REFLection?**

[<expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

**FETCh<Measurement>[:SCALar][:POWer][:AVG]:REFLection?**

[<expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

**READ<Measurement>[:SCALar][:POWer][:AVG]:REFLection?**

[<expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

**MEASure<Measurement>[:SCALar][:POWer][:AVG]:REFLection?**

[<expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

Reflection coefficient/transmission factor of a DUT, measured by two power sensors.

**Suffix:**

<Measurement>          1 to 8  
                             Measurement

**Query parameters:**

<expected\_value\_or\_source\_list>  
                                 <numeric> | <expr>

<resolution\_or\_source\_list>  
                                 <numeric> | <expr>

<source\_list>            <expr>

For the parameter descriptions, see ["Parameter list"](#)  
 on page 188.

**Usage:**                    Query only

**CONFigure<Measurement>[:SCALar][:POWer][:AVG]:RLOSs?**

[<expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

**FETCh<Measurement>[:SCALar][:POWer][:AVG]:RLOSs?**

[<expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

**READ<Measurement>[:SCALar][:POWer][:AVG]:RLOSs?**

[<expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

**MEASure<Measurement>[:SCALar][:POWer][:AVG]:RLOSs?**

[<expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

Return loss/transmission loss of a DUT, measured by two power sensors.

**Suffix:**

<Measurement>      1 to 8  
Measurement

**Query parameters:**

<expected\_value\_or\_source\_list>  
                          <numeric> | <expr>

<resolution\_or\_source\_list>  
                          <numeric> | <expr>

<source\_list>           <expr>

For the parameter descriptions, see "[Parameter list](#)"  
on page 188.

**Usage:**               Query only

## 14.4.2 Continuous Average Measurements with Buffering

Further commands to configure the continuous average measurement are describes in [Chapter 14.6.6, "Continuous Average"](#), on page 274.

Further information about the measurement:

- [Chapter 7.1, "Continuous Average"](#), on page 71

**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.

---

**CONF**igure<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>...]

Measured average power measured by one power sensor with buffering.

**Suffix:**

<Measurement>      1 to 8  
                          Measurement

**Query parameters:**

<buffered\_size>      <expr>

<expected\_value\_or\_source\_list>  
                          <numeric> | <expr>

<resolution\_or\_source\_list>  
                          <numeric> | <expr>

<source\_list>        <expr>

For the parameter descriptions, see "[Parameter list](#)"  
 on page 194.

**Usage:**              Query only

**CONFigure<Measurement>:ARRay[:POWer][:AVG]:DIFFerence?** <buffered\_size>[,  
 <expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

**FETCh<Measurement>:ARRay[:POWer][:AVG]:DIFFerence?** <buffered\_size>[,  
 <expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

**READ<Measurement>:ARRay[:POWer][:AVG]:DIFFerence?** <buffered\_size>[,  
 <expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

**MEASure<Measurement>:ARRay[:POWer][:AVG]:DIFFerence?** <buffered\_size>[,  
 <expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

Difference measured by two power sensors with buffering.

**Suffix:**

<Measurement>      1 to 8  
                          Measurement

**Query parameters:**

<buffered\_size>      <expr>

<expected\_value\_or\_source\_list>  
                          <numeric> | <expr>

<resolution\_or\_source\_list>  
                          <numeric> | <expr>

<source\_list>        <expr>

For the parameter descriptions, see "[Parameter list](#)"  
 on page 194.

**Usage:**              Query only

**CONFigure<Measurement>:ARRAY[:POWER][:AVG]:DIFFerence:RELative?**

<buffered\_size>[, <expected\_value\_or\_source\_list>,  
<resolution\_or\_source\_list>, <source\_list>...]

**FETCh<Measurement>:ARRAY[:POWER][:AVG]:DIFFerence:RELative?**

<buffered\_size>[, <expected\_value\_or\_source\_list>,  
<resolution\_or\_source\_list>, <source\_list>...]

**READ<Measurement>:ARRAY[:POWER][:AVG]:DIFFerence:RELative?**

<buffered\_size>[, <expected\_value\_or\_source\_list>,  
<resolution\_or\_source\_list>, <source\_list>...]

**MEASure<Measurement>:ARRAY[:POWER][:AVG]:DIFFerence:RELative?**

<buffered\_size>[, <expected\_value\_or\_source\_list>,  
<resolution\_or\_source\_list>, <source\_list>...]

Relative difference measured by two power sensors with buffering.

**Suffix:**

<Measurement>      1 to 8  
                         Measurement

**Query parameters:**

<buffered\_size>      <expr>  
  
<expected\_value\_or\_source\_list>  
                         <numeric> | <expr>  
  
<resolution\_or\_source\_list>  
                         <numeric> | <expr>  
  
<source\_list>        <expr>

For the parameter descriptions, see "[Parameter list](#)"  
on page 194,

**Usage:**            Query only

**CONFigure<Measurement>:ARRAY[:POWER][:AVG]:RATio?** <buffered\_size>[,  
<expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

**FETCh<Measurement>:ARRAY[:POWER][:AVG]:RATio?** <buffered\_size>[,  
<expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

**READ<Measurement>:ARRAY[:POWER][:AVG]:RATio?** <buffered\_size>[,  
<expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

**MEASure<Measurement>:ARRAY[:POWER][:AVG]:RATio?** <buffered\_size>[,  
<expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

Ratio measured by two power sensors with buffering.

**Suffix:**

<Measurement>      1 to 8  
                         Measurement

**Query parameters:**

<buffered\_size>      <expr>  
  
<expected\_value\_or\_source\_list>  
                         <numeric> | <expr>

<resolution\_or\_source\_list>  
<numeric> | <expr>

<source\_list> <expr>  
For the parameter descriptions, see "[Parameter list](#)"  
on page 194.

**Usage:** Query only

---

**CONFigure<Measurement>:ARRay[:POWer][:AVG]:RATio:RELative?**

<buffered\_size>[, <expected\_value\_or\_source\_list>,  
<resolution\_or\_source\_list>, <source\_list>...]

**FETCh<Measurement>:ARRay[:POWer][:AVG]:RATio:RELative?** <buffered\_size>[,  
<expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

**READ<Measurement>:ARRay[:POWer][:AVG]:RATio:RELative?** <buffered\_size>[,  
<expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

**MEASure<Measurement>:ARRay[:POWer][:AVG]:RATio:RELative?**

<buffered\_size>[, <expected\_value\_or\_source\_list>,  
<resolution\_or\_source\_list>, <source\_list>...]

Relative ratio measured by two power sensor with buffering.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Query parameters:**

<buffered\_size> <expr>

<expected\_value\_or\_source\_list>  
<numeric> | <expr>

<resolution\_or\_source\_list>  
<numeric> | <expr>

<source\_list> <expr>  
For the parameter descriptions, see "[Parameter list](#)"  
on page 194.

**Usage:** Query only

---

**CONFigure<Measurement>:ARRay[:POWer][:AVG]:REFlection?** <buffered\_size>[,  
<expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

**FETCh<Measurement>:ARRay[:POWer][:AVG]:REFlection?** <buffered\_size>[,  
<expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

**READ<Measurement>:ARRay[:POWer][:AVG]:REFlection?** <buffered\_size>[,  
<expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

**MEASure<Measurement>:ARRay[:POWer][:AVG]:REFlection?** <buffered\_size>[,  
<expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

Reflection coefficient/transmission factor of a DUT, measured by two power sensors  
with buffering.

**Suffix:**

<Measurement>      1 to 8  
Measurement

**Query parameters:**

<buffered\_size>      <expr>  
  
<expected\_value\_or\_source\_list>  
                         <numeric> | <expr>  
  
<resolution\_or\_source\_list>  
                         <numeric> | <expr>  
  
<source\_list>        <expr>

For the parameter descriptions, see ["Parameter list"](#) on page 194.

**Usage:**              Query only

**CONFigure**<Measurement>:**ARRay**[:**POWER**][:**AVG**]:**RELative**? <buffered\_size>[,  
                         <expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]  
**FETCh**<Measurement>:**ARRay**[:**POWER**][:**AVG**]:**RELative**? <buffered\_size>[,  
                         <expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]  
**READ**<Measurement>:**ARRay**[:**POWER**][:**AVG**]:**RELative**? <buffered\_size>[,  
                         <expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]  
**MEASure**<Measurement>:**ARRay**[:**POWER**][:**AVG**]:**RELative**? <buffered\_size>[,  
                         <expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

Relative power measured by one power sensor with buffering.

**Suffix:**

<Measurement>      1 to 8  
Measurement

**Query parameters:**

<buffered\_size>      <expr>  
  
<expected\_value\_or\_source\_list>  
                         <numeric> | <expr>  
  
<resolution\_or\_source\_list>  
                         <numeric> | <expr>  
  
<source\_list>        <expr>

For the parameter descriptions, see ["Parameter list"](#) on page 194.

**Usage:**              Query only

**CONFigure**<Measurement>:**ARRay**[:**POWER**][:**AVG**]:**RLOSs**? <buffered\_size>[,  
                         <expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]  
**FETCh**<Measurement>:**ARRay**[:**POWER**][:**AVG**]:**RLOSs**? <buffered\_size>[,  
                         <expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

**READ<Measurement>:ARRay[:POWer][:AVG]:RLOSs?** <buffered\_size>[,  
 <expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

**MEASure<Measurement>:ARRay[:POWer][:AVG]:RLOSs?** <buffered\_size>[,  
 <expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

Return loss/transmission loss of a DUT, measured by two power sensors with buffering.

**Suffix:**

<Measurement>      1 to 8  
 Measurement

**Query parameters:**

<buffered\_size>      <expr>  
 <expected\_value\_or\_source\_list>  
                          <numeric> | <expr>  
 <resolution\_or\_source\_list>  
                          <numeric> | <expr>  
 <source\_list>        <expr>

For the parameter descriptions, see "[Parameter list](#)" on page 194.

**Usage:**            Query only

**CONFigure<Measurement>:ARRay[:POWer][:AVG]:SUM?** <buffered\_size>[,  
 <expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

**FETCh<Measurement>:ARRay[:POWer][:AVG]:SUM?** <buffered\_size>[,  
 <expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

**READ<Measurement>:ARRay[:POWer][:AVG]:SUM?** <buffered\_size>[,  
 <expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

**MEASure<Measurement>:ARRay[:POWer][:AVG]:SUM?** <buffered\_size>[,  
 <expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

Sum of the values measured by two power sensors with buffering.

**Suffix:**

<Measurement>      1 to 8  
 Measurement

**Query parameters:**

<buffered\_size>      <expr>  
 <expected\_value\_or\_source\_list>  
                          <numeric> | <expr>  
 <resolution\_or\_source\_list>  
                          <numeric> | <expr>  
 <source\_list>        <expr>

For the parameter descriptions, see "[Parameter list](#)" on page 194.

**Usage:**            Query only

**CONFigure<Measurement>:ARRay[:POWer][:AVG]:SUM:RELative?**

<buffered\_size>[, <expected\_value\_or\_source\_list>,  
<resolution\_or\_source\_list>, <source\_list>...]

**FETCh<Measurement>:ARRay[:POWer][:AVG]:SUM:RELative? <buffered\_size>[,**

<expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

**READ<Measurement>:ARRay[:POWer][:AVG]:SUM:RELative? <buffered\_size>[,**

<expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

**MEASure<Measurement>:ARRay[:POWer][:AVG]:SUM:RELative?**

<buffered\_size>[, <expected\_value\_or\_source\_list>,  
<resolution\_or\_source\_list>, <source\_list>...]

Relative sum measured by two power sensors with buffering.

**Suffix:**

<Measurement>      1 to 8  
                         Measurement

**Query parameters:**

<buffered\_size>      <expr>

<expected\_value\_or\_source\_list>  
                         <numeric> | <expr>

<resolution\_or\_source\_list>  
                         <numeric> | <expr>

<source\_list>        <expr>

For the parameter descriptions, see "[Parameter list](#)"  
on page 194.

**Usage:**              Query only

**CONFigure<Measurement>:ARRay[:POWer][:AVG]:SWR? <buffered\_size>[,**

<expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

**FETCh<Measurement>:ARRay[:POWer][:AVG]:SWR? <buffered\_size>[,**

<expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

**READ<Measurement>:ARRay[:POWer][:AVG]:SWR? <buffered\_size>[,**

<expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

**MEASure<Measurement>:ARRay[:POWer][:AVG]:SWR? <buffered\_size>[,**

<expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

Standing wave ratio measurement of two power sensors with buffering.

**Suffix:**

<Measurement>      1 to 8  
                         Measurement

**Query parameters:**

<buffered\_size>      <expr>

<expected\_value\_or\_source\_list>  
                         <numeric> | <expr>

<resolution\_or\_source\_list>  
                         <numeric> | <expr>



<source\_list>            <expr>  
 For the parameter descriptions, see ["Parameter list"](#)  
 on page 194.

**Usage:**                    Query only

### 14.4.3 Trace Measurements

Further commands to configure this measurement are describes in [Chapter 14.6.7, "Trace"](#), on page 275.

Further information about the measurement:

- [Chapter 7.3, "Trace"](#), on page 75

#### 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 456.
- <capture\_time>  
 Mandatory. Period within which measured data are captured in the trace measurements.  
 Corresponds to [\[SENSe<Sensor>:\] TRACe:TIME](#) on page 245.
- <source\_list>  
 Mandatory. Primary and secondary sensor. The number for each sensor is preceded by the character @. The entire expression is enclosed in parentheses.  
 Example: (@3),(@2)  
 Sensor C is the primary sensor, and sensor B is the secondary sensor.

---

**CONFigure<Measurement>:XTIME[:POWer]? <scope\_size>, <capture\_time>,  
 <source\_list>**

**FETCh<Measurement>:XTIME[:POWer]? <scope\_size>, <capture\_time>,  
 <source\_list>**

**READ<Measurement>:XTIME[:POWer]? <scope\_size>, <capture\_time>,  
 <source\_list>**

**MEASure<Measurement>:XTIME[:POWer]? <scope\_size>, <capture\_time>,  
 <source\_list>**

Used to measure power over time.

#### Suffix:

<Measurement>            1 to 8  
 Measurement

#### Query parameters:

<scope\_size>            <expr>  
 <capture\_time>            Default unit: s

<source\_list>            <expr>  
 For the parameter descriptions, see "[Parameter list](#)"  
 on page 201.

**Usage:**                    Query only

**CONFigure**<Measurement>:XTIME[:POWER]:NONE <scope\_size>, <capture\_time>,  
 <source\_list>

Disables trace 2. In contrast, trace 1 is always active.

**Suffix:**

<Measurement>            1 to 8  
 Measurement

**Setting parameters:**

<scope\_size>            <expr>

<capture\_time>            Default unit: s

<source\_list>            <expr>  
 For the parameter descriptions, see "[Parameter list](#)"  
 on page 201.

**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.

**Suffix:**

<Measurement>            1 to 8  
 Measurement

**Query parameters:**

<scope\_size>            <expr>

<capture\_time>            Default unit: s

<source\_list>            <expr>  
 For the parameter descriptions, see "[Parameter list](#)"  
 on page 201.

**Usage:**                    Query only

#### 14.4.4 Burst Average Measurements

Further information about the measurement:

- [Chapter 7.2, "Burst Average"](#), on page 73

##### Parameter list

For burst average measurements, 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? <dtolerance>, <start_exclude>,
  <end_exclude>[, <expected_value_or_source_list>,
  <resolution_or_source_list>, <source_list>...]
```

```
READ<Measurement>[:SCALar][:POWer]:BURSt? <dtolerance>, <start_exclude>,
  <end_exclude>[, <expected_value_or_source_list>,
  <resolution_or_source_list>, <source_list>...]
```

```
MEASure<Measurement>[:SCALar][:POWer]:BURSt? <dtolerance>,
  <start_exclude>, <end_exclude>[, <expected_value_or_source_list>,
  <resolution_or_source_list>, <source_list>...]
```

Power measured by one power sensor.

##### Suffix:

<code>&lt;Measurement&gt;</code>	1 to 8 Measurement
----------------------------------	-----------------------

**Query parameters:**

<dtolerance> Default unit: s

<start\_exclude> Default unit: s

<end\_exclude> Default unit: s

<expected\_value\_or\_source\_list>  
<numeric> | <expr>

<resolution\_or\_source\_list>  
<numeric> | <expr>

<source\_list> <expr>

For the parameter descriptions, see ["Parameter list"](#) on page 203.

**Usage:** Query only

**CONF**igure<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>...]

**MEAS**ure<Measurement>[:SCALar][:POWER]:BURSt:RELative? <dtolerance>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

Relative power measured by one power sensors.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Query parameters:**

<dtolerance> Default unit: s

<start\_exclude> Default unit: s

<end\_exclude> Default unit: s

<expected\_value\_or\_source\_list>  
<numeric> | <expr>

<resolution\_or\_source\_list>  
<numeric> | <expr>

<source\_list> <expr>

For the parameter descriptions, see ["Parameter list"](#) on page 203.

**Usage:** Query only

---

**CONFigure**<Measurement>[:SCALar][:POWer]:BURSt:DIFFerence? <dtolerance>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

**FETCh**<Measurement>[:SCALar][:POWer]:BURSt:DIFFerence? <dtolerance>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

**READ**<Measurement>[:SCALar][:POWer]:BURSt:DIFFerence? <dtolerance>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

**MEASure**<Measurement>[:SCALar][:POWer]:BURSt:DIFFerence? <dtolerance>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

Difference measured by two power sensors.

**Suffix:**

<Measurement>      1 to 8  
Measurement

**Query parameters:**

<dtolerance>      Default unit: s

<start\_exclude>    Default unit: s

<end\_exclude>      Default unit: s

<expected\_value\_or\_source\_list>  
                      <numeric> | <expr>

<resolution\_or\_source\_list>  
                      <numeric> | <expr>

<source\_list>      <expr>

For the parameter descriptions, see "[Parameter list](#)" on page 203.

**Usage:**            Query only

---

**CONFigure**<Measurement>[:SCALar][:POWer]:BURSt:DIFFerence:RELative? <dtolerance>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

**FETCh**<Measurement>[:SCALar][:POWer]:BURSt:DIFFerence:RELative? <dtolerance>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

**READ**<Measurement>[:SCALar][:POWer]:BURSt:DIFFerence:RELative? <dtolerance>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

**MEASure**<Measurement>[:SCALar][:POWer]:BURSt:DIFFerence:RELative? <dtolerance>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

Relative difference measured by two power sensors.

**Suffix:**

<Measurement>      1 to 8  
Measurement

**Query parameters:**

<dtolerance>          Default unit: s

<start\_exclude>      Default unit: s

<end\_exclude>        Default unit: s

<expected\_value\_or\_source\_list>  
                          <numeric> | <expr>

<resolution\_or\_source\_list>  
                          <numeric> | <expr>

<source\_list>         <expr>

For the parameter descriptions, see "[Parameter list](#)"  
on page 203.

**Usage:**              Query only

**CONF**igure<Measurement>[:**SCAL**ar][:**POW**er]:**BUR**St:**SUM**? <dtolerance>,  
          <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>,  
          <resolution\_or\_source\_list>, <source\_list>...]

**FET**Ch<Measurement>[:**SCAL**ar][:**POW**er]:**BUR**St:**SUM**? <dtolerance>,  
          <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>,  
          <resolution\_or\_source\_list>, <source\_list>...]

**REA**D<Measurement>[:**SCAL**ar][:**POW**er]:**BUR**St:**SUM**? <dtolerance>,  
          <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>,  
          <resolution\_or\_source\_list>, <source\_list>...]

**MEAS**ure<Measurement>[:**SCAL**ar][:**POW**er]:**BUR**St:**SUM**? <dtolerance>,  
          <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>,  
          <resolution\_or\_source\_list>, <source\_list>...]

Sum measured by two power sensors.

**Suffix:**

<Measurement>      1 to 8  
Measurement

**Query parameters:**

<dtolerance>          Default unit: s

<start\_exclude>      Default unit: s

<end\_exclude>        Default unit: s

<expected\_value\_or\_source\_list>  
                          <numeric> | <expr>

<resolution\_or\_source\_list>  
                          <numeric> | <expr>

<source\_list>            <expr>  
 For the parameter descriptions, see "[Parameter list](#)"  
 on page 203.

**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>...]

Sum measured by two power sensors.

**Suffix:**

<Measurement>        1 to 8  
 Measurement

**Query parameters:**

<dtolerance>        Default unit: s

<start\_exclude>     Default unit: s

<end\_exclude>        Default unit: s

<expected\_value\_or\_source\_list>  
 <numeric> | <expr>

<resolution\_or\_source\_list>  
 <numeric> | <expr>

<source\_list>        <expr>  
 For the parameter descriptions, see "[Parameter list](#)"  
 on page 203.

**Usage:**                Query only

**CONFigure<Measurement>[:SCALar][:POWer]:BURSt:RATio?** <dtolerance>,  
 <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>,  
 <resolution\_or\_source\_list>, <source\_list>...]

**FETCh<Measurement>[:SCALar][:POWer]:BURSt:RATio?** <dtolerance>,  
 <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>,  
 <resolution\_or\_source\_list>, <source\_list>...]

**READ<Measurement>[:SCALar][:POWer]:BURSt:RATio?** <dtolerance>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

**MEASure<Measurement>[:SCALar][:POWer]:BURSt:RATio?** <dtolerance>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

Ratio measured by two power sensors.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Query parameters:**

<dtolerance> Default unit: s

<start\_exclude> Default unit: s

<end\_exclude> Default unit: s

<expected\_value\_or\_source\_list>  
<numeric> | <expr>

<resolution\_or\_source\_list>  
<numeric> | <expr>

<source\_list> <expr>

For the parameter descriptions, see ["Parameter list"](#) on page 203.

**Usage:** Query only

**CONFigure<Measurement>[:SCALar][:POWer]:BURSt:RATio:RELative?** <dtolerance>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

**FETCh<Measurement>[:SCALar][:POWer]:BURSt:RATio:RELative?** <dtolerance>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

**READ<Measurement>[:SCALar][:POWer]:BURSt:RATio:RELative?** <dtolerance>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

**MEASure<Measurement>[:SCALar][:POWer]:BURSt:RATio:RELative?** <dtolerance>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

Relative ratio measured by two power sensors.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Query parameters:**

<dtolerance> Default unit: s

<start\_exclude> Default unit: s



<end\_exclude>      Default unit: s

<expected\_value\_or\_source\_list>  
                         <numeric> | <expr>

<resolution\_or\_source\_list>  
                         <numeric> | <expr>

<source\_list>            <expr>

For the parameter descriptions, see "[Parameter list](#)" on page 203.

**Usage:**                Query only

**CONFigure**<Measurement>[:**SCALar**][:**POWer**]:**BURSt:SWR?** <dtolerance>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

**FETCh**<Measurement>[:**SCALar**][:**POWer**]:**BURSt:SWR?** <dtolerance>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

**READ**<Measurement>[:**SCALar**][:**POWer**]:**BURSt:SWR?** <dtolerance>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

**MEASure**<Measurement>[:**SCALar**][:**POWer**]:**BURSt:SWR?** <dtolerance>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

Standing wave ratio, measured by two power sensors.

**Suffix:**

<Measurement>      1 to 8  
                         Measurement

**Query parameters:**

<dtolerance>            Default unit: s

<start\_exclude>        Default unit: s

<end\_exclude>          Default unit: s

<expected\_value\_or\_source\_list>  
                         <numeric> | <expr>

<resolution\_or\_source\_list>  
                         <numeric> | <expr>

<source\_list>            <expr>

For the parameter descriptions, see "[Parameter list](#)" on page 203.

**Usage:**                Query only

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**CONFigure**<Measurement>[:SCALar][:POWer]:BURSt:REFLection? <dtolerance>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

**FETCh**<Measurement>[:SCALar][:POWer]:BURSt:REFLection? <dtolerance>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

**READ**<Measurement>[:SCALar][:POWer]:BURSt:REFLection? <dtolerance>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

**MEASure**<Measurement>[:SCALar][:POWer]:BURSt:REFLection? <dtolerance>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

Reflection coefficient/transmission factor of a DUT, measured by two power sensors.

**Suffix:**

<Measurement>      1 to 8  
Measurement

**Query parameters:**

<dtolerance>      Default unit: s

<start\_exclude>    Default unit: s

<end\_exclude>      Default unit: s

<expected\_value\_or\_source\_list>  
                      <numeric> | <expr>

<resolution\_or\_source\_list>  
                      <numeric> | <expr>

<source\_list>      <expr>

For the parameter descriptions, see "[Parameter list](#)" on page 203.

**Usage:**            Query only

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**CONFigure**<Measurement>[:SCALar][:POWer]:BURSt:RLOSs? <dtolerance>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

**FETCh**<Measurement>[:SCALar][:POWer]:BURSt:RLOSs? <dtolerance>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

**READ**<Measurement>[:SCALar][:POWer]:BURSt:RLOSs? <dtolerance>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

**MEASure**<Measurement>[:SCALar][:POWer]:BURSt:RLOSs? <dtolerance>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

Return loss/transmission loss of a DUT, measured by two power sensors.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Query parameters:**

<dtolerance> Default unit: s

<start\_exclude> Default unit: s

<end\_exclude> Default unit: s

<expected\_value\_or\_source\_list>  
<numeric> | <expr>

<resolution\_or\_source\_list>  
<numeric> | <expr>

<source\_list> <expr>

For the parameter descriptions, see "[Parameter list](#)" on page 203.

**Usage:** Query only

### 14.4.5 Timeslot Measurements

Further commands to configure this measurement are describes in [Chapter 14.6.10, "Timeslot"](#), on page 302.

Further information about the measurement:

- [Chapter 7.6, "Timeslot"](#), on page 94

**Parameter list**

For timeslot measurements, the following parameters are used.

- <tslot\_width>  
Mandatory. Width of a timeslot.  
Corresponds to `[SENSe<Sensor>:] [POWer:] TSLot[:AVG]:WIDTH` on page 441.
- <no\_slots>  
Mandatory. Number of timeslots to be measured.  
Corresponds to `[SENSe<Sensor>:] [POWer:] TSLot[:AVG]:COUNT` on page 440.
- <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>`...]

Power measured by one power sensor.

**Suffix:**

`<Measurement>`      1 to 8  
Measurement

**Query parameters:**

`<tslot_width>`      Default unit: s  
`<no_slots>`      Default unit: s  
`<start_exclude>`      Default unit: s  
`<end_exclude>`      Default unit: s  
`<expected_value_or_source_list>`  
                          `<numeric>` | `<expr>`  
`<resolution_or_source_list>`  
                          `<numeric>` | `<expr>`  
`<source_list>`      `<expr>`

For the parameter descriptions, see "[Parameter list](#)" on page 211.

**Usage:**      Query only

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**CONFigure**<Measurement>[:SCALar][:POWer]:TSLot:RELative? <tslot\_width>, <no\_slots>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]  
**FETCh**<Measurement>[:SCALar][:POWer]:TSLot:RELative? <tslot\_width>, <no\_slots>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]  
**READ**<Measurement>[:SCALar][:POWer]:TSLot:RELative? <tslot\_width>, <no\_slots>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]  
**MEASure**<Measurement>[:SCALar][:POWer]:TSLot:RELative? <tslot\_width>, <no\_slots>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

Relative power measured by one power sensor.

**Suffix:**

<Measurement>      1 to 8  
                          Measurement

**Query parameters:**

<tslot\_width>      Default unit: s  
 <no\_slots>         Default unit: s  
 <start\_exclude>    Default unit: s  
 <end\_exclude>      Default unit: s  
 <expected\_value\_or\_source\_list>  
                          <numeric> | <expr>  
 <resolution\_or\_source\_list>  
                          <numeric> | <expr>  
 <source\_list>       <expr>

For the parameter descriptions, see "[Parameter list](#)" on page 211.

**Usage:**            Query only

---

**CONFigure**<Measurement>[:SCALar][:POWer]:TSLot:DIFFerence? <tslot\_width>, <no\_slots>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]  
**FETCh**<Measurement>[:SCALar][:POWer]:TSLot:DIFFerence? <tslot\_width>, <no\_slots>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]  
**READ**<Measurement>[:SCALar][:POWer]:TSLot:DIFFerence? <tslot\_width>, <no\_slots>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]  
**MEASure**<Measurement>[:SCALar][:POWer]:TSLot:DIFFerence? <tslot\_width>, <no\_slots>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

Power measured by two power sensors.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Query parameters:**

<tslot\_width> Default unit: s  
<no\_slots> Default unit: s  
<start\_exclude> Default unit: s  
<end\_exclude> Default unit: s  
<expected\_value\_or\_source\_list>  
<numeric> | <expr>  
<resolution\_or\_source\_list>  
<numeric> | <expr>  
<source\_list> <expr>

For the parameter descriptions, see ["Parameter list"](#) on page 211.

**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>...]

Relative difference measured by two power sensors.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Query parameters:**

<tslot\_width> Default unit: s  
<no\_slots> Default unit: s  
<start\_exclude> Default unit: s  
<end\_exclude> Default unit: s  
<expected\_value\_or\_source\_list>  
<numeric> | <expr>

<resolution\_or\_source\_list>  
<numeric> | <expr>

<source\_list> <expr>

For the parameter descriptions, see "Parameter list" on page 211.

**Usage:** Query only

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**CONFigure**<Measurement>[:SCALar][:POWer]:TSLot:SUM? <tslot\_width>, <no\_slots>, <start\_exclude>, <end\_exclude>[,

<expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

**FETCh**<Measurement>[:SCALar][:POWer]:TSLot:SUM? <tslot\_width>, <no\_slots>[,

<start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>[,

<resolution\_or\_source\_list>, <source\_list>...]

**READ**<Measurement>[:SCALar][:POWer]:TSLot:SUM? <tslot\_width>, <no\_slots>[,

<start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>[,

<resolution\_or\_source\_list>, <source\_list>...]

**MEASure**<Measurement>[:SCALar][:POWer]:TSLot:SUM? <tslot\_width>, <no\_slots>[,

<start\_exclude>, <end\_exclude>[,

<expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

Sum measured by two power sensors.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Query parameters:**

<tslot\_width> Default unit: s

<no\_slots> Default unit: s

<start\_exclude> Default unit: s

<end\_exclude> Default unit: s

<expected\_value\_or\_source\_list>  
<numeric> | <expr>

<resolution\_or\_source\_list>  
<numeric> | <expr>

<source\_list> <expr>

For the parameter descriptions, see "Parameter list" on page 211.

**Usage:** Query only

**CONFigure<Measurement>[:SCALar][:POWER]:TSLot:SUM:RELative?**

<tslot\_width>, <no\_slots>, <start\_exclude>, <end\_exclude>[,  
<expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

**FETCh<Measurement>[:SCALar][:POWER]:TSLot:SUM:RELative? <tslot\_width>**,

<no\_slots>, <start\_exclude>, <end\_exclude>[,  
<expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

**READ<Measurement>[:SCALar][:POWER]:TSLot:SUM:RELative? <tslot\_width>**,

<no\_slots>, <start\_exclude>, <end\_exclude>[,  
<expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

**MEASure<Measurement>[:SCALar][:POWER]:TSLot:SUM:RELative? <tslot\_width>**,

<no\_slots>, <start\_exclude>, <end\_exclude>[,  
<expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

Relative sum measured by two power sensors.

**Suffix:**

<Measurement>      1 to 8  
                         Measurement

**Query parameters:**

<tslot\_width>      Default unit: s

<no\_slots>      Default unit: s

<start\_exclude>      Default unit: s

<end\_exclude>      Default unit: s

<expected\_value\_or\_source\_list>  
                         <numeric> | <expr>

<resolution\_or\_source\_list>  
                         <numeric> | <expr>

<source\_list>      <expr>

For the parameter descriptions, see "[Parameter list](#)"  
on page 211.

**Usage:**      Query only

**CONFigure<Measurement>[:SCALar][:POWER]:TSLot:RATio? <tslot\_width>**,

<no\_slots>, <start\_exclude>, <end\_exclude>[,  
<expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

**FETCh<Measurement>[:SCALar][:POWER]:TSLot:RATio? <tslot\_width>**,

<no\_slots>, <start\_exclude>, <end\_exclude>[,  
<expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

**READ<Measurement>[:SCALar][:POWER]:TSLot:RATio? <tslot\_width>**, <no\_slots>

<start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>,  
<resolution\_or\_source\_list>, <source\_list>...]

**MEASure<Measurement>[:SCALar][:POWER]:TSLot:RATio? <tslot\_width>**,

<no\_slots>, <start\_exclude>, <end\_exclude>[,  
<expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

Ratio measured by two power sensors.



**Suffix:**

<Measurement> 1 to 8  
Measurement

**Query parameters:**

<tslot\_width> Default unit: s  
<no\_slots> Default unit: s  
<start\_exclude> Default unit: s  
<end\_exclude> Default unit: s  
<expected\_value\_or\_source\_list>  
<numeric> | <expr>

<resolution\_or\_source\_list>  
<numeric> | <expr>

<source\_list> <expr>

For the parameter descriptions, see ["Parameter list"](#) on page 211.

**Usage:** Query only

**CONFigure<Measurement>[:SCALar][:POWer]:TSLot:RATio:RELative?**

<tslot\_width>, <no\_slots>, <start\_exclude>, <end\_exclude>[,  
<expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

**FETCh<Measurement>[:SCALar][:POWer]:TSLot:RATio:RELative?** <tslot\_width>,  
<no\_slots>, <start\_exclude>, <end\_exclude>[,  
<expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

**READ<Measurement>[:SCALar][:POWer]:TSLot:RATio:RELative?** <tslot\_width>,  
<no\_slots>, <start\_exclude>, <end\_exclude>[,  
<expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

**MEASure<Measurement>[:SCALar][:POWer]:TSLot:RATio:RELative?**  
<tslot\_width>, <no\_slots>, <start\_exclude>, <end\_exclude>[,  
<expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

Relative ratio measured by two power sensors.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Query parameters:**

<tslot\_width> Default unit: s  
<no\_slots> Default unit: s  
<start\_exclude> Default unit: s  
<end\_exclude> Default unit: s  
<expected\_value\_or\_source\_list>  
<numeric> | <expr>

<resolution\_or\_source\_list>  
                                   <numeric> | <expr>

<source\_list>                  <expr>

For the parameter descriptions, see ["Parameter list"](#)  
 on page 211.

**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>...]

Standing wave ratio measured by two power sensors.

**Suffix:**

<Measurement>                  1 to 8  
                                   Measurement

**Query parameters:**

<tslot\_width>                  Default unit: s

<no\_slots>                      Default unit: s

<start\_exclude>                Default unit: s

<end\_exclude>                  Default unit: s

<expected\_value\_or\_source\_list>  
                                   <numeric> | <expr>

<resolution\_or\_source\_list>  
                                   <numeric> | <expr>

<source\_list>                  <expr>

For the parameter descriptions, see ["Parameter list"](#)  
 on page 211.

**Usage:**                      Query only

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**CONFigure**<Measurement>[:SCALar][:POWer]:TSLot:REFLection? <tslot\_width>, <no\_slots>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]  
**FETCh**<Measurement>[:SCALar][:POWer]:TSLot:REFLection? <tslot\_width>, <no\_slots>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]  
**READ**<Measurement>[:SCALar][:POWer]:TSLot:REFLection? <tslot\_width>, <no\_slots>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]  
**MEASure**<Measurement>[:SCALar][:POWer]:TSLot:REFLection? <tslot\_width>, <no\_slots>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

Reflection coefficient/transmission factor of a DUT, measured by two power sensors.

**Suffix:**

<Measurement>      1 to 8  
                          Measurement

**Query parameters:**

<tslot\_width>      Default unit: s

<no\_slots>      Default unit: s

<start\_exclude>      Default unit: s

<end\_exclude>      Default unit: s

<expected\_value\_or\_source\_list>  
                          <numeric> | <expr>

<resolution\_or\_source\_list>  
                          <numeric> | <expr>

<source\_list>      <expr>

For the parameter descriptions, see "[Parameter list](#)" on page 211.

**Usage:**      Query only

---

**CONFigure**<Measurement>[:SCALar][:POWer]:TSLot:RLOSs? <tslot\_width>, <no\_slots>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]  
**FETCh**<Measurement>[:SCALar][:POWer]:TSLot:RLOSs? <tslot\_width>, <no\_slots>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]  
**READ**<Measurement>[:SCALar][:POWer]:TSLot:RLOSs? <tslot\_width>, <no\_slots>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]  
**MEASure**<Measurement>[:SCALar][:POWer]:TSLot:RLOSs? <tslot\_width>, <no\_slots>, <start\_exclude>, <end\_exclude>[, <expected\_value\_or\_source\_list>, <resolution\_or\_source\_list>, <source\_list>...]

Return loss/transmission loss of a DUT, measured by two power sensors.

**Suffix:**

<Measurement>      1 to 8  
Measurement

**Query parameters:**

<tslot\_width>      Default unit: s  
<no\_slots>      Default unit: s  
<start\_exclude>      Default unit: s  
<end\_exclude>      Default unit: s  
<expected\_value\_or\_source\_list>  
                          <numeric> | <expr>

<resolution\_or\_source\_list>  
                          <numeric> | <expr>

<source\_list>      <expr>

For the parameter descriptions, see ["Parameter list"](#) on page 211.

**Usage:**      Query only

#### 14.4.6 Statistics Measurements

Further commands to configure this measurement are describes in [Chapter 14.6.11, "Statistics"](#), on page 305.

Further information about the measurement:

- [Chapter 7.7, "Statistics"](#), on page 100

##### 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 446.
- <capture\_time>  
Mandatory. Time interval during which the power for the statistical evaluation is measured.  
Corresponds to [\[SENSe<Sensor>:\]STATistics:TIME](#) on page 447
- <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).

**Suffix:**

<Measurement>      1 to 8  
                         Measurement

**Query parameters:**

<statistics\_size>    <expr>

<capture\_time>      Default unit: s

<source\_list>        <expr>

For the parameter descriptions, see "[Parameter list](#)" on page 220.

**Usage:**             Query only

---

**CONFigure**<Measurement>:STATistics:PDF? <statistics\_size>, <capture\_time>, <source\_list>

**FETCh**<Measurement>:STATistics:PDF? <statistics\_size>, <capture\_time>, <source\_list>

**READ**<Measurement>:STATistics:PDF? <statistics\_size>, <capture\_time>, <source\_list>

**MEASure**<Measurement>:STATistics:PDF? <statistics\_size>, <capture\_time>, <source\_list>

Measures the power in the defined time interval and performs a statistic evaluation (complementary cumulative distribution function, CCDF).

**Suffix:**

<Measurement>      1 to 8  
                         Measurement

**Query parameters:**

<statistics\_size>    <expr>

<capture\_time>      Default unit: s

<source\_list>        <expr>

For the parameter descriptions, see "[Parameter list](#)" on page 220.

**Usage:**             Query only

## 14.5 Starting and Ending a Measurement

In a basic scenario, the measurement is started immediately after the measurement mode is enabled.

If you want to start the measurement only if a specific condition is fulfilled, define a trigger.

Further information:

- [Chapter 6.3, "Triggering"](#), on page 60
- [Chapter 14.6.2, "Configuring the Trigger"](#), on page 258

<a href="#">ABORt&lt;Measurement&gt;</a> .....	222
<a href="#">ABORt&lt;undef&gt;:ALL</a> .....	222
<a href="#">INITiate&lt;Measurement&gt;:CONTInuous</a> .....	223
<a href="#">INITiate&lt;Undef&gt;:ALL:CONTInuous</a> .....	223
<a href="#">INITiate&lt;Measurement&gt;:DISable</a> .....	223
<a href="#">INITiate&lt;Undef&gt;:ALL:DISable</a> .....	224
<a href="#">INITiate&lt;Measurement&gt;[:IMMediate]</a> .....	224
<a href="#">INITiate&lt;Undef&gt;:ALL[:IMMediate]</a> .....	225

---

### 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 8  
Measurement

**Usage:**              Event

---

### ABORt<undef>:ALL

Applies to all connected power sensors. See [ABORt<Measurement>](#) on page 222.

#### 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 8  
Measurement

**Parameters:**

<state>              If you use `SYSTem:PRESet` instead of `*RST`, the RST value differs. See [Table 14-16](#).

**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 223.

**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 8  
 Measurement

**Parameters:**  
 <state> \*RST: 0

#### **INITiate<Undef>:ALL:DISable <state>**

Applies to all connected power sensors. See [INITiate<Measurement>:DISable](#) on page 223.

**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 using [INITiate<Measurement>:CONTinuous OFF](#).

The command is not fully R&S NRP2 compatible. If port 1 is assigned to measurement 1 and so on, the command works. If port 1 is assigned to measurement 2, for example, enable the R&S NRP2 emulation using [SYSTEM:LANGuage "NRP2"](#).

**Suffix:**  
 <Measurement> 1 to 8  
 Measurement

**Example:** If you work in a master/slave setup, you need to trigger the slave before triggering the master. To prevent overlapping execution, use \*WAI, see also [Chapter 15.3, "Command Sequence and Synchronization"](#), on page 468. In this example, sensor 2 is the slave, sensor 1 is the master:

```
INIT2
*WAI
INIT1
```

**Usage:** Event



**INITiate<Undef>:ALL[:IMMEDIATE]**

Applies to all connected power sensors. See [INITiate<Measurement>\[:IMMEDIATE\]](#) on page 224.

**Suffix:**

<Undef>                    1 to n  
                                   No suffix required.

**Usage:**

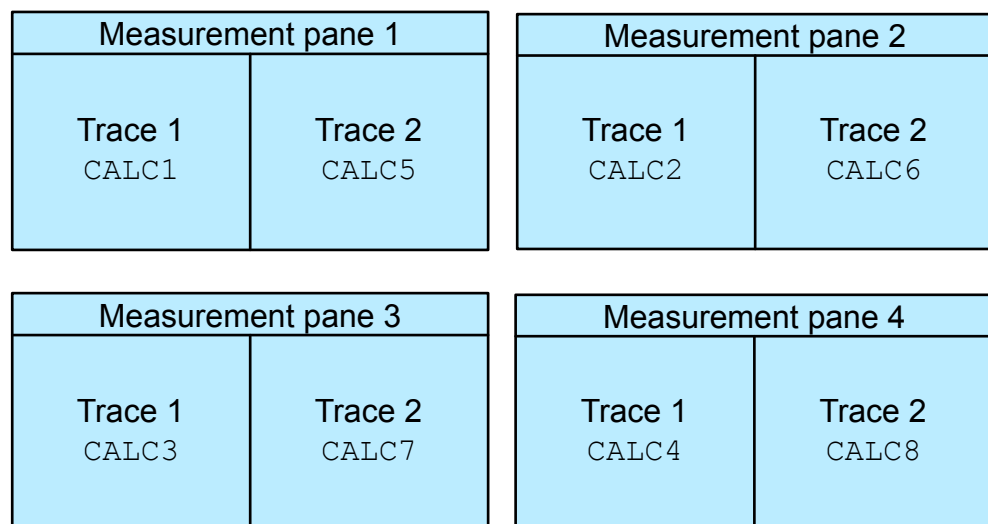
Event

## 14.6 Measurement Settings and Results

The R&S NRX supports up to 4 measurement channels. The trace, pulse analysis, statistics measurements support 2 traces. Thus, each measurement channel has 2 separate measurements, adding up to 8 different measurement results that are configured using the commands of the `CALCulate<Measurement>` subsystem.

*Table 14-1: Assigned measurement panes and traces*

Measurement suffix	Assigned measurement panes	Assigned traces
<code>CALCulate&lt;Measurement&gt;</code>	<code>WINDow&lt;Window&gt;</code>	
<code>CALC1 to CALC4</code>	<code>WIND1 to WIND4</code>	1
<code>CALC5 to CALC8</code>	<code>WIND1 to WIND4</code>	2



For each measurement, you can define two sensor configurations in parallel, a primary and a secondary sensor configuration.

Further information:

- [Chapter 5.1, "Parallel Measurements"](#), on page 44
- [Chapter 14.7, "Calculation Functions"](#), on page 323

## 14.6.1 Configuring Display and Results

Further information:

- [Chapter 6.1, "Display Settings"](#), on page 50

### 14.6.1.1 General Settings

CALCulate<Measurement>:AVALue.....	226
CALCulate<Measurement>:DMODE.....	226
CALCulate<Measurement>:EXTRemes:RESet.....	227
CALCulate<Measurement>:HOLD:FUNction.....	227
CALCulate<Measurement>:HOLD[:STATe].....	228
CALCulate<Measurement>:LIMit<undef>:TYPE.....	228
CALCulate<Measurement>:LIMit<undef>[:STATe].....	228
CALCulate<Measurement>:RESolution.....	229
DISPlay:BRIGthness.....	229
DISPlay:ERRorlist.....	229
DISPlay:LAYout.....	230
DISPlay:MESSage:TEXT:CLEar.....	230
DISPlay:MESSage:TEXT[:DATA].....	230
DISPlay:MESSage:TYPE.....	230
DISPlay:MESSage[:STATe].....	230
DISPlay:OVERload[:STATe].....	231
DISPlay:PIXMap?.....	231
DISPlay:UPDate.....	231
DISPlay[:WINDow<Window>][:STATe].....	231
DISPlay[:WINDow<Window>]:POSition.....	232
SYSTem:SPEed.....	232

---

#### CALCulate<Measurement>:AVALue <value>

Determines which additional information about the measured values is shown in the display.

##### Suffix:

<Measurement>      1 to 8  
Measurement

##### Parameters:

<value>              NONE | EXTRemes | STATistics  
\*RST:                NONE

**Manual operation:** See "[Auxiliary Values](#)" on page 52

---

#### CALCulate<Measurement>:DMODE <mode>

Specifies the display format of the measured values.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Parameters:**

<mode> SDIGital | SANalog | GRAPhical | MARKer | GRID | INFO | STATistics | TABLe

**SDIGital | SANalog**

For continuous average, burst average, NRT measurements  
Numeric format without/with bar chart

**SDIGital | SANalog | GRAPhical**

For time gate, timeslot measurements  
Numeric format without/with bar chart or measured values plotted over time

**MARKer | GRID | INFO**

For trace measurements  
Shows or hides additional information below the graph.

**STATistics | TABLe**

For statistics measurements  
Waveform or tabular format

\*RST: SDIGital

**Manual operation:** See ["Display Format"](#) on page 52  
See ["Info / Marker"](#) on page 76  
See ["Graph / Table"](#) on page 102

**CALCulate<Measurement>:EXTRemes:RESet**

Saves the currently measured value as the new minimum and maximum values.

You can query the minimum and maximum values using:

- [CALCulate<Measurement>:MAXimum:DATA?](#)
- [CALCulate<Measurement>:MINimum:DATA?](#)

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Usage:** Event

**CALCulate<Measurement>:HOLD:FUNCTION <function>**

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

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

Alias: [CALCulate<Measurement>:LIMit<undef>:TYPE](#)

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Parameters:**

<function> MAX | MIN | DIFFerence  
**MAXimum**  
Maximum value  
**MINimum**  
Minimum value  
**DIFFerence**  
Difference between maximum and minimum value  
 \*RST: MAX

**Manual operation:** See ["Max Hold Function"](#) on page 57

**CALCulate<Measurement>:HOLD[:STATe] <state>**

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

Alias: [CALCulate<Measurement>:LIMit<undef>\[:STATe\]](#)

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Parameters:**

<state> OFF | ON | RESet  
 \*RST: OFF

**Manual operation:** See ["Max Hold"](#) on page 56

**CALCulate<Measurement>:LIMit<undef>:TYPE <type>**

Alias for [CALCulate<Measurement>:HOLD:FUNctIon](#) on page 227.

**Suffix:**

<Measurement> 1 to 8  
Measurement  
 <undef> 1 to n  
No suffix required.

**Parameters:**

<type> MAX | MIN | DIFFerence  
 \*RST: MAX

**CALCulate<Measurement>:LIMit<undef>[:STATe] <state>**

Alias for [CALCulate<Measurement>:HOLD\[:STATe\]](#).

**Suffix:**

<Measurement> 1 to 8  
Measurement

<undef> 1 to n  
No suffix required.

**Parameters:**

<state> OFF | ON  
\*RST: OFF

**CALCulate<Measurement>:RESolution <resolution>**

Configures the resolution of the measurement.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Parameters:**

<resolution> I | OI | OOI | OOOI  
**I**  
No decimal places, e.g. 1 dBm  
**OI**  
1 decimal place, e.g. 0.1 dBm  
**OOI**  
2 decimal places, e.g. 0.01 dBm  
**OOOI**  
3 decimal places, e.g. 0.001 dBm  
\*RST: OOI

**Manual operation:** See "[Resolution](#)" on page 51

**DISPlay:BRIGhtness <brightness>**

Enables or disables the display backlight.

**Parameters:**

<brightness> Range: 0.0 to 1.0  
\*RST: 1.0

**DISPlay:ERRorlist <state>**

If enabled, displays a dialog containing the SCPI error queue. You can delete the queue using [SYSTem:ERRor:ALL?](#).

pressing the [DEL] key.

**Parameters:**

<state>

---

**DISPlay:LAYout** <layout>

Splits the measurement display into panes. A maximum number of 4 panes is possible, one for each measurement. See also [Chapter 4.1.5, "Selecting the Display Layout"](#), on page 36.

**Parameters:**

<layout>                    L1 | L2 | L3 | L4  
                               \*RST:        L1

---

**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  
                               String "\n" causes a line break. The max. number of lines depends on the message type: 9 lines for messages and 7 lines for queries.  
                               The length of a line depends on the characters used. Too long lines are cut off.

---

**DISPlay:MESSAge:TYPE** <type>

Sets the message type for the user-defined messages.

**Parameters:**

<type>                    QUERy | MESSAge

**QUERy**

The execution of remote control commands is blocked, until the dialog containing the query is closed.

**MESSAge**

Remote control command processing is immediately continued. Close the dialog containing the message by pressing [Esc] or using [DISPlay:MESSAge\[:STATe\]](#) OFF.

\*RST:                    MESSAge

---

**DISPlay:MESSAge[:STATe]** <state>

If enabled, displays a dialog containing a user-defined message.

Define the message text using [DISPlay:MESSAge:TEXT\[:DATA\]](#).

**Parameters:**

&lt;state&gt;

**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:**

&lt;state&gt;

OFF | ON | NEVer

\*RST: ON; but does not apply if NEVer is set.

**Manual operation:** See "[Hide Sensor Overload Message](#)" on page 168

**DISPlay:PIXMap?**

Queries the display content. The return value is a binary block data, for example:

#577110xxxxxxx...x

#577110 = block data header

xxxxxxx...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:**

&lt;mode&gt;

NORMal | SLOW | FREeze

`FREeze` is useful if discontinuities in the voltage progress at the analog outputs occur. In this state, the display does not consume CPU time.

\*RST: NORMal

**DISPlay[:WINDow<Window>][:STATe]** <state>

Opens or closes a measurement pane. This action also changes the total number of measurement panes set by `DISPlay:LAYout` and vice versa. See also [Chapter 4.1.5, "Selecting the Display Layout"](#), on page 36.

**Suffix:**

&lt;Window&gt;

1 to 4

Measurement pane

**Parameters:**

<state>                    OFF | ON

**DISPlay[:WINDow<Window>]:POSition <position>**

Swaps the position of measurement panes in the user interface. The numbering of the panes is not changed. See also [Chapter 4.1.6, "Swapping Measurement Panes"](#), on page 38.

**Suffix:**

<Window>                    1 to 4  
Measurement pane

**Parameters:**

<position>                    Range:     0 to 3  
                                  \*RST:     0

**SYSTem:SPEEd <mode>**

Changes the data processing speed.

**Parameters:**

<mode>                        NORMal | FAST | SLOW | FREeze

**FAST**

The display is switched off and the measured values are no longer displayed, since the continuous update of the screen content requires computation time.

\*RST:                        NORMal

**14.6.1.2 Scaling**

CALCulate<Measurement>:METer<DirectionalChannel>:LOWer[:DATA]:CCDF.....	233
CALCulate<Measurement>:METer<DirectionalChannel>:LOWer[:DATA]:RATio:RCoefficient.	233
CALCulate<Measurement>:METer<DirectionalChannel>:LOWer[:DATA]:RATio:RFRatio.....	234
CALCulate<Measurement>:METer<DirectionalChannel>:LOWer[:DATA]:RATio:RLOSs.....	234
CALCulate<Measurement>:METer<DirectionalChannel>:LOWer[:DATA]:RATio:SWR.....	235
CALCulate<Measurement>:METer<DirectionalChannel>:LOWer[:DATA]:RATio[:VALue].....	235
CALCulate<Measurement>:METer<DirectionalChannel>:LOWer[:DATA]:[POWER].....	235
CALCulate<Measurement>:METer<DirectionalChannel>:UPPer[:DATA]:CCDF.....	236
CALCulate<Measurement>:METer<DirectionalChannel>:UPPer[:DATA]:RATio:RCoefficient..	236
CALCulate<Measurement>:METer<DirectionalChannel>:UPPer[:DATA]:RATio:RFRatio.....	237
CALCulate<Measurement>:METer<DirectionalChannel>:UPPer[:DATA]:RATio:RLOSs.....	237
CALCulate<Measurement>:METer<DirectionalChannel>:UPPer[:DATA]:RATio:SWR.....	238
CALCulate<Measurement>:METer<DirectionalChannel>:UPPer[:DATA]:RATio[:VALue].....	238
CALCulate<Measurement>:METer<DirectionalChannel>:UPPer[:DATA]:[POWER].....	238
CALCulate<Measurement>:TRACe:X[:SCALe]:LEFT.....	239
CALCulate<Measurement>:TRACe:X[:SCALe]:LENGth.....	239
CALCulate<Measurement>:TRACe:Y[:SCALe]:SPAN:DB.....	239
CALCulate<Measurement>:TRACe:Y[:SCALe]:SPAN:DBM.....	240



CALCulate<Measurement>:TRACe:Y[:SCALe]:SPAN:DBUV.....	240
CALCulate<Measurement>:TRACe:Y[:SCALe]:SPAN:DPCT.....	240
CALCulate<Measurement>:TRACe:Y[:SCALe]:SPAN:ONE.....	241
CALCulate<Measurement>:TRACe:Y[:SCALe]:SPAN:WATT.....	241
CALCulate<Measurement>:TRACe:Y[:SCALe]:TOP:DB.....	241
CALCulate<Measurement>:TRACe:Y[:SCALe]:TOP:DBM.....	242
CALCulate<Measurement>:TRACe:Y[:SCALe]:TOP:DBUV.....	242
CALCulate<Measurement>:TRACe:Y[:SCALe]:TOP:DPCT.....	242
CALCulate<Measurement>:TRACe:Y[:SCALe]:TOP:ONE.....	243
CALCulate<Measurement>:TRACe:Y[:SCALe]:TOP:WATT.....	243
DISPlay[:WINDow<Window>]:ANALog:AUTO.....	243
DISPlay[:WINDow<Window>]:METer:AUTO.....	243
DISPlay[:WINDow<Window>]:ANALog:LOWer.....	244
DISPlay[:WINDow<Window>]:METer:LOWer.....	244
DISPlay[:WINDow<Window>]:ANALog:UPPer.....	244
DISPlay[:WINDow<Window>]:METer:UPPer.....	244
[SENSe<Sensor>:]TRACe:OFFSet:TIME.....	244
[SENSe<Sensor>:]TRACe:TIME.....	245

---

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

Sets the lower limit for the CCDF bargraph display.

**Suffix:**

<Measurement> 1 to 8  
 Measurement

<DirectionalChannel> 1 to 2  
 1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value> Range: 0.0 to 100.0  
 \*RST: 0.0  
 Default unit: pct

**Manual operation:** See "[Forward Scale Lower Limit, Reflection Scale Lower Limit](#)" on page 53

---

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

Sets the lower limit for the reflection coefficient bargraph display.

**Suffix:**

<Measurement> 1 to 8  
 Measurement

<DirectionalChannel> 1 to 2  
 1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value>            Range:     -1e18 to 1e18  
                       \*RST:     1.0  
                       Default unit: -

**Manual operation:** See ["Scale Lower Limit"](#) on page 53  
 See ["Forward Scale Lower Limit, Reflection Scale Lower Limit"](#)  
 on page 53

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

Sets the lower limit for the ratio of the forward/reverse power bargraph display.

**Suffix:**

<Measurement>    1 to 8  
                          Measurement

<DirectionalChannel> 1 to 2  
                          1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 =  
                          reflection (reverse)

**Parameters:**

<value>            Range:     0.0 to 100.0  
                       \*RST:     0.0  
                       Default unit: pct

**Manual operation:** See ["Scale Lower Limit"](#) on page 53  
 See ["Forward Scale Lower Limit, Reflection Scale Lower Limit"](#)  
 on page 53

**CALCulate<Measurement>:METer<DirectionalChannel>:LOWer[:DATA]:RATio:  
 RLOsS <value>**

Sets the lower limit for the return loss bargraph display.

**Suffix:**

<Measurement>    1 to 8  
                          Measurement

<DirectionalChannel> 1 to 2  
                          1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 =  
                          reflection (reverse)

**Parameters:**

<value>            Range:     -200.0 to 200.0  
                       \*RST:     -200.0  
                       Default unit: dB

**Manual operation:** See ["Scale Lower Limit"](#) on page 53  
 See ["Forward Scale Lower Limit, Reflection Scale Lower Limit"](#)  
 on page 53

---

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

Sets the lower limit for the standing wave ratio (SWR) bargraph display.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<DirectionalChannel> 1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value> Range: 0.0 to 1e18  
\*RST: 1.0  
Default unit: -

**Manual operation:** See ["Scale Lower Limit"](#) on page 53  
See ["Forward Scale Lower Limit, Reflection Scale Lower Limit"](#)  
on page 53

---

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

Sets the lower limit for the power ratio bargraph display.

If you enter a value without unit, the unit is defined by [UNIT<Measurement>:POWER:RATio](#). For further information, see [Chapter 14.6.1.3, "Units"](#), on page 245.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<DirectionalChannel> 1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value> Range: -180.0 to +180.0  
\*RST: -20.0  
Default unit: dB

**Manual operation:** See ["Scale Lower Limit"](#) on page 53  
See ["Forward Scale Lower Limit, Reflection Scale Lower Limit"](#)  
on page 53

---

**CALCulate<Measurement>:METer<DirectionalChannel>:LOWer[:DATA][:POWER]  
<value>**

Sets the lower limit for the power value bargraph display.

If you enter a value without unit, the unit is defined by [UNIT<Measurement>:POWER\[:VALue\]](#). For further information, see [Chapter 14.6.1.3, "Units"](#), on page 245.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<DirectionalChannel> 1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value> Range: -120.0 to +150.0  
\*RST: -60.0  
Default unit: dBm

**Manual operation:** See ["Scale Lower Limit"](#) on page 53  
See ["Forward Scale Lower Limit, Reflection Scale Lower Limit"](#) on page 53

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

Sets the upper limit for the CCDF bargraph display.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<DirectionalChannel> 1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value> Range: 0.0 to 100.0  
\*RST: 100.0  
Default unit: pct

**Manual operation:** See ["Forward Scale Upper Limit, Reflection Scale Upper Limit"](#) on page 54

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

Sets the upper limit for the reflection coefficient bargraph display.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<DirectionalChannel> 1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value> Range: -1e18 to 1e18  
 \*RST: 5.0  
 Default unit: -

**Manual operation:** See ["Scale Upper Limit"](#) on page 53  
 See ["Forward Scale Upper Limit, Reflection Scale Upper Limit"](#)  
 on page 54

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

Sets the upper limit for the ratio of the forward/reverse power bargraph display.

**Suffix:**

<Measurement> 1 to 8  
 Measurement

<DirectionalChannel> 1 to 2  
 1 = primary sensor, 2 = secondary sensor or

**Parameters:**

<value> Range: 0.0 to 100.0  
 \*RST: 100.0  
 Default unit: pct

**Manual operation:** See ["Scale Upper Limit"](#) on page 53  
 See ["Forward Scale Upper Limit, Reflection Scale Upper Limit"](#)  
 on page 54

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

Sets the upper limit for the return loss bargraph display.

**Suffix:**

<Measurement> 1 to 8  
 Measurement

<DirectionalChannel> 1 to 2  
 1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 =  
 reflection (reverse)

**Parameters:**

<value> Range: -200.0 to 200.0  
 \*RST: 200.0  
 Default unit: dB

**Manual operation:** See ["Scale Upper Limit"](#) on page 53  
 See ["Forward Scale Upper Limit, Reflection Scale Upper Limit"](#)  
 on page 54

---

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

Sets the upper limit for the standing wave ratio (SWR) bargraph display.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<DirectionalChannel> 1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value> Range: 0.0 to 1e18  
\*RST: 2.0  
Default unit: -

**Manual operation:** See ["Scale Upper Limit"](#) on page 53  
See ["Forward Scale Upper Limit, Reflection Scale Upper Limit"](#)  
on page 54

---

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

Sets the upper limit for the power ratio bargraph display.

If you enter a value without unit, the unit is defined by [UNIT<Measurement>:POWER:RATio](#). For further information, see [Chapter 14.6.1.3, "Units"](#), on page 245.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<DirectionalChannel> 1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value> Range: -180.0 to +180.0  
\*RST: +20.0  
Default unit: dB

**Manual operation:** See ["Scale Upper Limit"](#) on page 53  
See ["Forward Scale Upper Limit, Reflection Scale Upper Limit"](#)  
on page 54

---

**CALCulate<Measurement>:METer<DirectionalChannel>:UPPer[:DATA][:POWER]  
<value>**

Sets the upper limit for the power value bargraph display.

If you enter a value without unit, the unit is defined by [UNIT<Measurement>:POWER\[:VALue\]](#). For further information, see [Chapter 14.6.1.3, "Units"](#), on page 245.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<DirectionalChannel> 1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value> Range: -120.0 to +150.0  
\*RST: +10.0  
Default unit: dBm

**Manual operation:** See "[Scale Upper Limit](#)" on page 53  
See "[Forward Scale Upper Limit, Reflection Scale Upper Limit](#)" on page 54

**CALCulate<Measurement>:TRACe:X[:SCALe]:LEFT <value>**

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

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Parameters:**

<value> Range: -15.0 to 15.0  
\*RST: 0.0  
Default unit: s

**Manual operation:** See "[Start Time](#)" on page 54

**CALCulate<Measurement>:TRACe:X[:SCALe]:LENGth <value>**

Sets the duration of the trace.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Parameters:**

<value> Range: 8.3e-9 to 30.0  
\*RST: 0.01  
Default unit: s

**Manual operation:** See "[Trace Length](#)" on page 55

**CALCulate<Measurement>:TRACe:Y[:SCALe]:SPAN:DB <value>**

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

Sets the power level range.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Parameters:**

<value> Range: 0.005 to 400.0  
\*RST: 50.0  
Default unit: dB

**Manual operation:** See "[Power Span](#)" on page 55

**CALCulate<Measurement>:TRACe:Y[:SCALe]:SPAN:DBM <value>**

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

Sets the power level range.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Parameters:**

<value> Range: 0.005 to 400.0  
\*RST: 50.0  
Default unit: dBm

**Manual operation:** See "[Power Span](#)" on page 55

**CALCulate<Measurement>:TRACe:Y[:SCALe]:SPAN:DBUV <value>**

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

Sets the power level range.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Parameters:**

<value> Range: 0.005 to 400.0  
\*RST: 100.0  
Default unit: dB $\mu$ V

**Manual operation:** See "[Power Span](#)" on page 55

**CALCulate<Measurement>:TRACe:Y[:SCALe]:SPAN:DPCT <value>**

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

Sets the power level range.

**Suffix:**

<Measurement> 1 to 8  
Measurement



**Parameters:**

<value>                    Range:        0.005 to 2e18  
                                  \*RST:        200.0  
                                  Default unit: dpct

**Manual operation:**    See "[Power Span](#)" on page 55

**CALCulate<Measurement>:TRACe:Y[:SCALe]:SPAN:ONE <value>**

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

Sets the power level range without unit.

**Suffix:**

<Measurement>        1 to 8  
                                  Measurement

**Parameters:**

<value>                    Range:        0.005 to 2e18  
                                  \*RST:        10.0  
                                  Default unit: -

**Manual operation:**    See "[Power Span](#)" on page 55

**CALCulate<Measurement>:TRACe:Y[:SCALe]:SPAN:WATT <value>**

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

Sets the power level range.

**Suffix:**

<Measurement>        1 to 8  
                                  Measurement

**Parameters:**

<value>                    Range:        1e-12 to 2e9  
                                  \*RST:        1e-3  
                                  Default unit: W

**Manual operation:**    See "[Power Span](#)" on page 55

**CALCulate<Measurement>:TRACe:Y[:SCALe]:TOP:DB <value>**

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

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

**Suffix:**

<Measurement>        1 to 8  
                                  Measurement

**Parameters:**

<value>                    Range:        -200.0 to 200.0  
                               \*RST:        25.0  
                               Default unit: dB

**Manual operation:**    See "[Power Reference](#)" on page 55

**CALCulate<Measurement>:TRACe:Y[:SCALe]:TOP:DBM <value>**

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

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

**Suffix:**

<Measurement>        1 to 8  
                               Measurement

**Parameters:**

<value>                    Range:        -200.0 to 200.0  
                               \*RST:        0.0  
                               Default unit: dBm

**Manual operation:**    See "[Power Reference](#)" on page 55

**CALCulate<Measurement>:TRACe:Y[:SCALe]:TOP:DBUV <value>**

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

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

**Suffix:**

<Measurement>        1 to 8  
                               Measurement

**Parameters:**

<value>                    Range:        -100.0 to 300.0  
                               \*RST:        150.0  
                               Default unit: dBuV

**Manual operation:**    See "[Power Reference](#)" on page 55

**CALCulate<Measurement>:TRACe:Y[:SCALe]:TOP:DPCT <value>**

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

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

**Suffix:**

<Measurement>        1 to 8  
                               Measurement

**Parameters:**

<value>                    Range:     -1e18 to 1e18  
                               \*RST:       100.0  
                               Default unit: dpct

**Manual operation:** See ["Power Reference"](#) on page 55

**CALCulate<Measurement>:TRACe:Y[:SCALE]:TOP:ONE <value>**

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

Sets the power reference value without unit. The reference value is assigned to the top line of the grid.

**Suffix:**

<Measurement>        1 to 8  
                               Measurement

**Parameters:**

<value>                    Range:     -1e18 to 1e18  
                               \*RST:       10.0  
                               Default unit: -

**Manual operation:** See ["Power Reference"](#) on page 55

**CALCulate<Measurement>:TRACe:Y[:SCALE]:TOP:WATT <value>**

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

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

**Suffix:**

<Measurement>        1 to 8  
                               Measurement

**Parameters:**

<value>                    Range:     -1e9 to 1e9  
                               \*RST:       1e-3  
                               Default unit: W

**Manual operation:** See ["Power Reference"](#) on page 55

**DISPlay[:WINDow<Window>]:ANALog:AUTO <state>****DISPlay[:WINDow<Window>]:METer:AUTO <state>**

Automatically determines the scaling for the analog display. The upper and the lower limit value are set depending on the current measurement data.

**Suffix:**

<Window>                1 to 4  
                               Measurement pane

**Parameters:**

<state> ONCE | OFF  
 \*RST: OFF

**DISPlay[:WINDow<Window>]:ANALog:LOWer** <value>

**DISPlay[:WINDow<Window>]:METer:LOWer** <value>

Sets the lower limit value of the analog scale.

**Suffix:**

<Window> 1 to 4  
 Measurement pane

**Parameters:**

<value> Depends on the current output unit of the measured value.  
 Range: 1e-18 W to 1e18 W; -150 DBM to 210 DBM; PCT:  
 1e-18 PCT to 1e22 PCT; -200 DB to 200 DB

**DISPlay[:WINDow<Window>]:ANALog:UPPer** <value>

**DISPlay[:WINDow<Window>]:METer:UPPer** <value>

Sets the upper limit value of the analog scale.

**Suffix:**

<Window> 1 to 4  
 Measurement pane

**Parameters:**

<value> See [DISPlay\[:WINDow<Window>\]:METer:LOWer](#)  
 on page 244.

**[SENSe<Sensor>:]TRACe:OFFSet:TIME** <time>

Adds an offset to the beginning of the trace sequence. Thus, the trace in the result display is moved in positive or negative x-direction. If you measure with more than one power sensor, you can use this offset to arrange the traces to each other. The start of recording relative to the trigger event is set using [TRIGger<Measurement>\[:CHANnel<Channel>\]:DELay\[:VALue\]](#).

**Suffix:**

<Sensor> 1 to 128  
 Configured sensor connected at: port A = 1, ... , port D = 4, R&S  
 NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<time> Range: -15.0 to 15.0  
 \*RST: 0.0  
 Default unit: s

**[SENSe<Sensor>:]TRACe:TIME <time>**

Sets the duration of the trace.

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<time> Range: 8.3e-9 to 30.0  
\*RST: 0.01  
Default unit: s

**Manual operation:** See "Power / Div" on page 55

**14.6.1.3 Units**

If you enter a value that is expressed in a certain unit, for example Hz, you can omit the unit. Then, the default unit provided in the remote command description is used. If you need decimal multiples and submultiples of a unit, you can use SCPI prefixes, see "Units" on page 464.

If you enter a power value or power ratio that can be expressed in more than one unit, you can enter the value together with the unit, and the unit is recognized. If you enter a value without unit, the unit defined by one of the following commands is used:

- `UNIT<Measurement>:POWer[:VALue]`
- `UNIT<Measurement>:POWer:RATio`

After a reset, the default unit is used.

<code>[SENSe&lt;Sensor&gt;:]UNIT:POWer[:VALue]</code> .....	245
<code>SOURce:UNIT:POWer</code> .....	246
<code>UNIT&lt;Measurement&gt;:POWer:RATio</code> .....	246
<code>UNIT&lt;Measurement&gt;:POWer:REFLection</code> .....	246
<code>UNIT&lt;Measurement&gt;:POWer:RELative:STATe</code> .....	247
<code>UNIT&lt;Measurement&gt;:POWer[:VALue]</code> .....	247

**[SENSe<Sensor>:]UNIT:POWer[:VALue] <unit>**

Sets the output unit for the measured power values. For NRT measurements, sets the unit of the absolute forward power measurement.

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<unit> DBM | DBUV | W  
 Available units.  
 If the R&S NRP2 emulation is enabled using `SYSTEM:LANGUage`, the unit is fixed to W.  
 \*RST: DBM

**Manual operation:** See "[Forward Unit](#)" on page 52

**SOURCE:UNIT:POWER** <power>

Requires the sensor check source (R&S NRX-B1).

Sets the unit of the power level for the output signal.

**Parameters:**

<power> DBM | DBUV | W  
 \*RST: DBM

**Manual operation:** See "[Power Level](#)" on page 146

**UNIT<Measurement>:POWER:RATio** <unit>

Sets the output unit for the measured power ratio values. For NRT measurements, sets the unit of the relative forward power measurement.

**Suffix:**

<Measurement> 1 to 8  
 Measurement

**Parameters:**

<unit> DB | DPCT | O  
 The character o stands for One (x1).  
 \*RST: DB

**Manual operation:** See "[Unit](#)" on page 51  
 See "[Forward Unit](#)" on page 52

**UNIT<Measurement>:POWER:REFlection** <unit>

Effective if `CALCulate<Measurement>[:CHANnel<Channel>]:FEED<Channel>` "POWER:REVerse" is set.

Sets how the ratio of forward and reverse power is expressed.

**Suffix:**

<Measurement> 1 to 8  
 Measurement

**Parameters:**

<unit> RCO | RL | SWR | RFR

**RCO**

Reflection coefficient; 0 to 1, no unit

**RL**

Return loss in dB

**SWR**Standing wave ratio; 1 to  $\infty$ , no unit**RFR**

Ratio between forward and reverse power; 0 % to 100 %

\*RST: SWR

**Manual operation:** See ["Standing Wave Ratio \(SWR\)"](#) on page 111  
 See ["Return Loss"](#) on page 111  
 See ["Reflection Coefficient"](#) on page 111  
 See ["Reflection Ratio"](#) on page 112

**UNIT<Measurement>:POWER:RELative:STATe** <state>

Alias for [CALCulate<Measurement>:RELative<DirectionalChannel>:STATe](#) on page 272.

ON corresponds to ON and SET.

**Suffix:**

<Measurement> 1 to 8  
 Measurement

**Parameters:**

<state> OFF | ON  
 \*RST: 0

**UNIT<Measurement>:POWER[:VALue]** <unit>

Sets the output unit for the measured power values. For NRT measurements, sets the unit of the absolute forward power measurement.

**Suffix:**

<Measurement> 1 to 8  
 Measurement

**Parameters:**

<unit> DBM | DBUV | W  
 \*RST: DBM

**Manual operation:** See ["Unit"](#) on page 51  
 See ["Forward Unit"](#) on page 52

#### 14.6.1.4 Limits

CALCulate<Measurement>:LIMit<undef>:CLEar:AUTO.....	248
CALCulate<Measurement>:LIMit<undef>:CLEar[:IMMEDIATE].....	248
CALCulate<Measurement>:LIMit<undef>:FAIL?.....	249
CALCulate<Measurement>:LIMit<undef>:FCOunt?.....	249
CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer[:DATA].....	249
CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer[:DATA]:CCDF.....	250
CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer[:DATA]:RATio:RCOefficient... 250	250
CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer[:DATA]:RATio:RFRatio.....	251
CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer[:DATA]:RATio:RLOSs.....	251
CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer[:DATA]:RATio:SWR.....	251
CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer[:DATA]:RATio[:VALue].....	252
CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer[:DATA]:POWer.....	252
CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer:STATe.....	253
CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer[:DATA].....	253
CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer[:DATA]:CCDF.....	253
CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer[:DATA]:RATio:RCOefficient... 254	254
CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer[:DATA]:RATio:RFRatio.....	254
CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer[:DATA]:RATio:RLOSs.....	254
CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer[:DATA]:RATio:SWR.....	255
CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer[:DATA]:RATio[:VALue].....	255
CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer[:DATA]:POWer.....	256
CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer:STATe.....	256

---

#### CALCulate<Measurement>:LIMit<undef>:CLEar:AUTO <mode>

If enabled, automatically resets the limit monitoring state and the internal counter for limit violations if one of the following commands is executed:

- INITiate<Measurement>[:IMMEDIATE]
- INITiate<Measurement>:CONTinuous ON
- MEASure<Measurement>... query
- READ<Measurement>... query

#### Suffix:

<Measurement>	1 to 8 Measurement
<undef>	1 to n No suffix required.

#### Parameters:

<mode>	OFF   ON   ONCE
--------	-----------------

---

#### CALCulate<Measurement>:LIMit<undef>:CLEar[:IMMEDIATE]

Resets the limit monitoring state and the internal counter for limit violations.



<b>Suffix:</b>	
<Measurement>	1 to 8 Measurement
<undef>	1 to n No suffix required.
<b>Usage:</b>	Event

---

**CALCulate<Measurement>:LIMit<undef>:FAIL?**

Queries whether upper or lower limits have been violated. If one of the following events occurs, the status is reset:

- R&S NRX is switched on.
- Reset is performed (\*RST).
- `CALCulate<Measurement>:LIMit<undef>:CLEar[:IMMediate]` is executed.

<b>Suffix:</b>	
<Measurement>	1 to 8 Measurement
<undef>	1 to n No suffix required.
<b>Usage:</b>	Query only

---

**CALCulate<Measurement>:LIMit<undef>:FCOunt?**

Queries the number of limit violations. The counter is reset if one of the following events occurs:

- R&S NRX is switched on.
- Reset is performed (\*RST).
- `CALCulate<Measurement>:LIMit<undef>:CLEar[:IMMediate]` is executed.

<b>Suffix:</b>	
<Measurement>	1 to 8 Measurement
<undef>	1 to n No suffix required.
<b>Usage:</b>	Query only

---

**CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer[:DATA] <value>**

Sets the lower limit for the measured values.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<DirectionalChannel> 1 to 2  
1 = forward, 2 = reflection (reverse)

**Parameters:**

<value>

**Manual operation:** See "[Lower Limit](#)" on page 57  
See "[Forward Lower Limit, Reflection Lower Limit](#)" on page 58

**CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer[:DATA]:CCDF**  
<value>

Sets the lower limit for the complementary cumulative distribution function (CCDF).

**Suffix:**

<Measurement> 1 to 8  
Measurement

<DirectionalChannel> 1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value> Range: 0.0 to 100.0  
\*RST: 0.0  
Default unit: pct

**Manual operation:** See "[Forward Lower Limit, Reflection Lower Limit](#)" on page 58

**CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer[:DATA]:RATio:**  
**RCOefficient** <value>

Sets the lower limit for the reflection coefficient.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<DirectionalChannel> 1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value> Range: -1e18 to 1e18  
\*RST: 1.0  
Default unit: -

**Manual operation:** See "[Lower Limit](#)" on page 57  
See "[Forward Lower Limit, Reflection Lower Limit](#)" on page 58

---

**CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer[:DATA]:RATio:  
RFRatio <value>**

Sets the lower limit for the ratio of forward/reverse power.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<DirectionalChannel> 1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value> Range: 0.0 to 100.0  
\*RST: 0.0  
Default unit: pct

**Manual operation:** See "[Lower Limit](#)" on page 57  
See "[Forward Lower Limit, Reflection Lower Limit](#)" on page 58

---

**CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer[:DATA]:RATio:  
RLOSs <value>**

Sets the lower limit for the return loss.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<DirectionalChannel> 1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value> Range: -200.0 to 200.0  
\*RST: -200.0  
Default unit: dB

**Manual operation:** See "[Lower Limit](#)" on page 57  
See "[Forward Lower Limit, Reflection Lower Limit](#)" on page 58

---

**CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer[:DATA]:RATio:  
SWR <value>**

Sets the lower limit for the standing wave ratio (SWR).

**Suffix:**

<Measurement> 1 to 8  
Measurement

<DirectionalChannel> 1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value> Range: 0.0 to 1e18  
 \*RST: 1.0  
 Default unit: -

**Manual operation:** See "[Lower Limit](#)" on page 57  
 See "[Forward Lower Limit, Reflection Lower Limit](#)" on page 58

**CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer[:DATA]:RATio[:VALue]** <value>

Sets the lower limit for the measured power ratios.

If you enter a value without unit, the unit is defined by [UNIT<Measurement>:POWER:RATio](#). For further information, see [Chapter 14.6.1.3, "Units"](#), on page 245.

**Suffix:**

<Measurement> 1 to 8  
 Measurement

<DirectionalChannel> 1 to 2  
 1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value> Range: -180.0 to +180.0  
 \*RST: -20.0  
 Default unit: dB

**Manual operation:** See "[Lower Limit](#)" on page 57  
 See "[Forward Lower Limit, Reflection Lower Limit](#)" on page 58

**CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer[:DATA]:POWER** <value>

Sets the lower limit for the measured power values.

If you enter a value without unit, the unit is defined by [UNIT<Measurement>:POWER\[:VALue\]](#). For further information, see [Chapter 14.6.1.3, "Units"](#), on page 245.

**Suffix:**

<Measurement> 1 to 8  
 Measurement

<DirectionalChannel> 1 to 2  
 1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value> Range: -120.0 to +150.0  
 \*RST: -60.0  
 Default unit: dBm

**Manual operation:** See ["Lower Limit"](#) on page 57  
 See ["Forward Lower Limit, Reflection Lower Limit"](#) on page 58

---

**CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer:STATe** <state>

Enables or disables the monitoring function for the lower limit.

**Suffix:**

<Measurement> 1 to 8  
 Measurement

<DirectionalChannel> 1 to 2  
 1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<state> \*RST: OFF

**Manual operation:** See ["Lower Limit State"](#) on page 57  
 See ["Forward Lower Limit State, Reflection Lower Limit State"](#) on page 58

---

**CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer[:DATA]** <value>

Sets the upper limit for the measured values.

**Suffix:**

<Measurement> 1 to 8  
 Measurement

<DirectionalChannel> 1 to 2  
 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value>

**Manual operation:** See ["Upper Limit"](#) on page 58  
 See ["Forward Upper Limit, Reflection Upper Limit"](#) on page 59

---

**CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer[:DATA]:CCDF**  
 <value>

Sets the upper limit for the complementary cumulative distribution function (CCDF).

**Suffix:**

<Measurement> 1 to 8  
 Measurement

<DirectionalChannel> 1 to 2  
 1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value>                    Range:        0.0 to 100.0  
                                  \*RST:        100.0  
                                  Default unit: pct

**Manual operation:**    See "[Forward Upper Limit, Reflection Upper Limit](#)" on page 59

**CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer[:DATA]:RATio:  
 RCOefficient <value>**

Sets the upper limit for the reflection coefficient.

**Suffix:**

<Measurement>        1 to 8  
                                  Measurement

<DirectionalChannel> 1 to 2  
                                  1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 =  
                                  reflection (reverse)

**Parameters:**

<value>                    Range:        -1e18 to 1e18  
                                  \*RST:        5.0  
                                  Default unit: -

**Manual operation:**    See "[Upper Limit](#)" on page 58  
                                  See "[Forward Upper Limit, Reflection Upper Limit](#)" on page 59

**CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer[:DATA]:RATio:  
 RFRatio <value>**

Sets the upper limit for the ratio of forward/reverse power.

**Suffix:**

<Measurement>        1 to 8  
                                  Measurement

<DirectionalChannel> 1 to 2  
                                  1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 =  
                                  reflection (reverse)

**Parameters:**

<value>                    Range:        0.0 to 100.0  
                                  \*RST:        100.0  
                                  Default unit: pct

**Manual operation:**    See "[Upper Limit](#)" on page 58  
                                  See "[Forward Upper Limit, Reflection Upper Limit](#)" on page 59

**CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer[:DATA]:RATio:  
 RLOSS <value>**

Sets the upper limit for the return loss.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<DirectionalChannel> 1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value> Range: -200.0 to 200.0  
\*RST: 200.0  
Default unit: dB

**Manual operation:** See ["Upper Limit"](#) on page 58  
See ["Forward Upper Limit, Reflection Upper Limit"](#) on page 59

**CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer[:DATA]:RATio:SWR**  
**<value>**

Sets the upper limit for the standing wave ratio (SWR).

**Suffix:**

<Measurement> 1 to 8  
Measurement

<DirectionalChannel> 1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value> Range: 0.0 to 1e18  
\*RST: 2.0  
Default unit: -

**Manual operation:** See ["Upper Limit"](#) on page 58  
See ["Forward Upper Limit, Reflection Upper Limit"](#) on page 59

**CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer[:DATA]:RATio[:**  
**VALue] <value>**

Sets the upper limit for the measured power ratios.

If you enter a value without unit, the unit is defined by [UNIT<Measurement>:POWer:RATio](#). For further information, see [Chapter 14.6.1.3, "Units"](#), on page 245.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<DirectionalChannel> 1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value> Range: -180.0 to +180.0  
 \*RST: +20.0  
 Default unit: dB

**Manual operation:** See ["Upper Limit"](#) on page 58  
 See ["Forward Upper Limit, Reflection Upper Limit"](#) on page 59

**CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer[:DATA]:POWer**  
 <value>

Sets the upper limit for the measured power values.

If you enter a value without unit, the unit is defined by `UNIT<Measurement>:POWer[:VALue]`. For further information, see [Chapter 14.6.1.3, "Units"](#), on page 245.

**Suffix:**

<Measurement> 1 to 8  
 Measurement

<DirectionalChannel> 1 to 2  
 1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value> Range: -120.0 to +150.0  
 \*RST: +10.0  
 Default unit: dBm

**Manual operation:** See ["Upper Limit"](#) on page 58  
 See ["Forward Upper Limit, Reflection Upper Limit"](#) on page 59

**CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer:STATe** <state>

Enables or disables the monitoring function for the upper limit.

**Suffix:**

<Measurement> 1 to 8  
 Measurement

<DirectionalChannel> 1 to 2  
 1 = primary sensor, 2 = secondary sensor or

**Parameters:**

<state> \*RST: OFF

**Manual operation:** See ["Upper Limit State"](#) on page 57  
 See ["Forward Upper Limit State, Reflection Upper Limit State"](#) on page 59



### 14.6.1.5 Result Formats and Screenshots

FORMat:SREGister.....	257
FORMat[:READings][:DATA].....	257
FORMat[:READings]:BORDER.....	257
SYSTem:HCOPY.....	258

---

#### FORMat:SREGister <register>

Specifies the format that is used for the return value of \*STB?.

##### Parameters:

<register>            ASCII | BINary | HEXadecimal | OCTal  
 \*RST:                ASCII

---

#### FORMat[:READings][:DATA] [<data,length>, <arg1>]

Specifies how the controller expects numeric data from the R&S NRX.

##### Parameters:

<data,length>        <REAL,32 | 64>  
 Floating point numbers as standardized in IEEE 754, 32-bit or 64-bit. If you omit the length, the R&S NRX uses the last used length.  
 Example for REAL, 32 format:  
 #14....<binary float value>....  
 Example for REAL, 64 format:  
 #18....<binary float value>....

<arg1>                <ASCII[,0 to 12]>  
 Readable value. The digit defines the number of decimal places. If more values are output, they are separated by commas.  
 Example: -2.279610E+01  
 \*RST:                ASCII,0  
 The reset value 0 does not restrict the number of decimal places.

---

#### FORMat[:READings]:BORDER <border>

Selects the order of bytes in 64-bit binary data.

##### Parameters:

<border>              NORMAL | SWAPped  
**NORMAL**  
 The 1st byte is the least significant byte, the 4th/8th byte the most significant byte.  
 Fulfills the Little Endian (little end comes first) convention, used by x86/x64 CPUs, for example.

**SWAPped**

The 1st byte is the most significant byte, the 4th/8th byte the least significant byte.

Fulfills the Big Endian (big end comes first) convention.

\*RST:        NORMal

**Example:**        FORM:BORD NORM

**SYSTem:HCOPY** [<filename>]

Creates a screenshot of the current display. If you supply a filename with the command, this filename is used for the target file. Otherwise, an internal name is generated that you can query using this command.

See also [Chapter 4.1.8, "Creating and Saving Screenshots"](#), on page 40.

**Parameters:**

<filename>

**Manual operation:** See "[Screenshot](#)" on page 26

**14.6.2 Configuring the Trigger**

Further Information:

- [Chapter 6.3, "Triggering"](#), on page 60

TRIGger<undef>:ALL:ATRigger[:STATe].....	259
TRIGger<Measurement>[:CHANnel<Channel>]:ATRigger[:STATe].....	259
TRIGger<undef>:ALL:COUNT.....	259
TRIGger<Measurement>[:CHANnel<Channel>]:COUNT.....	259
TRIGger<undef>:ALL:DELay:AUTO.....	260
TRIGger<Measurement>[:CHANnel<Channel>]:DELay:AUTO.....	260
TRIGger<undef>:ALL:DELay[:VALue].....	260
TRIGger<Measurement>[:CHANnel<Channel>]:DELay[:VALue].....	260
TRIGger<undef>:ALL:DTIME.....	261
TRIGger<Measurement>[:CHANnel<Channel>]:DTIME.....	261
TRIGger<Measurement>[:CHANnel<Channel>]:EXTernal<Port>:IMPedance.....	261
TRIGger<undef>:ALL:HOLDoff.....	262
TRIGger<Measurement>[:CHANnel<Channel>]:HOLDoff.....	262
TRIGger<undef>:ALL:HYSTeresis.....	262
TRIGger<Measurement>[:CHANnel<Channel>]:HYSTeresis.....	262
TRIGger<Measurement>[:CHANnel<Channel>]:JITTer:METHod.....	263
TRIGger<undef>:ALL:LEVel.....	263
TRIGger<Measurement>[:CHANnel<Channel>]:LEVel.....	263
TRIGger<undef>:ALL:MODE.....	264
TRIGger<Measurement>:MODE.....	264
TRIGger<Measurement>[:CHANnel<Channel>]:MASTer:PORT.....	264
TRIGger<Measurement>[:CHANnel<Channel>]:MASTer[:STATe].....	265
TRIGger<undef>:ALL:SLOPe.....	265
TRIGger<Measurement>[:CHANnel<Channel>]:SLOPe.....	265

TRIGger<undef>:ALL:SOURce.....	266
TRIGger<Measurement>[:CHANnel<Channel>]:SOURce.....	266
TRIGger<Measurement>[:CHANnel<Channel>]:SYNChronize:PORT.....	266
TRIGger<undef>:ALL:SYNChronize[:STATe].....	266
TRIGger<Measurement>[:CHANnel<Channel>]:SYNChronize[:STATe].....	266
TRIGger<undef>:ALL[:IMMEDIATE].....	267
TRIGger<Measurement>[:IMMEDIATE].....	267

---

**TRIGger<undef>:ALL:ATRigger[:STATe] <stat>**
**TRIGger<Measurement>[:CHANnel<Channel>]:ATRigger[:STATe] <stat>**

Controls the automatic trigger function. If enabled, an artificial trigger is generated if the delay time has elapsed after the measurement start and no trigger event has occurred.

The auto delay is set using `TRIGger<Measurement>[:CHANnel<Channel>]:DELay:AUTO` on page 260.

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 8 Measurement
<Channel>	1 to 2 1 = primary sensor, 2 = secondary sensor

**Parameters:**

<stat>	ON   OFF *RST: ON
--------	----------------------

---

**TRIGger<undef>:ALL:COUNT <count>**
**TRIGger<Measurement>[:CHANnel<Channel>]:COUNT <count>**

Sets the number of measurement cycles to be performed when the measurement is started using `INITiate<Measurement>[:IMMEDIATE]`.

This number equals the number of results that can be obtained from the sensor after a single measurement. As long as the defined number of measurements is not executed, the sensor automatically initiates another measurement internally when the current result is available.

This command is particularly useful 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 8 Measurement
---------------	-----------------------

<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 8  
Measurement

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<stat> ON | OFF  
\*RST: OFF

**TRIGger<undef>:ALL:DELay[:VALue] <delay>**

**TRIGger<Measurement>[:CHANnel<Channel>]:DELay[:VALue] <delay>**

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

The command is not fully R&S NRP2 compatible. If port 1 is assigned to measurement 1 and so on, the command works. If port 1 is assigned to measurement 2, for example, enable the R&S NRP2 emulation using [SYSTem:LANGuage "NRP2"](#).

**Suffix:**

<Measurement> 1 to 8  
Measurement

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<delay> Range: -5.0 to 10.0  
\*RST: 0.0  
Default unit: s

**Manual operation:** See ["Delay"](#) on page 64

---

**TRIGger<undef>:ALL:DTIME <dropout>**

**TRIGger<Measurement>[:CHANnel<Channel>]:DTIME <dropout>**

If the trigger level has been underrun with internal triggering, it is sometimes useful to wait some time (drop-out time) before retriggering. The measurement of unwanted signal components can thus be suppressed. See [Chapter 6.3.3, "Dropout Time"](#), on page 62.

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>            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 65

---

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

Requires a power sensor with a trigger input.

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

**Suffix:**

<Measurement>      1 to 8  
                          Measurement

<Channel>            1 to 2  
1 = primary sensor, 2 = secondary sensor

<Port>                1 to 2  
Power sensor ports; 1 = USB port, 2 = trigger I/O connector

**Parameters:**

<impedance>        HIGH | LOW  
**HIGH**  
~10 kΩ  
**LOW**  
50 kΩ  
\*RST:            HIGH

**Manual operation:**    See ["Trigger 2 Input Impedance"](#) on page 66

---

**TRIGger<undef>:ALL:HOLDoff <holdoff>**

**TRIGger<Measurement>[:CHANnel<Channel>]:HOLDoff <holdoff>**

Sets the hold-off time, see [Chapter 6.3.4, "Hold-Off Time"](#), on page 62.

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 8  
Measurement

<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 65

---

**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 8  
Measurement

<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 65

**TRIGger<Measurement>[:CHANnel<Channel>]:JITTer:METHod <method>**

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

**Suffix:**

<Measurement> 1 to 8  
Measurement

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<method> COMPensate | MEASure | NONE

**COMPensate**

Compensation means resampling of trace result.

**MEASure**

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

\*RST: COMPensate

**Manual operation:** See "[Jitter Suppression](#)" on page 65

**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 14.6.1.3, "Units"](#), on page 245.

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 8  
Measurement

<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 64

---

**TRIGger<undef>:ALL:MODE <mode>**

**TRIGger<Measurement>:MODE <mode>**

Controls the trigger execution depending on the setting of the trigger source, see [TRIGger<Measurement>\[:CHANnel<Channel>\]:SOURce](#).

**Suffix:**

<Measurement>      1 to 8  
Measurement

**Parameters:**

<mode>                NORMAL | FREerun | SINGle | AUTO

**NORMAL**

Continuous triggering with regular trigger events.

**FREerun**

Enables a continuous measurement. The power sensor executes one measurement cycle after the other.

**SINGle**

Disables continuous triggering so that only one trigger event at a time is executed.

**AUTO**

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

\*RST:                AUTO

**Manual operation:** See "[Trigger Mode](#)" on page 63

---

**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 8  
Measurement

<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 66



**TRIGger<Measurement>[:CHANnel<Channel>]:MASter[:STATe] <state>**

Enables or disables the power sensor as trigger master. 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 by `TRIGger<Measurement>[:CHANnel<Channel>]:MASter:PORT`.

The trigger master has to use its internal trigger source. Set the trigger source for the trigger slaves to `INTA | INTB | INTC | INTD`, 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 `OUTPut:TRIGger:SOURce SENS1 | SENS2 | SENS3 | SENS4` is set, also to the trigger output.

The command is not fully R&S NRP2 compatible. If port 1 is assigned to measurement 1 and so on, the command works. If port 1 is assigned to measurement 2, for example, enable the R&S NRP2 emulation using `SYSTem:LANGuage "NRP2"`.

**Suffix:**

<Measurement>      1 to 8  
Measurement

<Channel>            1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<state>              ON | OFF  
\*RST:                OFF

**Manual operation:** See "[Trigger Master State](#)" on page 65

**TRIGger<undef>:ALL:SLOPe <slope>****TRIGger<Measurement>[:CHANnel<Channel>]:SLOPe <slope>**

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

The command is not fully R&S NRP2 compatible. If port 1 is assigned to measurement 1 and so on, the command works. If port 1 is assigned to measurement 2, for example, enable the R&S NRP2 emulation using `SYSTem:LANGuage "NRP2"`.

**Suffix:**

<Measurement>      1 to 8  
Measurement

<Channel>            1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<slope>              POSitive | NEGative  
\*RST:                POSitive

**Manual operation:** See "[Slope](#)" on page 64

---

**TRIGger<undef>:ALL:SOURce <source>**

**TRIGger<Measurement>[:CHANnel<Channel>]:SOURce <source>**

Sets the source for the trigger event. See [Chapter 6.3.2, "Trigger Sources"](#), on page 61.

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 8  
Measurement

<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 6.3.2, "Trigger Sources"](#), on page 61.

**IMMEDIATE**

Measures immediately, does not wait for trigger condition.

\*RST:            INTernal

**Manual operation:** See ["Trigger Source"](#) on page 64

---

**TRIGger<Measurement>[:CHANnel<Channel>]:SYNChronize:PORT <port>**

Sets the internal or external connection for the sync output of the power sensor. For more information, see [TRIGger<Measurement>\[:CHANnel<Channel>\]:SYNChronize\[:STATe\]](#) on page 266.

**Suffix:**

<Measurement>      1 to 8  
Measurement

<Channel>            1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<port>                INTernal | EXT2 | EXTernal2  
\*RST:            INTernal

**Manual operation:** See ["Trigger Synchronize Port"](#) on page 66

---

**TRIGger<undef>:ALL:SYNChronize[:STATe] <state>**

**TRIGger<Measurement>[:CHANnel<Channel>]:SYNChronize[:STATe] <state>**

Usually used if [TRIGger<Measurement>\[:CHANnel<Channel>\]:MASTER\[:STATe\]](#) ON is set.

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

Make sure that the number of repetitions is the same for all power sensors involved in the measurement. Otherwise, the trigger bus is blocked by any power 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 8  
Measurement

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<state> ON | OFF  
\*RST: OFF

**Manual operation:** See "[Trigger Synchronize State](#)" on page 66

**TRIGger<undef>:ALL[:IMMediate]**

**TRIGger<Measurement>[:IMMediate]**

Starts a measurement.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Usage:** Event

### 14.6.3 Selecting the Measurement

Before starting a measurement, select the measurement type.

**CALCulate<Measurement>[:CHANnel<Channel>]:FEED<Channel> "<string>"**

Determines the data that are processed. The parameters depend on the measurement type.

The 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.

Table 14-2: Parameter to measurement assignment

Measurement type	"<string>"	Measured value
Continuous average	POWer:AVERage POWer:PEAK POWer:RANDom	Average value Peak value Randomly selected value
Burst average	POWer:AVERage POWer:PEAK POWer:RANDom	Average value Peak value Randomly selected value
Trace	POWer:TRACe POWer:PEAK:TRACe POWer:RANDom:TRACe	Measurement sequence Peak value of the samples per test point Randomly selected value
Pulse analysis	POWer:TRACe POWer:PEAK:TRACe POWer:RANDom:TRACe	Measurement sequence Peak value of the samples per test point Randomly selected value
Time gate	POWer:AVERage POWer:PEAK POWer:RANDom	Average value Peak value Randomly selected value
Time gate Graphical display The suffix <1 to 4> selects the time gate.	POWer:AVERage ON SWEEp<1 to 4> POWer:PTAverage ON SWEEp<1 to 4> POWer:PEAK ON SWEEp<1 to 4>	Average value in time gate 1, 2, 3 or 4 Peak-to-average value in time gate 1, 2, 3 or 4 Peak value in time gate 1, 2, 3 or 4
Timeslot	POWer:AVERage POWer:PEAK POWer:RANDom	Average value Peak value Randomly selected value
Statistics	CCDF:TRACe CDF:TRACe PDF:TRACe	Complementary cumulative distribution function Cumulative distribution function Probability density function
NRT, absolute Forward direction	POWer:FORWard:AVERage POWer:FORWard:PEP POWer:ABSORption:AVERage POWer:ABSORption:PEP POWer:FORWard:AVERage:BURSt POWer:ABSORption:AVERage: BURSt	Average power Peak power of an amplitude-modulated signal Absorbed average power Absorbed peak envelope power (PEP) Average power within a burst Absorbed burst average
NRT, absolute Reverse direction	POWer:OFF POWer:REVerse	Reverse power disabled Reverse power

Measurement type	"<string>"	Measured value
NRT, relative Forward direction	POWER:FORWARD:CCDFunction POWER:CFACtor	Complementary cumulative distribution function Crest factor
NRT, relative Reverse direction	POWER:SWRatio POWER:RLOSs POWER:RCoefficient POWER:RFRatio	Standing wave ratio Return loss Reflection coefficient Reflection ratio

**Suffix:**

<Measurement>	1 to 8 Measurement
<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>"	The availability depends on the measurement type, see <a href="#">Table 14-2</a> .
*RST:	POWER:AVERAge

<b>Manual operation:</b>	See <a href="#">"Statistics Function"</a> on page 103 See <a href="#">"Average"</a> on page 109 See <a href="#">"CCDF"</a> on page 109 See <a href="#">"Peak Envelope Power (PEP)"</a> on page 109 See <a href="#">"Absorption Average"</a> on page 109 See <a href="#">"Crest Factor (CF)"</a> on page 110 See <a href="#">"Absorption PEP"</a> on page 110 See <a href="#">"Burst Average"</a> on page 110 See <a href="#">"Absorption Burst"</a> on page 110 See <a href="#">"Off"</a> on page 111 See <a href="#">"Reverse Power"</a> on page 111 See <a href="#">"Standing Wave Ratio (SWR)"</a> on page 111 See <a href="#">"Return Loss"</a> on page 111 See <a href="#">"Reflection Coefficient"</a> on page 111 See <a href="#">"Reflection Ratio"</a> on page 112 See <a href="#">"Evaluate"</a> on page 116
--------------------------	---

**CALCulate<Measurement>:TYPE <type>**

Sets the measurement type.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Parameters:**

<type> CONTav | NRT | TRACe | STATistics | TGATe | BURStav |  
TSLot | PULSe  
\*RST: CONTav

**Manual operation:** See "[Measurement Type](#)" on page 68

**[SENSe<Sensor>:]AUXiliary <mode>**

Enables the measurement of additional measured values that are determined together with the main measured value.

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S  
NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<mode> NONE | MINMax | RNDMax

**NONE**

No additional values are measured.

**MINMax**

Minima and maxima of the trace are transmitted together with the measured value.

Usually, extreme values are lost due to averaging the measured values.

**RNDMax**

Randomly selected samples are transmitted. All evaluations use these values instead of the average values.

\*RST: NONE

#### 14.6.4 Selecting the Power Sensor

Further information:

- [Chapter 6.4, "Measurement Settings Dialog"](#), on page 67

[\[SENSe<Sensor>:\]CATalog?](#)..... 270

[CALCulate<Measurement>\[:CHANnel<Channel>\]:SENSe:INDEX](#).....271

**[SENSe<Sensor>:]CATalog?**

Returns a list of all connected power sensors together with the suffix of the port where the power sensor is connected.

<b>Suffix:</b>	
<Sensor>	1 to 128 Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100
<b>Example:</b>	CAT? Query "2:NRP33SN-900004" Response
<b>Usage:</b>	Query only
<b>Manual operation:</b>	See " <a href="#">Primary Sensor, Secondary Sensor</a> " on page 68

---

#### **CALCulate<Measurement>[:CHANnel<Channel>]:SENSe:INDEX <index>**

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

Assigns the primary or secondary sensor. You can choose any of the sensors that are connected to a sensor port of the R&S NRX. You can query the connected power sensors using [**SENSe<Sensor>:**]CATalog?.

<b>Suffix:</b>	
<Measurement>	1 to 8 Measurement
<Channel>	1 to 2 1 = primary sensor, 2 = secondary sensor
<b>Parameters:</b>	
<index>	Selects the power sensor by the R&S NRX port to which it is connected.  <b>1 to 4</b> Sensor connector A, B, C, D <b>4 to 100</b> USB connector <b>101</b> Optional connector: sensor interface for R&S NRT (R&S NRX-B9) <b>102 to 128</b> LAN interface Range: 0 to 128 *RST: 0

**Manual operation:** See "[Primary Sensor, Secondary Sensor](#)" on page 68

### 14.6.5 Relative Measurements

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

Further information:

- "Rel" on page 72

<a href="#">CALCulate&lt;Measurement&gt;:RELative&lt;DirectionalChannel&gt;[:MAGNitude]</a> .....	272
<a href="#">CALCulate&lt;Measurement&gt;:RELative&lt;DirectionalChannel&gt;[:MAGNitude]:AUTO</a> .....	272
<a href="#">CALCulate&lt;Measurement&gt;:RELative&lt;DirectionalChannel&gt;:STATe</a> .....	272
<a href="#">[SENSe&lt;Sensor&gt;:]POWER:REFerence</a> .....	273

---

### **CALCulate<Measurement>:RELative<DirectionalChannel>[:MAGNitude] <value>**

Sets the reference value for the measured relative values.

#### **Suffix:**

<Measurement>      1 to 8  
Measurement

<DirectionalChannel> 1 to 2  
1 = forward, 2 = reflection (reverse)

#### **Parameters:**

<value>

**Manual operation:** See ["Forward Reference Value, Reflection Reference Value"](#)  
on page 56  
See ["Reference Value"](#) on page 72

---

### **CALCulate<Measurement>:RELative<DirectionalChannel>[:MAGNitude]:AUTO <state>**

Alias for [CALCulate<Measurement>:RELative<DirectionalChannel>:STATe](#)  
on page 272.

ONCE corresponds to SET

#### **Suffix:**

<Measurement>      1 to 8  
Measurement

<DirectionalChannel> 1 to 2  
1 = forward, 2 = reflection (reverse)

#### **Parameters:**

<state>              OFF | ONCE  
\*RST:              OFF

**Manual operation:** See ["Relative Measurements"](#) on page 73

---

### **CALCulate<Measurement>:RELative<DirectionalChannel>:STATe <state>**

Allows you to relate measured power or a power ratio 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:

[CALCulate<Measurement>:MATH\[:EXPRession\]](#) on page 323



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

on page 267

Alias:

UNIT<Measurement>:POWER:RELative:STATe

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

**Suffix:**

<Measurement> 1 to 8  
Measurement

<DirectionalChannel> 1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 =  
reflection (reverse)

**Parameters:**

<state> OFF | ON | SET  
**OFF**  
Absolute power or power ratio  
**ON**  
Relative power or power ratio, using the specified reference  
value.  
**SET**  
Uses the current measurement value as reference value and  
enables the relative measurement.  
\*RST: OFF

**Manual operation:** See "[Forward Relative State, Reflection Relative State](#)"  
on page 56  
See "[Relative Measurements](#)" on page 73

[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 [SENSe<Sensor>:]UNIT:  
POWER[:VALue]. For further information, see [Chapter 14.6.1.3, "Units"](#), on page 245.

**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 "[Forward Reference Value, Reflection Reference Value](#)"  
on page 56  
See "[Reference Value](#)" on page 72

## 14.6.6 Continuous Average

In a continuous average measurement, you can use commands that combine several setting commands. They are described in:

- [Chapter 14.4.1, "Continuous Average Measurements"](#), on page 187
- [Chapter 14.4.2, "Continuous Average Measurements with Buffering"](#), on page 194

Further information:

- [Chapter 7.1, "Continuous Average"](#), on page 71

<a href="#">[SENSe&lt;Sensor&gt;:][POWer:][AVG:]BUFFer:CLEar</a> .....	274
<a href="#">[SENSe&lt;Sensor&gt;:][POWer:][AVG:]BUFFer:COUNT?</a> .....	274
<a href="#">[SENSe&lt;Sensor&gt;:][POWer:][AVG:]BUFFer:INFO?</a> .....	274
<a href="#">[SENSe&lt;Sensor&gt;:][POWer:][AVG:]BUFFer:SIZE</a> .....	275
<a href="#">[SENSe&lt;Sensor&gt;:][POWer:][AVG:]BUFFer:STATe</a> .....	275

---

### [SENSe<Sensor>:][POWer:][AVG:]BUFFer:CLEar

Effective for continuous average measurements.

Clears the contents of the result buffer.

**Suffix:**

<Sensor>                    1 to 128  
 Configured sensor connected at: port A = 1, ... , port D = 4, R&S  
 NRX-B9 = 101, USB and LAN port = 5 to 100

**Usage:**                    Event

---

### [SENSe<Sensor>:][POWer:][AVG:]BUFFer:COUNT?

Effective for continuous average measurements.

Queries the number of results that are currently stored in the result buffer.

**Suffix:**

<Sensor>                    1 to 128  
 Configured sensor connected at: port A = 1, ... , port D = 4, R&S  
 NRX-B9 = 101, USB and LAN port = 5 to 100

**Usage:**                    Query only

---

### [SENSe<Sensor>:][POWer:][AVG:]BUFFer:INFO? [<ITEM>]

Effective for continuous average measurements.

**Suffix:**

<Sensor>                    1 to 128  
 Configured sensor connected at: port A = 1, ... , port D = 4, R&S  
 NRX-B9 = 101, USB and LAN port = 5 to 100

**Query parameters:**

<ITEM>

**Usage:** Query only

---

**[SENSE<Sensor>:][POWER:][AVG:]BUFFEr:SIZE <count>**

Effective for continuous average measurements.

Sets the size of the result buffer.

You can enable the buffer using [\[SENSE<Sensor>:\] \[POWER:\] \[AVG:\]BUFFEr:STATE](#).

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<count> Range: 1 to 131072  
\*RST: 1

---

**[SENSE<Sensor>:][POWER:][AVG:]BUFFEr:STATE <state>**

Enables or disables the buffered continuous average measurement. If enabled, all results generated by trigger events are collected until the buffer is filled. Thus, a higher data rate is achieved.

You can set the size of the buffer with [\[SENSE<Sensor>:\] \[POWER:\] \[AVG:\]BUFFEr:SIZE](#).

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<state> ON | OFF  
\*RST: OFF

## 14.6.7 Trace

Further information:

- [Chapter 7.3, "Trace"](#), on page 75

### 14.6.7.1 Trace Measurement Settings

In a trace measurement, you can use commands that combine several setting commands. They are described in [Chapter 14.4.3, "Trace Measurements"](#), on page 201.

CALCulate<Measurement>:TRACe:X:POINts.....	276
[SENSe<Sensor>:]BWIDth:VIDeo:LIST?.....	276
[SENSe<Sensor>:]BANDwidth:VIDeo:LIST?.....	276
[SENSe<Sensor>:]TRACe:REALtime.....	276

---

### CALCulate<Measurement>:TRACe:X:POINts <points>

Sets the number of required values per trace sequence.

**Suffix:**

<Measurement>      1 to 8  
Measurement

**Parameters:**

<points>              Range:      1 to 8192  
                         \*RST:      660

---

### [SENSe<Sensor>:]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:REALtime <state>

Effective for trace measurements.

If disabled, each measurement from the power sensor is averaged. If enabled, only one sampling sequence per measurement is recorded, thus increasing the measurement speed. With a higher measurement speed, the measured values of an individual measurement are immediately delivered.

**Suffix:**

<Sensor>              1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S  
NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<state>                ON | OFF  
\*RST:                OFF

### 14.6.7.2 Using Markers

CALCulate<Measurement>:TRACe:MARKer<Marker>:XDELta?	277
CALCulate<Measurement>:TRACe:MARKer<Marker>:YDELta?	277
CALCulate<Measurement>:TRACe:MARKer<Marker>:YPOSition?	278
DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:FEED:INDex	278
DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:FUNCTion	278
DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:MODE	279
DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:MODE	279
DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:POWER:DBM	280
DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:POWER:DBUV	281
DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:RELative:POWER:DB	281
DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:POWER:RATio:DB	281
DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:RELative:POWER:DPCT	282
DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:POWER:RATio:DPCT	282
DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:RELative:POWER:O	282
DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:POWER:RATio:O	282
DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:RELative:POWER:WATT	282
DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:POWER:WATT	282
DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:RELative:TIME	283
DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:TIME	283
DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:REFerence	283
DISPlay[:WINDow<Window>]:TRACe:MARKer<Undef>:SELECTION	284

---

#### CALCulate<Measurement>:TRACe:MARKer<Marker>:XDELta?

Queries the time difference between two markers.

##### Suffix:

<Measurement>	1 to 8 Measurement
<Marker>	1 to 4 Marker (M1 to M4)

**Usage:** Query only

---

#### CALCulate<Measurement>:TRACe:MARKer<Marker>:YDELta?

Queries the power difference between two markers.

##### Suffix:

<Measurement>	1 to 8 Measurement
<Marker>	1 to 4 Marker (M1 to M4)

**Usage:** Query only

**CALCulate<Measurement>:TRACe:MARKer<Marker>:YPOSITION?**

Queries the position of a marker on the power axis.

**Suffix:**

<Measurement>      1 to 8  
Measurement

<Marker>            1 to 4  
Marker (M1 to M4)

**Usage:**            Query only

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

Effective if `DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:MODE`  
`MEASure` is set.

Selects the trace.

**Suffix:**

<Window>            1 to 4  
Measurement pane

<Marker>            1 to 4  
Marker (M1 to M4)

**Parameters:**

<index>            **0**  
No trace selected.

**1**  
Trace 1

**2**  
Trace 2

Range:            0 to 2

\*RST:            0

**Manual operation:** See "[Data Source](#)" on page 80

**DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:FUNCTion <function>**

Effective if `DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:MODE`  
`MEASure` is set.

Defines the measurement.

**Suffix:**

<Window>            1 to 4  
Measurement pane

<Marker> 1 to 4  
Marker (M1 to M4)

**Parameters:**

<function> POWer | RPOWer | RTIME | RPAVerage

**POWer**

Measures the power of the trace.

**RPOWer**

Measures the power ratio in relation to the reference marker.

**RTIME**

Measures the time difference in relation to the reference marker.

**RPAVerage**

Measures the average power between time positions of the marker and its reference marker.

\*RST: POWer

**Manual operation:** See "[Measurement Mode](#)" on page 80

**DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:MODE <mode>**

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

**Suffix:**

<Window> 1 to 4  
Measurement pane

<Marker> 1 to 4  
Marker (M1 to M4)

**Parameters:**

<mode> OFF | RULer | MEASure

**OFF**

Disables the marker.

**RULer**

Shows a line at the marker position. Useful if you use the marker as reference marker, [DISPlay\[:WINDow<Window>\]:TRACe:MARKer<Marker>:REFerence](#).

**MEASure**

Shows a triangle at the marker position.

\*RST: OFF

**Manual operation:** See "[Marker Mode](#)" on page 78

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

Defines where the marker is placed.

**Suffix:**

<Window> 1 to 4  
Measurement pane

<Marker> 1 to 4  
Marker (M1 to M4)

**Parameters:**

<mode> FTIME | FPOWER | RPOSITION | RPOWER | RPLLeft | RPRRight | PSEArch | MSEArch | RPSLeft | RPSRight | RMSLeft | RMSRight

**FTIME**  
At a fixed time, set by the marker position.

**FPOWER**  
At a fixed power value, set by the marker position.

**RPOSITION**  
At a time difference of the marker position to the x-position of the reference marker.

**RPOWER**  
At a power difference of the marker position to the y-position of the reference marker.

**RPLLeft**  
Starting from the left border, at a power difference of the marker position to the y-position of the reference marker.

**RPRRight**  
Starting from the right border, at a power difference of the marker position to the y-position of the reference marker.

**PSEArch**  
Measured maximum power

**MSEArch**  
Measured minimum power

**RPSLeft**  
Maximum power measured left from the reference marker.

**RPSRight**  
Maximum power measured right from the reference marker.

**RMSLeft**  
Minimum power measured left from the reference marker.

**RMSRight**  
Minimum power measured right from the reference marker.

\*RST: FTIME

**Manual operation:** See "[Position Mode](#)" on page 78

---

**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 279.

**Suffix:**

<Window> 1 to 4  
Measurement pane



<Marker> 1 to 4  
Measurement pane

**Parameters:**

<power> Range: -200.0 to 200.0  
\*RST: 0.0  
Default unit: dBm

**Manual operation:** See "[Position](#)" on page 79

**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 279.

**Suffix:**

<Window> 1 to 4  
Measurement pane

<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 79

**DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:RELative:  
POWER:DB <power>**

**DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:POWER:RATio:  
DB <power>**

Sets an absolute or relative power value for the marker position defined under [DISPlay\[:WINDow<Window>\]:TRACe:MARKer<Marker>:POSition:MODE](#) on page 279.

**Suffix:**

<Window> 1 to 4  
Measurement pane

<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 79

---

**DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:RELative:  
POWER:DPCT <power>**

**DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:POWER:RATio:  
DPCT <power>**

Sets an absolute or relative value for the marker position defined under [DISPlay\[:WINDow<Window>\]:TRACe:MARKer<Marker>:POSition:MODE](#) on page 279.

**Suffix:**

<Window>                    1 to 4  
                                  Measurement pane

<Marker>                    1 to 4  
                                  Measurement pane

**Parameters:**

<power>                    Range:        -1e18 to 1e18  
                                  \*RST:        0.0  
                                  Default unit: dpct

**Manual operation:**    See "[Position](#)" on page 79

---

**DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:RELative:  
POWER:O <power>**

**DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:POWER:RATio:  
O <power>**

Sets an absolute or relative value for the marker position defined under [DISPlay\[:WINDow<Window>\]:TRACe:MARKer<Marker>:POSition:MODE](#) on page 279.

**Suffix:**

<Window>                    1 to 4  
                                  Measurement pane

<Marker>                    1 to 4  
                                  Marker (M1 to M4)

**Parameters:**

<power>                    Range:        -1e18 to 1e18  
                                  \*RST:        0.0  
                                  Default unit: -

**Manual operation:**    See "[Position](#)" on page 79

---

**DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:RELative:  
POWER:WATT <power>**

**DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:POWER:WATT  
<power>**

Sets an absolute or relative power value for the marker position defined under [DISPlay\[:WINDow<Window>\]:TRACe:MARKer<Marker>:POSition:MODE](#) on page 279.

**Suffix:**

<Window> 1 to 4  
Measurement pane

<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 79

**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 279.

**Suffix:**

<Window> 1 to 4  
Measurement pane

<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 79

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

Defines a marker as reference marker.

**Suffix:**

<Window> 1 to 4  
Measurement pane

<Marker> 1 to 4  
Marker (M1 to M4)

**Parameters:**

<reference> Range: 1 to 4  
\*RST: 1

**Manual operation:** See "[Reference Marker](#)" on page 80

**DISPlay[:WINDow<Window>]:TRACe:MARKer<Undef>:SELECTION <markerNo>**

Shows the selected marker in the trace.

**Suffix:**

<Window>                    1 to 4  
Measurement pane

<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 76

## 14.6.8 Pulse Analysis

Further information:

- Chapter 7.4, "Pulse Analysis", on page 80

[SENSe<Sensor>:]TRACe:MEASurement[:STATe].....	285
[SENSe<Sensor>:]TRACe:MEASurement:AUTO[:STATe].....	285
[SENSe<Sensor>:]TRACe:MEASurement:OFFSet:TIME.....	286
[SENSe<Sensor>:]TRACe:MID:OFFSet:TIME.....	286
[SENSe<Sensor>:]TRACe:MID:TIME.....	286
CALCulate<Measurement>:TRACe:MEASurement:ALGorithm.....	287
CALCulate<Measurement>:TRACe:MEASurement:DEFine:DURation:REFerence.....	287
CALCulate<Measurement>:TRACe:MEASurement:DEFine:TRANSition:HREFerence.....	287
CALCulate<Measurement>:TRACe:MEASurement:DEFine:TRANSition:LREFerence.....	288
CALCulate<Measurement>:TRACe:MEASurement:POWER:AVG?.....	288
CALCulate<Measurement>:TRACe:MEASurement:POWER:HREFerence?.....	288
CALCulate<Measurement>:TRACe:MEASurement:POWER:LREFerence?.....	289
CALCulate<Measurement>:TRACe:MEASurement:POWER:MAX?.....	289
CALCulate<Measurement>:TRACe:MEASurement:POWER:MIN?.....	289
CALCulate<Measurement>:TRACe:MEASurement:POWER:PULSe:BASE?.....	289
CALCulate<Measurement>:TRACe:MEASurement:POWER:PULSe:TOP?.....	290
CALCulate<Measurement>:TRACe:MEASurement:POWER:REFerence?.....	290
CALCulate<Measurement>:TRACe:MEASurement:PULSe:DCYCLE?.....	290
CALCulate<Measurement>:TRACe:MEASurement:PULSe:DURation?.....	290
CALCulate<Measurement>:TRACe:MEASurement:PULSe:PERiod?.....	291
CALCulate<Measurement>:TRACe:MEASurement:PULSe:SEPARation?.....	291
CALCulate<Measurement>:TRACe:MEASurement:TRANSition:NEGative:DURation?.....	291
CALCulate<Measurement>:TRACe:MEASurement:TRANSition:NEGative:OCCurrence?.....	292
CALCulate<Measurement>:TRACe:MEASurement:TRANSition:NEGative:OVERshoot?.....	292
CALCulate<Measurement>:TRACe:MEASurement:TRANSition:POSitive:DURation?.....	292
CALCulate<Measurement>:TRACe:MEASurement:TRANSition:POSitive:OCCurrence?.....	293
CALCulate<Measurement>:TRACe:MEASurement:TRANSition:POSitive:OVERshoot?.....	293
CALCulate<Measurement>:TRACe:MEASurement:TRANSition:SPERiod?.....	293
DISPlay[:WINDow<Window>]:TRACe:MEASurement:POWER:AVG[:STATe].....	294

DISPlay[:WINDow<Window>]:TRACe:MEASurement:POWer:MAXimum[:STATe].....	294
DISPlay[:WINDow<Window>]:TRACe:MEASurement:POWer:MINimum[:STATe].....	294
DISPlay[:WINDow<Window>]:TRACe:MEASurement:POWer:PULSe:BASE[:STATe].....	295
DISPlay[:WINDow<Window>]:TRACe:MEASurement:POWer:PULSe:HREFerence[:STATe]..	295
DISPlay[:WINDow<Window>]:TRACe:MEASurement:POWer:PULSe:LREFerence[:STATe]...	295
DISPlay[:WINDow<Window>]:TRACe:MEASurement:POWer:PULSe:TOP[:STATe].....	296
DISPlay[:WINDow<Window>]:TRACe:MEASurement:PULSe:DCYClE[:STATe].....	296
DISPlay[:WINDow<Window>]:TRACe:MEASurement:PULSe:DURation[:STATe].....	296
DISPlay[:WINDow<Window>]:TRACe:MEASurement:PULSe:PERiod[:STATe].....	297
DISPlay[:WINDow<Window>]:TRACe:MEASurement:PULSe:RESolution[:STATe].....	297
DISPlay[:WINDow<Window>]:TRACe:MEASurement:PULSe:SEPAration[:STATe].....	297
DISPlay[:WINDow<Window>]:TRACe:MEASurement:RRELation.....	298
DISPlay[:WINDow<Window>]:TRACe:MEASurement:SELectioN.....	298
DISPlay[:WINDow<Window>]:TRACe:MEASurement:TRANSition:NEGative:DURation[: STATe].....	298
DISPlay[:WINDow<Window>]:TRACe:MEASurement:TRANSition:NEGative: OCCurrence[:STATe].....	298
DISPlay[:WINDow<Window>]:TRACe:MEASurement:TRANSition:NEGative: OVERshoot[:STATe].....	299
DISPlay[:WINDow<Window>]:TRACe:MEASurement:TRANSition:POSitive:DURation[: STATe].....	299
DISPlay[:WINDow<Window>]:TRACe:MEASurement:TRANSition:POSitive: OCCurrence[:STATe].....	299
DISPlay[:WINDow<Window>]:TRACe:MEASurement:TRANSition:POSitive: OVERshoot[:STATe].....	300

---

#### [SENSe<Sensor>:]TRACe:MEASurement[:STATe] <value>

Enables or disables automatic pulse measurement. If enabled, the power sensor automatically determines the pulse parameters for the currently measured trace.

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<value> ON | OFF  
\*RST: OFF

---

#### [SENSe<Sensor>:]TRACe:MEASurement:AUTO[:STATe] <value>

Enables or disables the automatic transfer of the measured pulse parameters after each trace. If enabled, the trace and pulse data are synchronously displayed in continuous measurement mode.

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<value> \*RST: OFF

**[SENSe<Sensor>:]TRACe:MEASurement:OFFSet:TIME <value>**

Sets the start time of the pulse analysis, referenced to delay set by [TRIGger<Measurement>\[:CHANnel<Channel>\]:DElay\[:VALue\]](#).

By default, the parameters of the first detected pulse are determined. Using this command, you can determine parameters of another pulse. Make sure that the pulse analysis does not begin until shortly before this pulse.

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<value> Default unit: s

**[SENSe<Sensor>:]TRACe:MID:OFFSet:TIME <time>**

Sets an offset to the start of the gate in which the pulse analysis is performed. See also [\[SENSe<Sensor>:\]TRACe:MID:TIME](#) on page 286.

**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 length of the gate in which the pulse analysis is performed. The gate start is referenced to the trigger event.

Used to define a gate on a trace measurement, in which you want to perform a pulse analysis. If the gate length equals the length of the trace measurement, the first detected pulse is analyzed. Using a gate, you can investigate successive pulses.

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<time>                    Range:     0.0 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 8  
                               Measurement

**Parameters:**

<value>                    HISTogram | INTegration | PEAK  
                               \*RST:     HISTogram

**Manual operation:** See "[Algorithm](#)" on page 88

**CALCulate<Measurement>:TRACe:MEASurement:DEFine:DURation:REFerence <value>**

Effective for pulse analysis measurements.

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

**Suffix:**

<Measurement>        1 to 8  
                               Measurement

**Parameters:**

<value>                    Range:     0.0 to 100.0  
                               \*RST:     50.0  
                               Default unit: pct

**Manual operation:** See "[Reference Level](#)" on page 89

**CALCulate<Measurement>:TRACe:MEASurement:DEFine:TRANSition: HREFerence <value>**

Effective for pulse analysis measurements.

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

**Suffix:**

<Measurement>        1 to 8  
                               Measurement

**Parameters:**

<value>                    Range:     0.0 to 100.0  
                                  \*RST:     90.0  
                                  Default unit: pct

**Manual operation:**    See "[High Reference Level](#)" on page 89

**CALCulate<Measurement>:TRACe:MEASurement:DEFine:TRANSition:  
 LREFerence <value>**

Effective for pulse analysis measurements.

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

**Suffix:**

<Measurement>        1 to 8  
                                  Measurement

**Parameters:**

<value>                    Range:     0.0 to 100.0  
                                  \*RST:     10.0  
                                  Default unit: pct

**Manual operation:**    See "[Low Reference Level](#)" on page 89

**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 8  
                                  Measurement

**Usage:**                    Query only

**Manual operation:**    See "[Trace Avg](#)" on page 87

**CALCulate<Measurement>:TRACe:MEASurement:POWer:HREFerence?**

Effective for pulse analysis measurements.

Queries the power level at high reference level set by [CALCulate<Measurement>:TRACe:MEASurement:DEFine:TRANSition:HREFerence](#).

**Suffix:**

<Measurement>        1 to 8  
                                  Measurement

**Usage:**                    Query only

**Manual operation:**    See "[High Ref.](#)" on page 87



---

**CALCulate<Measurement>:TRACe:MEASurement:POWer:LREference?**

Effective for pulse analysis measurements.

Queries the power level at low reference level set by [CALCulate<Measurement>:TRACe:MEASurement:DEFine:TRANSition:LREference](#).

**Suffix:**

<Measurement>      1 to 8  
                                 Measurement

**Usage:**                      Query only

**Manual operation:**    See "[Low Ref.](#)" on page 87

---

**CALCulate<Measurement>:TRACe:MEASurement:POWer:MAX?**

Effective for pulse analysis measurements.

Queries the maximum power measured within the analysis window.

**Suffix:**

<Measurement>      1 to 8  
                                 Measurement

**Usage:**                      Query only

**Manual operation:**    See "[Trace Peak](#)" on page 86

---

**CALCulate<Measurement>:TRACe:MEASurement:POWer:MIN?**

Effective for pulse analysis measurements.

Queries the minimum power measured within the analysis window.

**Suffix:**

<Measurement>      1 to 8  
                                 Measurement

**Usage:**                      Query only

**Manual operation:**    See "[Trace Min](#)" on page 87

---

**CALCulate<Measurement>:TRACe:MEASurement:POWer:PULSe:BASE?**

Effective for pulse analysis measurements.

Queries the pulse base power level detected by the selected [CALCulate<Measurement>:TRACe:MEASurement:ALGorithm](#). This value is used as a reference (0 %) to determine other parameter values such as the rising or falling thresholds.

**Suffix:**

<Measurement>      1 to 8  
                                 Measurement

**Usage:** Query only

**Manual operation:** See ["Pulse Base"](#) on page 87

#### **CALCulate<Measurement>:TRACe:MEASurement:POWer:PULSe:TOP?**

Effective for pulse analysis measurements.

Queries the pulse top power level detected by the selected [CALCulate<Measurement>:TRACe:MEASurement:ALGorithm](#). This value is used as a reference (100 %) to determine other parameter values such as the rising or falling thresholds.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Usage:** Query only

**Manual operation:** See ["Pulse Top"](#) on page 86

#### **CALCulate<Measurement>:TRACe:MEASurement:POWer:REFerence?**

Effective for pulse analysis measurements.

Queries the power level at reference level. See [CALCulate<Measurement>:TRACe:MEASurement:DEFine:DURation:REFerence](#) on page 287.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Usage:** Query only

#### **CALCulate<Measurement>:TRACe:MEASurement:PULSe:DCYCLE?**

Effective for pulse analysis measurements.

Queries the duty cycle of the measured power.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Usage:** Query only

**Manual operation:** See ["Duty Cycle"](#) on page 84

#### **CALCulate<Measurement>:TRACe:MEASurement:PULSe:DURation?**

Effective for pulse analysis measurements.

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

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Usage:** Query only

**Manual operation:** See "[Pulse Width](#)" on page 83

**CALCulate<Measurement>:TRACe:MEASurement:PULSe:PERiod?**

Effective for pulse analysis measurements.

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

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Usage:** Query only

**Manual operation:** See "[Pulse Period](#)" on page 83

**CALCulate<Measurement>:TRACe:MEASurement:PULSe:SEParation?**

Effective for pulse analysis measurements.

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

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Usage:** Query only

**Manual operation:** See "[Pulse Off Time](#)" on page 84

**CALCulate<Measurement>:TRACe:MEASurement:TRANSition:NEGative:DURation?**

Effective for pulse analysis measurements.

Queries the time that the pulse requires to transition from the pulse top level to the pulse base level.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Usage:** Query only

**Manual operation:** See "[Fall Time](#)" on page 84

---

**CALCulate<Measurement>:TRACe:MEASurement:TRANSition:NEGative:  
OCCurrence?**

Effective for pulse analysis measurements.

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

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Usage:** Query only

**Manual operation:** See "[Stop Time](#)" on page 85

---

**CALCulate<Measurement>:TRACe:MEASurement:TRANSition:NEGative:  
OVERshoot?**

Effective for pulse analysis measurements.

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

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

Depends on the setting under [DISPlay\[:WINDow<Window>\]:TRACe:MEASurement:RRELation](#).

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Usage:** Query only

**Manual operation:** See "[Neg. Overshoot](#)" on page 86

---

**CALCulate<Measurement>:TRACe:MEASurement:TRANSition:POSitive:  
DURATION?**

Effective for pulse analysis measurements.

Queries the time that the pulse requires to transition from the pulse base level to the pulse top level.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Usage:** Query only

**Manual operation:** See "[Rise Time](#)" on page 84

---

**CALCulate<Measurement>:TRACe:MEASurement:TRANSition:POSitive:  
OCCurrence?**

Effective for pulse analysis measurements.

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

**Suffix:**

<Measurement>      1 to 8  
                                 Measurement

**Usage:**                      Query only

**Manual operation:**    See "[Start Time](#)" on page 84

---

**CALCulate<Measurement>:TRACe:MEASurement:TRANSition:POSitive:  
OVERshoot?**

Effective for pulse analysis measurements.

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

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

Depends on the setting under `DISPlay[:WINDow<Window>]:TRACe:MEASurement:RRELation`.

**Suffix:**

<Measurement>      1 to 8  
                                 Measurement

**Usage:**                      Query only

**Manual operation:**    See "[Pos. Overshoot](#)" on page 87

---

**CALCulate<Measurement>:TRACe:MEASurement:TRANSition:SPERiod?**

Effective for pulse analysis measurements.

Queries the number of samples per second.

**Suffix:**

<Measurement>      1 to 8  
                                 Measurement

**Usage:**                      Query only

**Manual operation:**    See "[Sampling Rate](#)" on page 85

---

**DISPlay[:WINDow<Window>]:TRACe:MEASurement:POWer:AVG[:STATe]** <value>

Effective for pulse analysis measurements.

Enables or disables the display of the average signal power. See [CALCulate<Measurement>:TRACe:MEASurement:POWer:AVG?](#) on page 288.

**Suffix:**

<Window>                    1 to 4  
Measurement pane

**Parameters:**

<value>                    \*RST:        OFF

**Manual operation:**    See "[Trace Avg](#)" on page 87

---

**DISPlay[:WINDow<Window>]:TRACe:MEASurement:POWer:MAXimum[:STATe]**  
<value>

Effective for pulse analysis measurements.

Enables or disables the display of the maximum power measured within the analysis window. See [CALCulate<Measurement>:TRACe:MEASurement:POWer:MAX?](#) on page 289.

**Suffix:**

<Window>                    1 to 4  
Measurement pane

**Parameters:**

<value>                    \*RST:        OFF

**Manual operation:**    See "[Trace Peak](#)" on page 86

---

**DISPlay[:WINDow<Window>]:TRACe:MEASurement:POWer:MINimum[:STATe]**  
<value>

Effective for pulse analysis measurements.

Enables or disables the display of the minimum power measured within the analysis window. See [CALCulate<Measurement>:TRACe:MEASurement:POWer:MIN?](#) on page 289.

**Suffix:**

<Window>                    1 to 4  
Measurement pane

**Parameters:**

<value>                    \*RST:        OFF

**Manual operation:**    See "[Trace Min](#)" on page 87

---

**DISPlay[:WINDow<Window>]:TRACe:MEASurement:POWer:PULSe:BASE[:STATE] <value>**

Effective for pulse analysis measurements.

Enables or disables the display of the pulse base power. See [CALCulate<Measurement>:TRACe:MEASurement:POWer:PULSe:BASE?](#) on page 289.

**Suffix:**

<Window>                    1 to 4  
Measurement pane

**Parameters:**

<value>                    \*RST:        OFF

**Manual operation:**    See "[Pulse Base](#)" on page 87

---

**DISPlay[:WINDow<Window>]:TRACe:MEASurement:POWer:PULSe:HREFerence[:STATE] <value>**

Effective for pulse analysis measurements.

Enables or disables the display of the power level at high reference level. See [CALCulate<Measurement>:TRACe:MEASurement:POWer:HREFerence?](#) on page 288.

**Suffix:**

<Window>                    1 to 4  
Measurement pane

**Parameters:**

<value>                    \*RST:        OFF

**Manual operation:**    See "[High Ref.](#)" on page 87

---

**DISPlay[:WINDow<Window>]:TRACe:MEASurement:POWer:PULSe:LREFerence[:STATE] <value>**

Effective for pulse analysis measurements.

Enables or disables the display of the power level at low reference level. See [CALCulate<Measurement>:TRACe:MEASurement:POWer:LREFerence?](#) on page 289.

**Suffix:**

<Window>                    1 to 4  
Measurement pane

**Parameters:**

<value>                    \*RST:        OFF

**Manual operation:**    See "[Low Ref.](#)" on page 87

---

**DISPlay[:WINDow<Window>]:TRACe:MEASurement:POWer:PULSe:TOP[:STATe]**  
<value>

Effective for pulse analysis measurements.

Enables or disables the display of the pulse top power. See

[CALCulate<Measurement>:TRACe:MEASurement:POWer:PULSe:TOP?](#)  
on page 290.

**Suffix:**

<Window>                    1 to 4  
                                  Measurement pane

**Parameters:**

<value>                    \*RST:        OFF

**Manual operation:**    See "[Pulse Top](#)" on page 86

---

**DISPlay[:WINDow<Window>]:TRACe:MEASurement:PULSe:DCYCLe[:STATe]**  
<value>

Effective for pulse analysis measurements.

Enables or disables the display of the duty cycle of the measured power. See

[CALCulate<Measurement>:TRACe:MEASurement:PULSe:DCYCLe?](#) on page 290.

**Suffix:**

<Window>                    1 to 4  
                                  Measurement pane

**Parameters:**

<value>                    \*RST:        OFF

**Manual operation:**    See "[Duty Cycle](#)" on page 84

---

**DISPlay[:WINDow<Window>]:TRACe:MEASurement:PULSe:DURation[:STATe]**  
<value>

Effective for pulse analysis measurements.

Enables or disables the display of the pulse width. See [CALCulate<Measurement>:](#)

[TRACe:MEASurement:PULSe:DURation?](#) on page 290.

**Suffix:**

<Window>                    1 to 4  
                                  Measurement pane

**Parameters:**

<value>                    \*RST:        OFF

**Manual operation:**    See "[Pulse Width](#)" on page 83



---

**DISPlay[:WINDow<Window>]:TRACe:MEASurement:PULSe:PERiod[:STATe]**  
<value>

Effective for pulse analysis measurements.

Enables or disables the display of the time that the pulse signal needs to complete one cycle. See [CALCulate<Measurement>:TRACe:MEASurement:PULSe:PERiod?](#) on page 291.

**Suffix:**

<Window>                    1 to 4  
                                  Measurement pane

**Parameters:**

<value>                    \*RST:        OFF

**Manual operation:**    See "[Pulse Period](#)" on page 83

---

**DISPlay[:WINDow<Window>]:TRACe:MEASurement:PULSe:RESolution[:STATe]**  
<value>

Effective for pulse analysis measurements.

Displays the number of samples per second. See [CALCulate<Measurement>:TRACe:MEASurement:TRANsition:SPERiod?](#) on page 293.

**Suffix:**

<Window>                    1 to 4  
                                  Measurement pane

**Parameters:**

<value>                    \*RST:        OFF

**Manual operation:**    See "[Sampling Rate](#)" on page 85

---

**DISPlay[:WINDow<Window>]:TRACe:MEASurement:PULSe:SEParation[:STATe]**  
<value>

Effective for pulse analysis measurements.

Enables or disables the display of the gap between two pulses. See [CALCulate<Measurement>:TRACe:MEASurement:PULSe:SEParation?](#) on page 291.

**Suffix:**

<Window>                    1 to 4  
                                  Measurement pane

**Parameters:**

<value>                    \*RST:        OFF

**Manual operation:**    See "[Pulse Off Time](#)" on page 84

---

**DISPlay[:WINDow<Window>]:TRACe:MEASurement:RRELation <refRelation>**

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

**Suffix:**

<Window>            1 to 4  
                         Measurement pane

**Parameters:**

<refRelation>        POWer | VOLTage  
                         \*RST:        POWer

**Manual operation:** See "[Reference Levels relate to](#)" on page 88

---

**DISPlay[:WINDow<Window>]:TRACe:MEASurement:SELECTION <traceNo>**

Selects the displayed trace.

**Suffix:**

<Window>            1 to 4  
                         Measurement pane

**Parameters:**

<traceNo>            Range:        1 to 2  
                         \*RST:        1

**Manual operation:** See "[T1 / T2](#)" on page 81

---

**DISPlay[:WINDow<Window>]:TRACe:MEASurement:TRANSition:NEGative: DURATION[:STATE] <value>**

Effective for pulse analysis measurements.

Enables or disables the display of the fall time of the first detected pulse. See [CALCulate<Measurement>:TRACe:MEASurement:TRANSition:NEGative: DURATION?](#) on page 291.

**Suffix:**

<Window>            1 to 4  
                         Measurement pane

**Parameters:**

<value>                \*RST:        OFF

**Manual operation:** See "[Fall Time](#)" on page 84

---

**DISPlay[:WINDow<Window>]:TRACe:MEASurement:TRANSition:NEGative: OCCurrence[:STATE] <value>**

Effective for pulse analysis measurements.

Enables or disables the display of the time when the signal passes through the medial reference power level with falling edge. See [CALCulate<Measurement>:TRACe:MEASurement:TRANSition:NEGative: OCCurrence?](#) on page 292.

**Suffix:**

<Window>            1 to 4  
Measurement pane

**Parameters:**

<value>            \*RST:        OFF

**Manual operation:** See "[Stop Time](#)" on page 85

**DISPlay[:WINDow<Window>]:TRACe:MEASurement:TRANSition:NEGative:  
OVERshoot[:STATe] <value>**

Effective for pulse analysis measurements.

Enables or disables the display of the relative amount of negative overshoot. See [CALCulate<Measurement>:TRACe:MEASurement:TRANSition:NEGative:OVERshoot?](#) on page 292.

**Suffix:**

<Window>            1 to 4  
Measurement pane

**Parameters:**

<value>            \*RST:        OFF

**Manual operation:** See "[Neg. Overshoot](#)" on page 86

**DISPlay[:WINDow<Window>]:TRACe:MEASurement:TRANSition:POSitive:  
DURation[:STATe] <value>**

Effective for pulse analysis measurements.

Enables or disables the display of the rise time of the first detected pulse. See [CALCulate<Measurement>:TRACe:MEASurement:TRANSition:POSitive:DURation?](#) on page 292.

**Suffix:**

<Window>            1 to 4  
Measurement pane

**Parameters:**

<value>            \*RST:        OFF

**Manual operation:** See "[Rise Time](#)" on page 84

**DISPlay[:WINDow<Window>]:TRACe:MEASurement:TRANSition:POSitive:  
OCCurrence[:STATe] <value>**

Effective for pulse analysis measurements.

Enables or disables the display of the time when the signal passes through the medial reference power level with rising edge. See [CALCulate<Measurement>:TRACe:MEASurement:TRANSition:POSitive:OCCurrence?](#) on page 293.

**Suffix:**  
 <Window> 1 to 4  
 Measurement pane

**Parameters:**  
 <value> \*RST: OFF

**Manual operation:** See "Start Time" on page 84

**DISPlay[:WINDow<Window>]:TRACe:MEASurement:TRANSition:POSitive:OVERshoot[:STATe] <value>**

Effective for pulse analysis measurements.

Enables or disables the display of the relative amount of positive overshoot. See [CALCulate<Measurement>:TRACe:MEASurement:TRANSition:POSitive:OVERshoot?](#) on page 293.

**Suffix:**  
 <Window> 1 to 4  
 Measurement pane

**Parameters:**  
 <value> \*RST: OFF

**Manual operation:** See "Pos. Overshoot" on page 87

## 14.6.9 Time Gate

Further information:

- [Chapter 7.5, "Time Gate"](#), on page 89

[CALCulate<Measurement>\[:POWER\]:TGATe<Gate>\[:AVG\]:OFFSet\[:TIME\]](#)..... 300  
[CALCulate<Measurement>\[:POWER\]:TGATe<Gate>\[:AVG\]:TIME](#)..... 301  
[CALCulate<Measurement>\[:POWER\]:TGATe<Gate>\[:AVG\]\[:EXCLude\]:MID:OFFSet\[:TIME\]](#)... 301  
[CALCulate<Measurement>\[:POWER\]:TGATe<Gate>\[:AVG\]\[:EXCLude\]:MID:TIME](#)..... 301  
[CALCulate<Measurement>\[:POWER\]:TGATe<Gate>\[:AVG\]\[:EXCLude\]:MID\[:STATe\]](#).....302  
[CALCulate<Measurement>\[:POWER\]:TGATe<Undef>\[:AVG\]:SELection](#).....302

**CALCulate<Measurement>[:POWER]:TGATe<Gate>[:AVG]:OFFSet[:TIME] <value>**

Sets the length of the gate.

**Suffix:**  
 <Measurement> 1 to 8  
 Measurement

<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 94

**CALCulate<Measurement>[:POWER]:TGATe<Gate>[:AVG]:TIME <value>**

Sets the start time of the gate.

**Suffix:**

<Measurement>        1 to 8  
                               Measurement

<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 94

**CALCulate<Measurement>[:POWER]:TGATe<Gate>[:AVG][:EXCLude]:MID:OFFSet[:TIME] <value>**

Sets length of the fence.

**Suffix:**

<Measurement>        1 to 8  
                               Measurement

<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 94

**CALCulate<Measurement>[:POWER]:TGATe<Gate>[:AVG][:EXCLude]:MID:TIME <value>**

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

**Suffix:**

<Measurement>        1 to 8  
                               Measurement

<Gate> 1 to 4  
Time gate

**Parameters:**

<value> Range: 0.0 to 0.1  
\*RST: 0.0  
Default unit: s

**Manual operation:** See ["Start of Fence"](#) on page 94

**CALCulate<Measurement>[:POWER]:TGATe<Gate>[:AVG][:EXCLude]:MID[:STATe]**  
<value>

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

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

**Suffix:**

<Measurement> 1 to 8  
Measurement

<Gate> 1 to 4  
Time gate

**Parameters:**

<value> \*RST: OFF

**Manual operation:** See ["Fence"](#) on page 94

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

Selects the active gate for the measurement.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<Undef> 1 to n  
No suffix required.

**Parameters:**

<value> Range: 1 to 4  
\*RST: 1

**Manual operation:** See ["G1 / G2 / G3 / G4"](#) on page 92

### 14.6.10 Timeslot

In a timeslot measurement, you can use commands that combine several setting commands. They are described in [Chapter 14.4.5, "Timeslot Measurements"](#), on page 211.

Further information:

- [Chapter 7.6, "Timeslot"](#), on page 94

<a href="#">CALCulate&lt;Measurement&gt;:TSLot:TIMing:EXCLude:START</a> .....	303
<a href="#">CALCulate&lt;Measurement&gt;:TSLot:TIMing:EXCLude:STOP</a> .....	303
<a href="#">CALCulate&lt;Measurement&gt;[:POWer]:TSLot[:AVG]:COUNT</a> .....	303
<a href="#">CALCulate&lt;Measurement&gt;[:POWer]:TSLot[:AVG]:SELEction</a> .....	304
<a href="#">CALCulate&lt;Measurement&gt;[:POWer]:TSLot[:AVG]:WIDTh</a> .....	304
<a href="#">CALCulate&lt;Measurement&gt;[:POWer]:TSLot[:AVG][:EXCLude]:MID:OFFSet[:TIME]</a> .....	304
<a href="#">CALCulate&lt;Measurement&gt;[:POWer]:TSLot[:AVG][:EXCLude]:MID:TIME</a> .....	304
<a href="#">CALCulate&lt;Measurement&gt;[:POWer]:TSLot[:AVG][:EXCLude]:MID:STATe</a> .....	305

---

### **CALCulate<Measurement>:TSLot:TIMing:EXCLude:START** <value>

Defines an interval at the start of the timeslot that is excluded from the measurement.

#### **Suffix:**

<Measurement>      1 to 8  
Measurement

#### **Parameters:**

<value>              Range:      0.0 to 15.0  
                         \*RST:      0.0  
                         Default unit: s

**Manual operation:**    See "[Exclude from Start](#)" on page 99

---

### **CALCulate<Measurement>:TSLot:TIMing:EXCLude:STOP** <value>

Defines an interval at the end of the timeslot that is excluded from the measurement.

#### **Suffix:**

<Measurement>      1 to 8  
Measurement

#### **Parameters:**

<value>              Range:      0.0 to 15.0  
                         \*RST:      0.0  
                         Default unit: s

**Manual operation:**    See "[Exclude from End](#)" on page 99

---

### **CALCulate<Measurement>[:POWer]:TSLot[:AVG]:COUNT** <value>

Sets the number of simultaneously measured timeslots.

#### **Suffix:**

<Measurement>      1 to 8  
Measurement

#### **Parameters:**

<value>              Range:      1 to 128  
                         \*RST:      8

**Manual operation:** See "[Slots](#)" on page 99

---

**CALCulate<Measurement>[:POWER]:TSlot[:AVG]:SELECTION <value>**

Selects a timeslot for the measurement.

**Suffix:**

<Measurement>      1 to 8  
Measurement

**Parameters:**

<value>              Range:      1 to 128  
                         \*RST:      1

**Manual operation:** See "[Timeslot](#)" on page 97

---

**CALCulate<Measurement>[:POWER]:TSlot[:AVG]:WIDTH <value>**

Sets the length of the timeslot.

**Suffix:**

<Measurement>      1 to 8  
Measurement

**Parameters:**

<value>              Range:      50.0e-9 to 0.1  
                         \*RST:      1.0e-3  
                         Default unit: s

**Manual operation:** See "[Nominal Width](#)" on page 99

---

**CALCulate<Measurement>[:POWER]:TSlot[:AVG][:EXCLUDE]:MID:OFFSET[:TIME] <value>**

Sets the length of the fence.

**Suffix:**

<Measurement>      1 to 8  
Measurement

**Parameters:**

<value>              Range:      0.0 to 0.1  
                         \*RST:      0.0  
                         Default unit: s

**Manual operation:** See "[Length of Fence](#)" on page 100

---

**CALCulate<Measurement>[:POWER]:TSlot[:AVG][:EXCLUDE]:MID:TIME <value>**

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



**Suffix:**

<Measurement> 1 to 8  
Measurement

**Parameters:**

<value> Range: 0.0 to 0.1  
\*RST: 0.0  
Default unit: s

**Manual operation:** See ["Start of Fence"](#) on page 100

**CALCulate<Measurement>[:POWER]:TSLot[:AVG][:EXCLude]:MID[:STATe]**  
<value>

Enables or disables an exclusion interval in the timeslots. This exclusion interval is called fence. The fence is defined by its start time and its length.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Parameters:**

<value> \*RST: OFF

**Manual operation:** See ["Fence"](#) on page 100

## 14.6.11 Statistics

Further information:

- [Chapter 7.7, "Statistics"](#), on page 100

### 14.6.11.1 Statistics Measurement Settings

In a statistics measurement, you can use commands that combine several setting commands. They are described in [Chapter 14.4.6, "Statistics Measurements"](#), on page 220.

For time gate settings, see also [Chapter 14.6.9, "Time Gate"](#), on page 300.

[SENSe<Sensor>:]STATistics:AVERage?	305
[SENSe<Sensor>:]STATistics:OFFSet[:TIME]	306
[SENSe<Sensor>:]STATistics:PEAK?	306
CALCulate<Measurement>:STATistics:POWER:AVG:DATA?	306
CALCulate<Measurement>:STATistics:APERture	307
CALCulate<Measurement>:STATistics:AWGN[:STATe]	307
CALCulate<Measurement>:STATistics:SAMPles[:MINimum]	307
CALCulate<Measurement>:STATistics:TGATe:SELction	307

#### [SENSe<Sensor>:]STATistics:AVERage?

Queries the average power value calculated during a statistics measurement.

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Usage:**

Query only

**[SENSe<Sensor>:]STATistics:OFFSet[:TIME] <time>**

Sets the start of the sampling window, referenced to delay set by [TRIGger<Measurement>\[:CHANnel<Channel>\]:DELay\[:VALue\]](#).

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<time> Range: 0.0 to 10.0  
\*RST: 0.0  
Default unit: s

**[SENSe<Sensor>:]STATistics:PEAK?**

Queries the peak power value calculated during a CCDF or PDF statistics measurement.

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Usage:**

Query only

**CALCulate<Measurement>:STATistics:POWer:AVG:DATA?**

Effective for statistics measurements.

Queries the average power value in the sampling window.

The command is not fully R&S NRP2 compatible. If port 1 is assigned to measurement 1 and so on, the command works. If port 1 is assigned to measurement 2, for example, enable the R&S NRP2 emulation using [SYSTem:LANGuage](#) "NRP2".

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Usage:**

Query only

---

**CALCulate<Measurement>:STATistics:APERture <value>**

Effective for statistics measurements.

Sets the width of the sampling window for unsynchronized acquisition, that is if

[CALCulate<Measurement>:STATistics:TGATe:SElection](#) 0 is set.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Parameters:**

<value> Range: 10e-6 to 10.0  
\*RST: 0.01  
Default unit: s

**Manual operation:** See "[Aperture](#)" on page 116

---

**CALCulate<Measurement>:STATistics:AWGN[:STATe] <value>**

Effective for statistics measurements.

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

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Parameters:**

<value> \*RST: OFF

**Manual operation:** See "[AWGN](#)" on page 104

---

**CALCulate<Measurement>:STATistics:SAMPles[:MINimum] <value>**

Effective for statistics measurements.

Sets the minimum number of samples.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Parameters:**

<value> Range: 1 to 2147483647  
\*RST: 1000000

**Manual operation:** See "[Minimum Samples](#)" on page 104

---

**CALCulate<Measurement>:STATistics:TGATe:SElection <value>**

Effective for statistics measurements.

Configures the sampling window.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Parameters:**

<value> 0  
Continuous  
1 - 4  
Gate number  
Range: 0 to 4  
\*RST: 1

**Manual operation:** See "Evaluate" on page 107

**14.6.11.2 Scaling**

[SENSe<Sensor>:]STATistics:SCALe:X:MPWidth?	308
CALCulate<Measurement>:STATistics:PDF[:SCALe]:Y:PDIVision	308
CALCulate<Measurement>:STATistics:PDF[:SCALe]:Y:TOP	309
CALCulate<Measurement>:STATistics[:CDF][:SCALe]:Y[:LINear]:PDIVision	309
CALCulate<Measurement>:STATistics[:CDF][:SCALe]:Y[:LINear]:TOP	309
CALCulate<Measurement>:STATistics[:SCALe]:X:MODE	310
CALCulate<Measurement>:STATistics[:SCALe]:X:POINTs	310
CALCulate<Measurement>:STATistics[:SCALe]:X:RANGe	311
CALCulate<Measurement>:STATistics[:SCALe]:X:RLEVel:RELative	311
CALCulate<Measurement>:STATistics[:SCALe]:X:RLEVel[:ABSolute]	311
CALCulate<Measurement>:STATistics[:SCALe]:Y:SPACing	312

**[SENSe<Sensor>:]STATistics:SCALe:X:MPWidth?**

Queries the greatest level resolution that can be attained. If the value is exceeded, a settings conflict occurs, due to the following reasons:

- Number of pixels that has been selected is too great, see [CALCulate<Measurement>:STATistics\[:SCALe\]:X:POINTs](#) on page 310.
- Width chosen for the level range is too small, see [CALCulate<Measurement>:STATistics\[:SCALe\]:X:RANGe](#) on page 311.

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S  
NRX-B9 = 101, USB and LAN port = 5 to 100

**Usage:** Query only

**CALCulate<Measurement>:STATistics:PDF[:SCALe]:Y:PDIVision <value>**

Effective if [CALCulate<Measurement>:STATistics\[:SCALe\]:Y:SPACing](#) LIN is set.

Sets the scaling of the y-axis for PDF statistics measurements.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Parameters:**

<value> Range: 0.01 to 1000.0  
\*RST: 0.2  
Default unit: -

**Manual operation:** See "Y / div" on page 105

**CALCulate<Measurement>:STATistics:PDF[:SCALE]:Y:TOP <value>**

Effective if `CALCulate<Measurement>:STATistics[:SCALE]:Y:SPACing` LIN is set.

Sets the maximum value of the y-axis for PDF statistics measurements.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Parameters:**

<value> Range: 0.0 to 10000.0  
\*RST: 1.0  
Default unit: -

**Manual operation:** See "Y Maximum" on page 105

**CALCulate<Measurement>:STATistics[:CDF][:SCALE]:Y[:LINear]:PDIVision <value>**

Effective if `CALCulate<Measurement>:STATistics[:SCALE]:Y:SPACing` LIN is set.

Sets the scaling of the y-axis for CDF statistics measurements.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Parameters:**

<value> Range: 0.001 to 20.0  
\*RST: 20.0  
Default unit: pct

**Manual operation:** See "Y / div" on page 105

**CALCulate<Measurement>:STATistics[:CDF][:SCALE]:Y[:LINear]:TOP <value>**

Effective if `CALCulate<Measurement>:STATistics[:SCALE]:Y:SPACing` LIN is set.

Sets the maximum value of the y-axis for CDF statistics measurements.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Parameters:**

<value> Range: 0.0 to 100.0  
\*RST: 100.0  
Default unit: pct

**Manual operation:** See "[Y Maximum](#)" on page 105

**CALCulate<Measurement>:STATistics[:SCALe]:X:MODE <value>**

Effective for statistics measurements.

Sets relative or absolute scaling for the x-axis.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Parameters:**

<value> ABSolute | RELative  
\*RST: ABSolute

**Manual operation:** See "[Scaling of Power Axis](#)" on page 105

**CALCulate<Measurement>:STATistics[:SCALe]:X:POINTs <value>**

Effective for statistics measurements.

Sets the measurement result resolution. It specifies the number of pixels that are assigned to the logarithmic level range for measured value output. The width of the level range divided by N-1, where N is the number of pixels, must not be less than the smallest level resolution.

- Level range: [CALCulate<Measurement>:STATistics\[:SCALe\]:X:RANGe](#) on page 311
- Smallest level resolution: [\[SENSe<Sensor>:\]STATistics:SCALe:X:MPWidth?](#) on page 308

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Parameters:**

<value> Range: 3 to 8191  
\*RST: 600

**Manual operation:** See "[Power / div](#)" on page 105

**CALCulate<Measurement>:STATistics[:SCALe]:X:RANGe <value>**

Effective for statistics measurements.

Sets the width of the level range for the analysis result.

Lower limit of the level range:

- [CALCulate<Measurement>:STATistics\[:SCALe\]:X:RLEVEL:RELative](#) on page 311
- [CALCulate<Measurement>:STATistics\[:SCALe\]:X:RLEVEL\[:ABSolute\]](#) on page 311

**Suffix:**

<Measurement>      1 to 8  
Measurement

**Parameters:**

<value>              Range:      0.01 to 100.0  
                         \*RST:      50.0  
                         Default unit: dB

**Manual operation:** See "[Power / div](#)" on page 105

**CALCulate<Measurement>:STATistics[:SCALe]:X:RLEVEL:RELative <value>**

Effective for statistics measurements with relative power display.

Sets the lower limit of the level range for the analysis result. This level is assigned to the first pixel. The level assigned to the last pixel is equal to the level of the first pixel plus the level range.

**Suffix:**

<Measurement>      1 to 8  
Measurement

**Parameters:**

<value>              Range:      -400.0 to 400.0  
                         \*RST:      -25.0  
                         Default unit: dB

**Manual operation:** See "[Minimum Power](#)" on page 105

**CALCulate<Measurement>:STATistics[:SCALe]:X:RLEVEL[:ABSolute] <value>**

Effective for statistics measurements with absolute power display.

Sets the lower limit of the level range for the analysis result. This level is assigned to the first pixel. The level assigned to the last pixel is equal to the level of the first pixel plus the level range.

**Suffix:**

<Measurement>      1 to 8  
Measurement

**Parameters:**

<value>                    Range:        -400.0 to 400.0  
                               \*RST:        -30.0  
                               Default unit: dBm

**Manual operation:**    See "[Minimum Power](#)" on page 105

**CALCulate<Measurement>:STATistics[:SCALe]:Y:SPACing <value>**

Effective for statistics measurements.

Sets linear or logarithmic scaling for the y-axis.

**Suffix:**

<Measurement>        1 to 8  
                               Measurement

**Parameters:**

<value>                    LINear | LOGarithmic  
                               \*RST:        LOGarithmic

**Manual operation:**    See "[Scaling of Y Axis](#)" on page 105

**14.6.11.3 Using Markers**

<a href="#">CALCulate&lt;Measurement&gt;:STATistics[:CDF]:MARKer:Y:POSition.....</a>	312
<a href="#">CALCulate&lt;Measurement&gt;:STATistics:MARKer:HORizontal:DATA?.....</a>	312
<a href="#">CALCulate&lt;Measurement&gt;:STATistics:MARKer:VERTical:DATA[:POWER]?.....</a>	313
<a href="#">CALCulate&lt;Measurement&gt;:STATistics:MARKer:X:POSition[:ABSolute].....</a>	313
<a href="#">CALCulate&lt;Measurement&gt;:STATistics:MARKer:X:POSition:RELative.....</a>	313
<a href="#">CALCulate&lt;Measurement&gt;:STATistics:PDF:MARKer:Y:POSition.....</a>	314

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

Positions the y-marker to a measurement value of the CDF statistics measurement.

**Suffix:**

<Measurement>        1 to 8  
                               Measurement

**Parameters:**

<value>                    Range:        0.0 to 100.0  
                               \*RST:        50.0  
                               Default unit: pct

**Manual operation:**    See "[\[%\] marker](#)" on page 102

**CALCulate<Measurement>:STATistics:MARKer:HORizontal:DATA?**

Effective for statistics measurements.

Queries the measurement result at the x-marker position.



The command is not fully R&S NRP2 compatible. If port 1 is assigned to measurement 1 and so on, the command works. If port 1 is assigned to measurement 2, for example, enable the R&S NRP2 emulation using `SYSTem:LANGuage "NRP2"`.

**Suffix:**

<Measurement>      1 to 8  
Measurement

**Usage:**              Query only

**CALCulate<Measurement>:STATistics:MARKer:VERTical:DATA[:POWER]?**

Effective for statistics measurements.

Queries the power value at the y-marker position.

The command is not fully R&S NRP2 compatible. If port 1 is assigned to measurement 1 and so on, the command works. If port 1 is assigned to measurement 2, for example, enable the R&S NRP2 emulation using `SYSTem:LANGuage "NRP2"`.

**Suffix:**

<Measurement>      1 to 8  
Measurement

**Usage:**              Query only

**CALCulate<Measurement>:STATistics:MARKer:X:POSITION[:ABSolute] <value>**

Effective for statistics measurements.

Sets the absolute position of the x-marker.

**Suffix:**

<Measurement>      1 to 8  
Measurement

**Parameters:**

<value>              Range:      -200.0 to 200.0  
                      \*RST:      0.0  
                      Default unit: dBm

**Manual operation:** See "[dBm] / [dB] marker" on page 102

**CALCulate<Measurement>:STATistics:MARKer:X:POSITION:RELative <value>**

Effective for statistics measurements.

Sets the x-marker relative to a power value.

**Suffix:**

<Measurement>      1 to 8  
Measurement

**Parameters:**

<value> Range: -200.0 to 200.0  
 \*RST: 0.0  
 Default unit: dB

**Manual operation:** See "[dBm] / [dB] marker" on page 102

**CALCulate<Measurement>:STATistics:PDF:MARKer:Y:POSITION <value>**

Positions the y-marker to a measurement value of the PDF statistics measurement.

**Suffix:**

<Measurement> 1 to 8  
 Measurement

**Parameters:**

<value> Range: 0.0 to 10000.0  
 \*RST: 0.0  
 Default unit: -

**Manual operation:** See "[%] marker" on page 102

**14.6.12 NRT**

Further information:

- [Chapter 7.8, "NRT"](#), on page 107

[CALCulate<Measurement>:RELative<DirectionalChannel>:STATE](#)  
 on page 272

<a href="#">CALCulate&lt;Measurement&gt;:RELative&lt;DirectionalChannel&gt;:CCDF</a> .....	315
<a href="#">CALCulate&lt;Measurement&gt;:RELative&lt;DirectionalChannel&gt;:POWER[:MAGNitude]</a> .....	315
<a href="#">CALCulate&lt;Measurement&gt;:RELative&lt;DirectionalChannel&gt;:RATio:RCOefficient</a> .....	316
<a href="#">CALCulate&lt;Measurement&gt;:RELative&lt;DirectionalChannel&gt;:RATio:RFRatio</a> .....	316
<a href="#">CALCulate&lt;Measurement&gt;:RELative&lt;DirectionalChannel&gt;:RATio:RLOSs</a> .....	316
<a href="#">CALCulate&lt;Measurement&gt;:RELative&lt;DirectionalChannel&gt;:RATio:SWR</a> .....	317
<a href="#">CALCulate&lt;Measurement&gt;:RELative&lt;DirectionalChannel&gt;:RATio[:MAGNitude]</a> .....	317
<a href="#">[SENSe&lt;Sensor&gt;:]FUNCTion:CONCurent</a> .....	318
<a href="#">[SENSe&lt;Sensor&gt;:]FUNCTion:OFF:ALL&lt;Channel&gt;</a> .....	318
<a href="#">[SENSe&lt;Sensor&gt;:]FUNCTion:OFF[:FUNC]</a> .....	318
<a href="#">[SENSe&lt;Sensor&gt;:]FUNCTion:STATE?</a> .....	319
<a href="#">[SENSe&lt;Sensor&gt;:]POWER:REFLection:RANGE:AUTO</a> .....	319
<a href="#">[SENSe&lt;Sensor&gt;:]POWER[:POWER]:RANGE:AUTO</a> .....	319
<a href="#">[SENSe&lt;Sensor&gt;:]POWER:REFLection:RANGE:LIMit:DETECT</a> .....	319
<a href="#">[SENSe&lt;Sensor&gt;:]POWER[:POWER]:RANGE:LIMit:DETECT</a> .....	319
<a href="#">[SENSe&lt;Sensor&gt;:]POWER:REFLection:RANGE:LIMit[:STATE]</a> .....	320
<a href="#">[SENSe&lt;Sensor&gt;:]POWER[:POWER]:RANGE:LIMit[:STATE]</a> .....	320
<a href="#">[SENSe&lt;Sensor&gt;:]POWER:REFLection:RANGE:LOWER</a> .....	320
<a href="#">[SENSe&lt;Sensor&gt;:]POWER[:POWER]:RANGE:LOWER</a> .....	320

[SENSe<Sensor>:]POWer:REFLection:RANGe[:UPPer].....	320
[SENSe<Sensor>:]POWer[:POWer]:RANGe[:UPPer].....	320
[SENSe<Sensor>:]RRESolution.....	321

---

**CALCulate<Measurement>:RELative<DirectionalChannel>:CCDF <value>**

Sets the reference value for the cumulative distribution function (CCDF).

**Suffix:**

<Measurement> 1 to 8  
Measurement

<DirectionalChannel> 1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value> Range: 0.0 to 100.0  
\*RST: 50.0  
Default unit: pct

**Manual operation:** See "[Forward Reference Value, Reflection Reference Value](#)" on page 56  
See "[Reference Value](#)" on page 72

---

**CALCulate<Measurement>:RELative<DirectionalChannel>:POWer[:MAGNitude] <value>**

Sets the reference value for relative ratio measurements.

If you enter a value without unit, the unit is defined by `UNIT<Measurement>:POWer[:VALue]`. For further information, see [Chapter 14.6.1.3, "Units"](#), on page 245.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<DirectionalChannel> 1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value> Range: -120.0 to +150.0  
\*RST: +0.0  
Default unit: dBm

**Manual operation:** See "[Forward Reference Value, Reflection Reference Value](#)" on page 56  
See "[Reference Value](#)" on page 72

---

**CALCulate<Measurement>:RELative<DirectionalChannel>:RATio:RCOefficient**  
 <value>

Sets the reference value for the reflection coefficient.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<DirectionalChannel> 1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value> Range: 0.0 to 1.0  
\*RST: 0.5  
Default unit: -

**Manual operation:** See "[Forward Reference Value, Reflection Reference Value](#)" on page 56  
See "[Reference Value](#)" on page 72

---

**CALCulate<Measurement>:RELative<DirectionalChannel>:RATio:RFRatio**  
 <value>

Sets the reference value for the ratio of forward/reverse power.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<DirectionalChannel> 1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value> Range: 0.0 to 100.0  
\*RST: 50.0  
Default unit: pct

**Manual operation:** See "[Forward Reference Value, Reflection Reference Value](#)" on page 56  
See "[Reference Value](#)" on page 72

---

**CALCulate<Measurement>:RELative<DirectionalChannel>:RATio:RLOSs** <value>

Sets the reference value for the return loss.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<DirectionalChannel> 1 to 2

1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value> Range: -200.0 to 200.0  
 \*RST: 0.0  
 Default unit: dB

**Manual operation:** See "[Forward Reference Value, Reflection Reference Value](#)" on page 56  
 See "[Reference Value](#)" on page 72

**CALCulate<Measurement>:RELative<DirectionalChannel>:RATio:SWR <value>**

Sets the reference value for the standing wave ratio (SWR).

**Suffix:**

<Measurement> 1 to 8  
 Measurement

<DirectionalChannel> 1 to 2

1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value> Range: 0.0 to 1.0  
 \*RST: 0.5  
 Default unit: -

**Manual operation:** See "[Forward Reference Value, Reflection Reference Value](#)" on page 56  
 See "[Reference Value](#)" on page 72

**CALCulate<Measurement>:RELative<DirectionalChannel>:RATio[:MAGNitude] <value>**

Sets the reference value for relative ratio measurements.

**Suffix:**

<Measurement> 1 to 8  
 Measurement

<DirectionalChannel> 1 to 2

1 to 2

**Parameters:**

<value> Default unit: pct

**Manual operation:** See "[Forward Reference Value, Reflection Reference Value](#)" on page 56  
 See "[Reference Value](#)" on page 72

---

**[SENSe<Sensor>:]FUNCTION:CONCurent <concurrent>**

Requires the sensor interface for R&S NRT (R&S NRX-B9).

Enables or disables the usage of several measurement functions simultaneously.

**Suffix:**

<Sensor>                    101  
R&S NRT directional power sensor

**Parameters:**

<concurrent>                **ON**  
Two measurement functions can be enabled simultaneously.  
**OFF**  
Only a single function can be enabled. If a new measurement function is enabled, the previously active function is disabled automatically.  
\*RST:                    ON

---

**[SENSe<Sensor>:]FUNCTION:OFF:ALL<Channel>**

Requires the sensor interface for R&S NRT (R&S NRX-B9).

Disables all measurement functions for the specified channel.

**Suffix:**

<Sensor>                    101  
R&S NRT directional power sensor

<Channel>                    1 to 2  
1 = forward, 2 = reflection (reverse)

**Usage:**                    Event

---

**[SENSe<Sensor>:]FUNCTION:OFF[:FUNC] <function>**

Requires the sensor interface for R&S NRT (R&S NRX-B9).

Disables the specified measurement function.

The query returns all disabled measurement functions.

**Suffix:**

<Sensor>                    101  
R&S NRT directional power sensor

**Setting parameters:**

<function>                    See [CALCulate<Measurement>\[:CHANnel<Channel>\]:FEED<Channel>](#) on page 267.

**Usage:**                    Setting only

---

**[SENSe<Sensor>:]FUNCTION:STATe? <function>**

Requires the sensor interface for R&S NRT (R&S NRX-B9).

Queries whether the measurement function is enabled or disabled.

**Suffix:**

<Sensor>                    101  
R&S NRT directional power sensor

**Query parameters:**

<function>                See [CALCulate<Measurement>\[:CHANnel<Channel>\]:FEED<Channel>](#) on page 267.

**Usage:**                    Query only

---

**[SENSe<Sensor>:]POWER:REFLection:RANGe:AUTO <state>****[SENSe<Sensor>:]POWER[:POWER]:RANGe:AUTO <state>**

If enabled, adapts the scaling of the graphical display once.

**Suffix:**

<Sensor>                    1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<state>                    ON | OFF  
\*RST:                    ON

**Manual operation:**    See "[Autoscale](#)" on page 112

---

**[SENSe<Sensor>:]POWER:REFLection:RANGe:LIMit:DETECT <value>****[SENSe<Sensor>:]POWER[:POWER]:RANGe:LIMit:DETECT <value>**

Effective if the Out 1 / Trig Out connector is configured as monitoring output for the power indication, for example using [\[SENSe<Sensor>:\]POWER\[:POWER\]:RANGe:LIMit\[:STATe\]](#) ON.

Defines when a logic high level (> 2.7 V) is output at the Out 1 / Trig Out connector.

**Suffix:**

<Sensor>                    1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<value>                    INBound | OUTBound | HIGH  
**INBound**  
Measured power is within the range specified.  
**OUTBound**  
Measured power is out of the range defined.

**HIGH**

Measured power exceeds the upper scale limit.

\*RST: HIGH

**Manual operation:** See "[Fail Voltage](#)" on page 149

**[SENSe<Sensor>:]POWer:REFLection:RANGe:LIMit[:STATe] <state>**

**[SENSe<Sensor>:]POWer[:POWer]:RANGe:LIMit[:STATe] <state>**

Enables or disables the Out 1 / Trig Out connector as a monitoring output for the power indication.

If enabled, you cannot use the connector for any other purpose.

**Suffix:**

<Sensor> 1 to 128

Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<state> \*RST: OFF

**Manual operation:** See "[Mode](#)" on page 147

**[SENSe<Sensor>:]POWer:REFLection:RANGe:LOWer <lower>**

**[SENSe<Sensor>:]POWer[:POWer]:RANGe:LOWer <lower>**

Effective if [\[SENSe<Sensor>:\]POWer:REFLection:RANGe:AUTO](#) is disabled.

Sets the lower scale limit for the power indication.

The entry has no unit. The unit corresponds to the output unit selected by [UNIT<Measurement>:POWer\[:VALue\]](#) or [UNIT<Measurement>:POWer:RATio](#). If you change the unit, the entered value remains the same.

**Suffix:**

<Sensor> 1 to 128

Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<lower> Range: -1999.0 to 1999.0  
\*RST: 0.0

**Manual operation:** See "[Measurement for Limit Output](#)" on page 149

**[SENSe<Sensor>:]POWer:REFLection:RANGe[:UPPer] <upper>**

**[SENSe<Sensor>:]POWer[:POWer]:RANGe[:UPPer] <upper>**

Effective if [\[SENSe<Sensor>:\]POWer:REFLection:RANGe:AUTO](#) is disabled.

Sets the lower scale limit for the power indication. For further details, see [\[SENSe<Sensor>:\]POWer\[:POWer\]:RANGe:LOWer](#) on page 320.



**Suffix:**

&lt;Sensor&gt;

1 to 128

Configured sensor connected at: port A = 1, ... , port D = 4, R&amp;S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

&lt;upper&gt;

Range: -1999.0 to 1999.0

\*RST: 1.0

**Manual operation:** See "[Measurement for Limit Output](#)" on page 149**[SENSe<Sensor>:]RRESolution <rres>**

Requires the sensor interface for R&amp;S NRT (R&amp;S NRX-B9).

Configures the resolution of the measurement.

**Suffix:**

&lt;Sensor&gt;

101

R&amp;S NRT directional power sensor

**Parameters:**

&lt;rres&gt;

LOW | HIGH

**HIGH**Equals `CALCulate<Measurement>:RESolution 000I`.**LOW**

All other settings.

\*RST: LOW

**Manual operation:** See "[Resolution](#)" on page 51

### 14.6.13 Querying Measurement Results

<code>CALCulate&lt;Measurement&gt;:COUNT:DATA?</code> .....	321
<code>CALCulate&lt;Measurement&gt;:DATA?</code> .....	322
<code>CALCulate&lt;Measurement&gt;:MAXimum:DATA?</code> .....	322
<code>CALCulate&lt;Measurement&gt;:MINimum:DATA?</code> .....	322
<code>CALCulate&lt;Measurement&gt;:MEAN:DATA?</code> .....	322
<code>CALCulate&lt;Measurement&gt;:PTPeak:DATA?</code> .....	322
<code>CALCulate&lt;Measurement&gt;:SDEViation:DATA?</code> .....	322

**CALCulate<Measurement>:COUNT:DATA?**

Queries the number of measured values that are included for the calculation of the mean value and standard deviation.

**Suffix:**

&lt;Measurement&gt;

1 to 8

Measurement

**Usage:**

Query only

---

**CALCulate<Measurement>:DATA?**

Queries the measurement result.

**Suffix:**

<Measurement>      1 to 8  
                         Measurement

**Usage:**                      Query only

---

**CALCulate<Measurement>:MAXimum:DATA?****CALCulate<Measurement>:MINimum:DATA?**

Queries the maximum/minimum of all measured values.

**Suffix:**

<Measurement>      1 to 8  
                         Measurement

**Usage:**                      Query only

---

**CALCulate<Measurement>:MEAN:DATA?**

Queries the mean value of all measured values. The mean value is reset if the auxiliary values are reset.

**Suffix:**

<Measurement>      1 to 8  
                         Measurement

**Usage:**                      Query only

---

**CALCulate<Measurement>:PTPeak:DATA?**

Queries the peak-to-peak distance (maximum to minimum) of the measured values.

**Suffix:**

<Measurement>      1 to 8  
                         Measurement

**Usage:**                      Query only

---

**CALCulate<Measurement>:SDEVIation:DATA?**

Queries the standard deviation of all measured values. The standard deviation is calculated and reset together with the mean value, [CALCulate<Measurement>:MEAN:DATA?](#).

**Suffix:**

<Measurement>      1 to 8  
                         Measurement

**Usage:**                      Query only

## 14.7 Calculation Functions

Further information:

- "Channel Calculation Function" on page 68
- Chapter 14.3, "Addressing Measurements and Sensors", on page 186

### 14.7.1 Selecting a Calculation Function

CALCulate<Measurement>:MATH[:EXPRession]..... 323

CALCulate<Measurement>:MATH[:EXPRession]:CATalog?.....324

#### CALCulate<Measurement>:MATH[:EXPRession] [<expression>]

Selects a channel calculation function that processes the results of one or two power sensors. The result of this calculation is made available as a measured value.

SENS<sub>n</sub> is assigned as primary sensor, SENS<sub>m</sub> as secondary sensor.

**Table 14-3: <expression> parameters for absolute power measurements**

Channel calculation function	<expression>	Description
Single measurement	" (SENS <sub>n</sub> ) "	Measured value of sensor A, B, C or D
Sum	" (SENS <sub>n</sub> +SENS <sub>m</sub> ) "	Sum of the values measured by sensor n and sensor m
Difference	" (SENS <sub>n</sub> -SENS <sub>m</sub> ) "	Difference between the measured values of sensor n and sensor m
With n and m= 1, 2, 3, 4 or A, B, C, D		

**Table 14-4: <expression> parameters for relative power measurements**

Channel calculation function	<expression>	Description
Ratio	" (SENS <sub>n</sub> /SENS <sub>m</sub> ) "	Quotient of the values measured by sensor n and sensor m
Standing wave ratio	"SWR (SENS <sub>n</sub> , SENS <sub>m</sub> ) "	Standing wave ratio. No output unit. $\frac{1 + \sqrt{\text{SENS}_m / \text{SENS}_n}}{1 - \sqrt{\text{SENS}_m / \text{SENS}_n}}$ Sensor n measures the forward power of a wave. Sensor m measures the reflected power.
With n and m = 1, 2, 3, 4 or A, B, C, D		

Channel calculation function	<expression>	Description
Reflection coefficient	"RCO (SENSn, SENSm) "	Reflection coefficient of a DUT. No output unit. $\sqrt{\text{SENSm}/\text{SENSn}}$ Sensor n measures the forward power of a wave. Sensor m measures the reflected power.
Return loss	"RLOS (SENSn, SENSm) "	Return loss of a DUT. The output unit is dB. $10 \times \log \frac{\text{SENSm}/\text{SENSn}}{\text{SENSm}/\text{SENSn}}$ Sensor n measures the forward power of a wave. Sensor m measures the reflected power.
Reflection ratio	"REFL (SENSn, SENSm) "	Reflection ratio of a DUT. The output unit is percent. $100 \frac{\text{SENSm}}{\text{SENSn}}$ Sensor n measures the forward power of a wave. Sensor m measures the reflected power.
With n and m = 1, 2, 3, 4 or A, B, C, D		

**Table 14-5: Additional <expression> parameters for queries**

<expression>	Description
OFF	No channel calculation function is selected.
-	For SENSn or SENSm, if no primary or secondary sensor is selected.

**Suffix:**

<Measurement> 1 to 8  
Measurement

**Parameters:**

<expression> See [Table 14-3](#) and [Table 14-4](#). The unit is set by  
 UNIT<Measurement>:POWER[:VALue] or  
 UNIT<Measurement>:POWER:RATio.  
 The query returns two additional expressions, see [Table 14-5](#).  
 \*RST: Depends on the selected channel.  
 Default unit: Depends on <expression> and the set unit.

**Manual operation:** See "[Channel Calculation Function](#)" on page 68

---

**CALCulate<Measurement>:MATH[:EXPRession]:CATalog? [<expressions>]**

Queries all channel calculation functions supported by CALCulate<Measurement>:MATH[:EXPRession].

**Suffix:**

<Measurement>      1 to 8  
Measurement

**Query parameters:**

<expressions>

**Usage:**                      Query only

**Manual operation:**    See "[Channel Calculation Function](#)" on page 68

## 14.8 Configuring Sensors

- [Setting the Frequency](#)..... 325
- [Sensor Modes](#)..... 326
- [Sensor Corrections](#)..... 330
- [Sensor Filters](#)..... 335
- [Sensor Ranges](#)..... 343
- [Standardized Signals](#)..... 346
- [Frequency Selective Power Sensors](#)..... 359
- [NRT Measurement Type](#)..... 361

### 14.8.1 Setting the Frequency

<a href="#">[SENSe&lt;Sensor&gt;:]FREQUency:FIXed</a> .....	325
<a href="#">[SENSe&lt;Sensor&gt;:]FREQUency[:CW]</a> .....	325
<a href="#">[SENSe&lt;Sensor&gt;:]FREQUency:TRACk</a> .....	325

---

**[SENSe<Sensor>:]FREQUency:FIXed** <frequency>

**[SENSe<Sensor>:]FREQUency[:CW]** <frequency>

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

**Suffix:**

<Sensor>                      1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<frequency>                      Range:      0.0 to 110.0e9  
   \*RST:      1.0e9  
   Default unit: Hz

**Manual operation:**    See "[\[Freq\]](#)" on page 26

---

**[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

## 14.8.2 Sensor Modes

Further information:

- [Chapter 8.1, "Mode Settings"](#), on page 114
- [Chapter 14.8.8.1, "NRT Mode Settings"](#), on page 361

CALCulate<Measurement>[:CHANnel<Channel>]:BURSt:TIMing:EXCLude:STARt.....	326
CALCulate<Measurement>[:CHANnel<Channel>]:BURSt:TIMing:EXCLude:STOP.....	327
CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:DCYCLe:STATe.....	327
CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:DCYCLe[:VALue].....	327
CALCulate<Measurement>[:CHANnel<Channel>]:TRACe:ESAMpling.....	328
CALCulate<Measurement>[:CHANnel<Channel>]:SAMPling.....	328
CALCulate<Measurement>[:CHANnel<Channel>][:POWer]:BURSt:DTOLerance.....	329
CALCulate<Measurement>[:CHANnel<Channel>][:POWer][:AVG]:APERture[:VALue].....	329
CALCulate<Measurement>[:CHANnel<Channel>][:POWer][:AVG]:SMOothing[:STATe].....	330
CALCulate<Measurement>:TRACe:MEASurement:TRANSition:ESAMpling:AUTO[:STATe]....	330

---

**CALCulate<Measurement>[:CHANnel<Channel>]:BURSt:TIMing:EXCLude:STARt**  
<value>

Effective for burst average measurements.

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

**Suffix:**

<Measurement> 1 to 8  
Measurement

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<value> Range: 0.0 to 15.0  
\*RST: 0.0  
Default unit: s

**Manual operation:** See ["Exclude from Start, Exclude from End"](#) on page 117

---

**CALCulate<Measurement>[:CHANnel<Channel>]:BURSt:TIMing:EXCLude:STOP**  
<value>

Effective for burst average measurements.

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

**Suffix:**

<Measurement>      1 to 8  
                            Measurement

<Channel>            1 to 2  
                            1 = primary sensor, 2 = secondary sensor

**Parameters:**

<value>              Range:      0.0 to 15.0  
                            \*RST:      0.0  
                            Default unit: s

**Manual operation:** See ["Exclude from Start, Exclude from End"](#) on page 117

---

**CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:DCYCLe:STATe**  
<state>

Effective for continuous average measurements.

Enables or disables the duty cycle correction.

**Suffix:**

<Measurement>      1 to 8  
                            Measurement

<Channel>            1 to 2  
                            1 = primary sensor, 2 = secondary sensor

**Parameters:**

<state>              \*RST:      OFF

**Manual operation:** See ["Duty Cycle State"](#) on page 115

---

**CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:DCYCLe[:VALue]**  
<duty\_cycle>

Effective for continuous average measurements.

Sets the duty cycle for measuring pulse-modulated signals. The duty cycle defines the percentage of one period during which the signal is active. If the duty cycle is enabled, the R&S NRX 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.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<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 115

**CALCulate<Measurement>[:CHANnel<Channel>]:TRACe:ESAMpling <value>**

Effective for trace measurements.

Enables or disables the automatic equivalent sampling that allows for high resolution measurements.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<value> \*RST: ON

**Manual operation:** See "[Equivalent Time Sampling](#)" on page 116

**CALCulate<Measurement>[:CHANnel<Channel>]:SAMPling <value>**

Effective for continuous average measurements.

Sets the sampling rate.

If the sampling frequency is located within the video bandwidth, aliasing can occur, that is when spectral components near the sampling frequency cause beating effects. If you change the sampling rate, the beating effects usually disappear.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<value> FREQ1 | FREQ2  
**FREQ1**  
Normal sampling rate



**FREQ2**

Lower sampling rate

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

\*RST: FREQ1

**Manual operation:** See "[Sampling Rate](#)" on page 116

**CALCulate<Measurement>[:CHANnel<Channel>][:POWer]:BURSt:DTOLerance**  
 <value>

Effective for burst average measurements.

Detects the falling edge of a burst. If the power keeps low for at least the set time, the end of the burst is assumed. Modulation-specific power drops that are shorter than the set value are ignored.

See also [Chapter 7.2, "Burst Average"](#), on page 73.

**Suffix:**

<Measurement> 1 to 8  
 Measurement

<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 117

**CALCulate<Measurement>[:CHANnel<Channel>][:POWer][:AVG]:APERTure[:**  
**VALue] <value>**

Effective for continuous average measurements.

Sets the width of the sampling window.

When measuring modulated signals, the measurement can show fluctuation due to the modulation. If that is the case, adapt the size of the sampling window exactly to the modulation period to get an optimally stable display. If the modulation period varies or is not precisely known, you can also set `CALCulate<Measurement>[:CHANnel<Channel>][:POWer][:AVG]:SMOothing[:STATe] ON`.

**Suffix:**

<Measurement> 1 to 8  
 Measurement

<Channel> 1 to 2  
 1 = primary sensor, 2 = secondary sensor

**Parameters:**

<value>                    Range:        8.3e-9 to 30.0  
                               \*RST:        0.01  
                               Default unit: s

**Manual operation:**    See "[Aperture](#)" on page 116

**CALCulate<Measurement>[:CHANnel<Channel>][:POWer][:AVG]:SMOothing[:  
 STATE] <value>**

Effective for continuous average measurements.

Enables or disables the smoothing filter, a steep-edge digital lowpass filter. The filter reduces result fluctuations caused by modulation.

**Suffix:**

<Measurement>        1 to 8  
                               Measurement

<Channel>                1 to 2  
                               1 = primary sensor, 2 = secondary sensor

**Parameters:**

<value>                    See "[Smoothing](#)" on page 117.  
                               \*RST:        OFF

**Manual operation:**    See "[Smoothing](#)" on page 117

**CALCulate<Measurement>:TRACe:MEASurement:TRANSition:ESAMpling:  
 AUTO[:STATE] <value>**

Effective for pulse analysis measurements.

Enables or disables the automatic equivalent sampling that allows for high-resolution measurements.

**Suffix:**

<Measurement>        1 to 8  
                               Measurement

**Parameters:**

<value>                    \*RST:        ON

**Manual operation:**    See "[Equivalent Time Sampling](#)" on page 116

### 14.8.3 Sensor Corrections

Further information:

- [Chapter 8.2, "Correction Settings"](#), on page 118
- [Chapter 14.13, "Managing Setups and Correction Tables"](#), on page 386
- [Chapter 14.8.8.2, "NRT Correction Settings"](#), on page 365

[SENSe<Sensor>:]CORRection:SPDevice:LIST?	331
[SENSe<Sensor>:]CORRection:SPDevice:SElect	331
[SENSe<Sensor>:]CORRection:SPDevice:STATe	331
[SENSe<Sensor>:]RGAMma[:MAGNitude]	332
[SENSe<Sensor>:]RGAMma:PHASe	332
CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:OFFSet:STATe	332
CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:OFFSet:TABLE:INDeX	333
CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:OFFSet:TABLE[:STATe]	333
CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:OFFSet[:MAGNitude]	334
CALCulate<Measurement>[:CHANnel<Channel>]:SGAMma:CORRection:STATe	334
CALCulate<Measurement>[:CHANnel<Channel>]:SGAMma:PHASe	334
CALCulate<Measurement>[:CHANnel<Channel>]:SGAMma[:MAGNitude]	335

---

### [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 119

---

### [SENSe<Sensor>:]CORRection:SPDevice:SElect <num>

Selects a data set for S-parameter correction that has been loaded to 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 119

---

### [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`.

For some power sensors, the S-parameter correction is always activated. If you try to deactivate the S-parameter correction for such a power sensor, a SCPI error is generated.

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<state> ON | OFF  
\*RST: OFF

**Manual operation:** See "[S-Parameter List](#)" on page 119

**[SENSe<Sensor>:]RGAMma[:MAGNitude] <magnitude>**

Sets the magnitude of the complex reflection coefficient of the source,  $\Gamma_{\text{source}}$ .

A value of 0.0 corresponds to an ideal matched source. A value of 1.0 corresponds to total reflection.

**Suffix:**

<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: -

**[SENSe<Sensor>:]RGAMma:PHASe <phase\_angle>**

Sets the phase angle of the complex reflection coefficient of the source,  $\Gamma_{\text{source}}$ .

**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:**

<phase\_angle> Range: 0.0 to 360.0  
\*RST: 0.0  
Default unit: deg

**CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:OFFSet:STATe <state>**

Enables or disables the offset correction.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<state> ON | OFF  
\*RST: OFF

**Manual operation:** See "[Offset State](#)" on page 119  
See "[Offset](#)" on page 130

**CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:OFFSet:TABLE:  
INDEX <value>**

Selects one of the available offset tables.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor

**Setting parameters:**

<value> Range: 1 to 10  
\*RST: 1

**Usage:** Setting only

**Manual operation:** See "[Frequency dependent offset table](#)" on page 120

**CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:OFFSet:TABLE[:  
STATE] <state>**

Enables or disables the selected table.

If enabled, the measurement results are corrected using the specified offset. If the exact frequency value is not available in the table, the values of the table are interpolated. If the selected frequency is outside the specified frequency range, the first or last offset value of the table is used.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor

**Setting parameters:**

<state> \*RST: OFF

**Usage:** Setting only

**Manual operation:** See "[Frequency dependent offset active](#)" on page 120

**CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:OFFSet[:MAGNitude] <value>**

Effective if [CALCulate<Measurement>\[:CHANnel<Channel>\]:CORRection:OFFSet:STATe ON](#) is set.

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

**Suffix:**

<Measurement> 1 to 8  
Measurement

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value> Range: -200.0 to 200.0  
\*RST: 0.0  
Default unit: dB

**Manual operation:** See "[Offset](#)" on page 119  
See "[Offset](#)" on page 130

**CALCulate<Measurement>[:CHANnel<Channel>]:SGAMma:CORRection:STATe <value>**

Enables or disables gamma correction. See also "[Gamma Correction](#)" on page 120.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<value> \*RST: OFF

**Manual operation:** See "[Gamma Correction](#)" on page 120

**CALCulate<Measurement>[:CHANnel<Channel>]:SGAMma:PHASe <value>**

Effective if [CALCulate<Measurement>\[:CHANnel<Channel>\]:SGAMma:CORRection:STATe ON](#) is set.

Sets the phase angle of the complex reflection coefficient of the source.

**Suffix:**

<Measurement>	1 to 8 Measurement
<Channel>	1 to 2 1 = primary sensor, 2 = secondary sensor

**Parameters:**

<value>	Range: -360.0 to 360.0
	*RST: 0.0
	Default unit: deg

**Manual operation:** See "[Gamma Phase](#)" on page 121

**CALCulate<Measurement>[:CHANnel<Channel>]:SGAMma[:MAGNitude] <value>**

Effective if [CALCulate<Measurement>\[:CHANnel<Channel>\]:SGAMma:CORRection:STATe](#) ON is set.

Sets the magnitude of the complex reflection coefficient of the source.

**Suffix:**

<Measurement>	1 to 8 Measurement
<Channel>	1 to 2 1 = primary sensor, 2 = secondary sensor

**Parameters:**

<value>	Range: 0.0 to 1.0
	*RST: 0.0
	Default unit: -

**Manual operation:** See "[Gamma Magnitude](#)" on page 121

## 14.8.4 Sensor Filters

Further information:

- [Chapter 8.3, "Filter Settings"](#), on page 121
- [Chapter 14.8.8.3, "NRT Filter Settings"](#), on page 368

<a href="#">[SENSe&lt;Sensor&gt;:]AVERAge:COUNT:AUTO:RESolution</a> .....	336
<a href="#">[SENSe&lt;Sensor&gt;:]AVERAge:RESet</a> .....	336
<a href="#">CALCulate&lt;Measurement&gt;[:CHANnel&lt;Channel&gt;]:AVERAge:COUNT:AUTO:MTIME</a> .....	337
<a href="#">CALCulate&lt;Measurement&gt;[:CHANnel&lt;Channel&gt;]:AVERAge:COUNT:AUTO:NSRatio</a> .....	337
<a href="#">CALCulate&lt;Measurement&gt;[:CHANnel&lt;Channel&gt;]:AVERAge:COUNT:AUTO:SLOT</a> .....	337
<a href="#">CALCulate&lt;Measurement&gt;[:CHANnel&lt;Channel&gt;]:AVERAge:COUNT:AUTO:TYPE</a> .....	338
<a href="#">CALCulate&lt;Measurement&gt;[:CHANnel&lt;Channel&gt;]:AVERAge:TCONtrol:AUTO</a> .....	338
<a href="#">CALCulate&lt;Measurement&gt;[:CHANnel&lt;Channel&gt;]:AVERAge:TCONtrol[:ENUM]</a> .....	339
<a href="#">CALCulate&lt;Measurement&gt;[:CHANnel&lt;Channel&gt;]:AVERAge:TYPE</a> .....	340
<a href="#">CALCulate&lt;Measurement&gt;[:CHANnel&lt;Channel&gt;]:AVERAge[:STATe]</a> .....	340
<a href="#">CALCulate&lt;Measurement&gt;[:CHANnel&lt;Channel&gt;]:TRACe:AVERAge:COUNT[:VALue]</a> .....	340

CALCulate<Measurement>[:CHANnel<Channel>]:TRACe:AVERage:TCONtrol:AUTO.....	341
CALCulate<Measurement>[:CHANnel<Channel>]:TRACe:AVERage:TCONtrol[:ENUM].....	341
CALCulate<Measurement>[:CHANnel<Channel>]:TRACe:AVERage[:STATe].....	342
CALCulate<Measurement>[:CHANnel<Channel>][:POWer]:NCORrection[:STATe].....	342
CALCulate<Measurement>[:CHANnel<Channel>][:POWer]:VBWidth:ENUM.....	343

---

### [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> Indicates the number of significant digits.

1	
1	
2	
0.1	
3	
0.01	
4	
0.001	
Range:	1 to 4
*RST:	3

---

### [SENSe<Sensor>:]AVERage:RESet

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

Clears the filter buffer.

#### Suffix:

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Usage:** Event

**Manual operation:** See "[Clear Filter Buffer](#)" on page 123



---

**CALCulate<Measurement>[:CHANnel<Channel>]:AVERage:COUNT:AUTO:MTIME**  
 <value>

Effective for continuous average, burst average measurements, if

`CALCulate<Measurement>[:CHANnel<Channel>]:AVERage:COUNT:AUTO:TYPE RES` is set.

Sets an upper limit for the settling time of the auto-averaging filter that is never exceeded, thus limiting the length of the filter.

**Suffix:**

<Measurement>      1 to 8  
 Measurement

<Channel>            1 to 2  
 1 = primary sensor, 2 = secondary sensor

**Parameters:**

<value>              Range:      0.01 to 1000.0  
 \*RST:                1.0  
 Default unit: s

**Manual operation:** See "[Maximum Settling Time](#)" on page 123

---

**CALCulate<Measurement>[:CHANnel<Channel>]:AVERage:COUNT:AUTO:NSRatio** <value>

Effective for continuous average, burst average measurements, if

`CALCulate<Measurement>[:CHANnel<Channel>]:AVERage:COUNT:AUTO:TYPE NSR` is set.

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

**Suffix:**

<Measurement>      1 to 8  
 Measurement

<Channel>            1 to 2  
 1 = primary sensor, 2 = secondary sensor

**Parameters:**

<value>              Range:      100e-6 to 1.0  
 \*RST:                1.0  
 Default unit: dB

**Manual operation:** See "[Noise Content](#)" on page 123

---

**CALCulate<Measurement>[:CHANnel<Channel>]:AVERage:COUNT:AUTO:SLOT**  
 <value>

Effective for continuous average, burst average measurements.

Sets a timeslot from which the measured value is used to determine the filter length automatically. The timeslot number must not exceed the number of the currently set timeslots.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<value> Range: 1 to 128  
\*RST: 1

**Manual operation:** See ["Timeslot"](#) on page 124

**CALCulate<Measurement>[:CHANnel<Channel>]:AVERage:COUNT:AUTO:TYPE**  
<value>

Effective for continuous average, burst average measurements.

Sets the autofilter.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<value> RESolution | NSRatio

**RESolution**

Sets the averaging number so that the intrinsic noise of the power sensor does not exceed the value specified by [CALCulate<Measurement>\[:CHANnel<Channel>\]:AVERage:COUNT:AUTO:NSRatio](#).

**NSRatio**

Limits the averaging number as specified by [CALCulate<Measurement>\[:CHANnel<Channel>\]:AVERage:COUNT:AUTO:MTIME](#).

\*RST: RESolution

**Manual operation:** See ["Fixed Noise Mode"](#) on page 123

**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 339.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<state> \*RST: ON

**Manual operation:** See "[Moving Average State](#)" on page 124

**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 8  
Measurement

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<mode> MOVing | REPeat

If you use [SYSTem:PRESet](#) instead of \*RST, the RST value differs. See [Table 14-16](#).

**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 369.

\*RST: MOVing

**Manual operation:** See "[Moving Average](#)" on page 124

---

**CALCulate<Measurement>[:CHANnel<Channel>]:AVERAge:TYPE <type>**

Requires an R&S frequency selective power sensor.

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

**Suffix:**

<Measurement>      1 to 8  
                            Measurement

<Channel>            1 to 2  
                            1 = primary sensor, 2 = secondary sensor

**Parameters:**

<type>                POWer | VIDeo | LINear  
                            \*RST:        POWer

**Manual operation:** See "[Averaging Domain](#)" on page 124

---

**CALCulate<Measurement>[:CHANnel<Channel>]:AVERAge[:STATe] <value>**

Enables or disables the averaging filter. If enabled, the number of measured values is averaged. Averaging reduces the effect of noise so that more reliable results are obtained.

**Suffix:**

<Measurement>      1 to 8  
                            Measurement

<Channel>            1 to 2  
                            1 = primary sensor, 2 = secondary sensor

**Parameters:**

<value>                \*RST:        ON

**Manual operation:** See "[Filter State](#)" on page 122

---

**CALCulate<Measurement>[:CHANnel<Channel>]:TRACe:AVERAge:COUNT[:VALue] <value>**

Effective for trace measurements.

Sets the number of readings that are averaged for one measured value. The higher the count, the lower the noise, and the longer it takes to obtain a measured value.

**Suffix:**

<Measurement>      1 to 8  
                            Measurement

<Channel>            1 to 2  
                            1 = primary sensor, 2 = secondary sensor

**Parameters:**

<value> If the entered filter length is not a 2<sup>n</sup> value, the value is rounded to the next 2<sup>n</sup> value without an error message.

Range: 1 to 65536

\*RST: 4

**Manual operation:** See "[Filter Length](#)" on page 122

**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 341.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<state> \*RST: ON

**Manual operation:** See "[Moving Average State](#)" on page 124

**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 8  
Measurement

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<mode> MOVing | REPEAT

If you use [SYSTem:PRESet](#) instead of \*RST, the RST value differs. See [Table 14-16](#).

**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 124

**CALCulate<Measurement>[:CHANnel<Channel>]:TRACe:AVERAge[:STATe]**  
<value>

Effective for trace measurements.

Enables or disables the averaging filter. If enabled, the number of measured values is averaged. Averaging reduces the effect of noise so that more reliable results are obtained.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<value> \*RST: ON

**Manual operation:** See "[Filter State](#)" on page 122

**CALCulate<Measurement>[:CHANnel<Channel>][:POWER]:NCORrection[:STATe]**  
<state>

Effective for R&S frequency selective power sensors.

Enables or disables the noise cancellation.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<state> \*RST: OFF

---

**CALCulate<Measurement>[:CHANnel<Channel>][:POWER]:VBWidth:ENUM**  
<value>

Requires a wideband power sensor.

Sets the video filter bandwidth. Reducing the video bandwidth also increases the trigger sensitivity.

**Suffix:**

<Measurement>      1 to 8  
                                 Measurement

<Channel>            1 to 2  
                                 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value>              EFULI | E5M | E1M5 | E0M3

**EFULI**

Full

**E5M**

5 MHz

**E1M5**

1.5 MHz

**E0M3**

300 kHz

\*RST:                EFULI

**Manual operation:** See "[Video Bandwidth](#)" on page 125

## 14.8.5 Sensor Ranges

Further information:

- [Chapter 8.4, "Range Settings"](#), on page 125

<a href="#">CALCulate&lt;Measurement&gt;[:CHANnel&lt;Channel&gt;]:INPut:ATTenuation:AUTO.....</a>	343
<a href="#">CALCulate&lt;Measurement&gt;[:CHANnel&lt;Channel&gt;]:INPut:ATTenuation[:VALue].....</a>	344
<a href="#">CALCulate&lt;Measurement&gt;[:CHANnel&lt;Channel&gt;][:POWER][:AVG]:RANGe:AUTO.....</a>	344
<a href="#">CALCulate&lt;Measurement&gt;[:CHANnel&lt;Channel&gt;][:POWER][:AVG]:RANGe:CLEVel:STATe....</a>	345
<a href="#">CALCulate&lt;Measurement&gt;[:CHANnel&lt;Channel&gt;][:POWER][:AVG]:RANGe:CLEVel[:VALue]..</a>	345
<a href="#">CALCulate&lt;Measurement&gt;[:CHANnel&lt;Channel&gt;][:POWER][:AVG]:RANGe[:VALue].....</a>	345

---

**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 8  
                                 Measurement

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<auto> OFF | ON | ONCE

**ONCE**

Adjusts the input attenuation one time, then disables the automatic setting.

\*RST: OFF

**Manual operation:** See "[Attenuator Mode](#)" on page 127

**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 8  
Measurement

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<value> Only two values are possible, 0.0 dB and 30.0 dB. The entered value is rounded to the next value.

Range: 0.0 to 30.0

\*RST: 30.0

Default unit: dB

**Manual operation:** See "[Attenuation](#)" on page 127

**CALCulate<Measurement>[:CHANnel<Channel>][:POWer][:AVG]:RANGe:AUTO**  
<value>

Enables or disables the automatic measurement path selection.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<value> \*RST: ON

**Manual operation:** See "[Range State](#)" on page 126



---

**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 8  
Measurement

<Channel>            1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<value>              \*RST:        OFF

**Manual operation:** See "[User Defined Transition](#)" on page 126

---

**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 8  
Measurement

<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 127

---

**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 8  
Measurement

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<value> LOW | MID | HIGH  
\*RST: MID

**Manual operation:** See "[Range](#)" on page 126

## 14.8.6 Standardized Signals

For a set of standards, you can preconfigure settings.

### 14.8.6.1 Commands

<a href="#">SYSTem:STANdard:CATalog?</a> .....	346
<a href="#">SYSTem:STANdard:PRESet</a> .....	346
<a href="#">SYSTem:STANdard:PWSettings</a> .....	347
<a href="#">SYSTem:STANdard:TRIGger:SOURce</a> .....	347

---

#### **SYSTem:STANdard:CATalog?**

Queries the supported standards. Use the returned strings for [SYSTem:STANdard:PRESet](#).

**Usage:** Query only

---

#### **SYSTem:STANdard:PRESet** <string>

Configures the power sensor and trigger settings for the selected standard. Query the supported standards using [SYSTem:STANdard:CATalog?](#).

If [SYSTem:STANdard:PWSettings](#) OFF is set, also configures the R&S NRX display settings.

Use [SYSTem:STANdard:TRIGger:SOURce](#) to set the trigger source.

**Setting parameters:**

<string> "<standard name>"

Available standards. For the corresponding power sensor configuration, follow the link.

**GSM/EDGE**

[Table 14-6](#)

**DECT**

[Table 14-7](#)

**WCDMA/3GPP FDD**[Table 14-8](#)**WCDMA/3GPP TDD DL**[Table 14-9](#)**WCDMA/3GPP TDD UL**[Table 14-10](#)**TD-SCDMA**[Table 14-11](#)**Bluetooth DH1**[Table 14-12](#)**Bluetooth DH3**[Table 14-13](#)**Bluetooth DH5**[Table 14-14](#)**CDMA2000**[Table 14-15](#)

- Usage:** Setting only
- Manual operation:** See "[Parameter Set](#)" on page 69  
See "[Recall Parameter Set](#)" on page 70

**SYSTem:STANdard:PWSettings** <state>

Specifies whether the display settings are kept unchanged when using [SYSTem:STANdard:PRESet](#).

**Parameters:**

&lt;state&gt;

**ON**

Only configures the power sensor.

**OFF**

Configures the power sensor and the display settings of the R&S NRX. See [Chapter 14.8.6.3, "Display Configuration"](#), on page 358.

\*RST: OFF

- Manual operation:** See "[Preserve Window Settings](#)" on page 69

**SYSTem:STANdard:TRIGger:SOURce** <source>

Sets the trigger source for [SYSTem:STANdard:PRESet](#).

**Parameters:**

&lt;source&gt;

INTernal | EXTernal

**INTernal**

Internal triggering

**EXTernal**

External triggering

\*RST: INTERNAL

### 14.8.6.2 Preconfigured Settings

For the following standards, you can preconfigure the power sensor using:

- [Parameter Set](#)
- `SYSTEM:STANDARD:PRESET`

**Table 14-6: GSM/EDGE**

Sensor parameter	Remote control command	Value
Sensor mode	<code>CALCulate&lt;Measurement&gt;:TYPE</code>	TRACe
Aperture time	<code>CALCulate&lt;Measurement&gt;[:CHANnel&lt;Channel&gt;][:POWer][:AVG]:APERture[:VALue]</code>	4.615 ms
Duty cycle	<code>CALCulate&lt;Measurement&gt;[:CHANnel&lt;Channel&gt;]:CORRection:DCYCLE[:VALue]</code>	11.762 %
Duty cycle correction	<code>CALCulate&lt;Measurement&gt;[:CHANnel&lt;Channel&gt;]:CORRection:DCYCLE:STATE</code>	ON
Smoothing	<code>CALCulate&lt;Measurement&gt;[:CHANnel&lt;Channel&gt;][:POWer][:AVG]:SMOothing[:STATE]</code>	OFF
Dropout tolerance	<code>CALCulate&lt;Measurement&gt;[:CHANnel&lt;Channel&gt;][:POWer]:BURSt:DTOLerance</code>	577 µs
Exclude time start	<code>CALCulate&lt;Measurement&gt;:TSLot:TIMing:EXCLude:START</code>	20 µs
Exclude time end	<code>CALCulate&lt;Measurement&gt;:TSLot:TIMing:EXCLude:STOP</code>	30 µs
Timeslot count	<code>CALCulate&lt;Measurement&gt;[:POWer]:TSLot[:AVG]:COUNT</code>	8
Timeslot fence	<code>CALCulate&lt;Measurement&gt;[:POWer]:TSLot[:AVG][:EXCLude]:MID[:STATE]</code>	OFF
Timeslot width	<code>CALCulate&lt;Measurement&gt;[:POWer]:TSLot[:AVG]:WIDTH</code>	577 µs
Timegate offset	<code>CALCulate&lt;Measurement&gt;[:POWer]:TGATE&lt;Gate&gt;[:AVG]:OFFSet[:TIME]</code>	1: 20 µs 2: 2.328 ms
Timegate length	<code>CALCulate&lt;Measurement&gt;[:POWer]:TGATE&lt;Gate&gt;[:AVG]:TIME</code>	1: 527 µs 2: 527 µs
Timegate fence	<code>CALCulate&lt;Measurement&gt;[:POWer]:TGATE&lt;Gate&gt;[:AVG][:EXCLude]:MID[:STATE]</code>	OFF
Trace offset time	<code>CALCulate&lt;Measurement&gt;:TRACe:X[:SCALe]:LEFT</code>	-50 µs
Trace capture time	<code>CALCulate&lt;Measurement&gt;:TRACe:X[:SCALe]:LENGth</code>	5 ms
Trace number of points	<code>CALCulate&lt;Measurement&gt;:TRACe:X:POINTs</code>	261
Trace realtime	<code>[SENSe&lt;Sensor&gt;:]TRACe:REALtime</code>	OFF

Sensor parameter	Remote control command	Value
Trigger delay	TRIGger<Measurement>[:CHANnel<Channel>]: DELay[:VALue]	0 s
Trigger level	TRIGger<Measurement>[:CHANnel<Channel>]:LEVel	-20 dBm
Trigger source	TRIGger<Measurement>[:CHANnel<Channel>]: SOURce	INT
Trigger slope	TRIGger<Measurement>[:CHANnel<Channel>]:SLOPe	POS
Trigger holdoff	TRIGger<Measurement>[:CHANnel<Channel>]: HOLDoff	27 ms
Trigger dropout time	TRIGger<Measurement>[:CHANnel<Channel>]:DTIME	0 s
Trigger hysteresis	TRIGger<Measurement>[:CHANnel<Channel>]: HYSTeresis	3 dB

Table 14-7: DECT

Sensor parameter	Remote control command	Value
Sensor mode	CALCulate<Measurement>:TYPE	TRACe
Aperture time	CALCulate<Measurement>[:CHANnel<Channel>][: POWer][:AVG]:APERture[:VALue]	10 ms
Duty cycle	CALCulate<Measurement>[:CHANnel<Channel>]: CORRection:DCYCLE[:VALue]	3.7 %
Duty cycle correction	CALCulate<Measurement>[:CHANnel<Channel>]: CORRection:DCYCLE:STATE	ON
Smoothing	CALCulate<Measurement>[:CHANnel<Channel>][: POWer][:AVG]:SMOothing[:STATE]	OFF
Dropout tolerance	CALCulate<Measurement>[:CHANnel<Channel>][: POWer]:BURSt:DTOLerance	416.7 µs
Exclude time start	CALCulate<Measurement>:TSLot:TIMing:EXCLude: START	15 µs
Exclude time end	CALCulate<Measurement>:TSLot:TIMing:EXCLude: STOP	25 µs
Timeslot count	CALCulate<Measurement>[:POWer]:TSLot[:AVG]: COUNT	24
Timeslot fence	CALCulate<Measurement>[:POWer]:TSLot[:AVG][: EXCLude]:MID[:STATE]	OFF
Timeslot width	CALCulate<Measurement>[:POWer]:TSLot[:AVG]: WIDTh	416.667 µs
Timegate offset	CALCulate<Measurement>[:POWer]:TGATE<Gate>[: AVG]:OFFSet[:TIME]	1: 15 µs 2: 5.015 ms
Timegate length	CALCulate<Measurement>[:POWer]:TGATE<Gate>[: AVG]:TIME	1: 348.055 µs 2: 348.0 µs

Sensor parameter	Remote control command	Value
Timegate fence	CALCulate<Measurement>[:POWer]:TGATe<Gate>[:AVG][:EXCLude]:MID[:STATe]	OFF
Trace offset time	CALCulate<Measurement>:TRACe:X[:SCALe]:LEFT	-200 µs
Trace capture time	CALCulate<Measurement>:TRACe:X[:SCALe]:LENGth	10.250 ms
Trace number of points	CALCulate<Measurement>:TRACe:X:POINts	261
Trace realtime	[SENSE<Sensor>:]TRACe:REALtime	OFF
Trigger delay	TRIGger<Measurement>[:CHANnel<Channel>]:DELay[:VALue]	0 s
Trigger level	TRIGger<Measurement>[:CHANnel<Channel>]:LEVel	-30 dBm
Trigger source	TRIGger<Measurement>[:CHANnel<Channel>]:SOURce	INT
Trigger slope	TRIGger<Measurement>[:CHANnel<Channel>]:SLOPe	POS
Trigger holdoff	TRIGger<Measurement>[:CHANnel<Channel>]:HOLDoff	39.9 ms
Trigger dropout time	TRIGger<Measurement>[:CHANnel<Channel>]:DTIME	0 s
Trigger hysteresis	TRIGger<Measurement>[:CHANnel<Channel>]:HYSTeresis	3 dB

Table 14-8: WCDMA/3GPP FDD

Sensor parameter	Remote control command	Value
Sensor mode	CALCulate<Measurement>:TYPE	CONTAv
Aperture time	CALCulate<Measurement>[:CHANnel<Channel>][:POWer][:AVG]:APERture[:VALue]	10 ms
Duty cycle correction	CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:DCYCLe:STATe	OFF
Smoothing	CALCulate<Measurement>[:CHANnel<Channel>][:POWer][:AVG]:SMOothing[:STATe]	OFF
Filter auto	CALCulate<Measurement>[:CHANnel<Channel>]:AVERage:COUNT:AUTO[:STATe]	OFF
Filter length	CALCulate<Measurement>[:CHANnel<Channel>]:AVERage:COUNT[:VALue]	16
Trigger source	TRIGger<Measurement>[:CHANnel<Channel>]:SOURce	EXT

Table 14-9: WCDMA/3GPP TDD DL

Sensor parameter	Remote control command	Value
Sensor mode	CALCulate<Measurement>:TYPE	TRACe
Aperture time	CALCulate<Measurement>[:CHANnel<Channel>][:POWer][:AVG]:APERture[:VALue]	10 ms
Duty cycle	CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:DCYClE[:VALue]	6.667 %
Duty cycle correction	CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:DCYClE:STATe	ON
Smoothing	CALCulate<Measurement>[:CHANnel<Channel>][:POWer][:AVG]:SMOothing[:STATe]	OFF
Dropout tolerance	CALCulate<Measurement>[:CHANnel<Channel>][:POWer]:BURSt:DTOLerance	666.667 µs
Exclude time start	CALCulate<Measurement>:TSLot:TIMing:EXCLude:START	25 µs
Exclude time end	CALCulate<Measurement>:TSLot:TIMing:EXCLude:STOP	40 µs
Timeslot count	CALCulate<Measurement>[:POWer]:TSLot[:AVG]:COUNT	15
Timeslot fence	CALCulate<Measurement>[:POWer]:TSLot[:AVG][:EXCLude]:MID[:STATe]	OFF
Timeslot width	CALCulate<Measurement>[:POWer]:TSLot[:AVG]:WIDTh	666.667 µs
Timegate offset	CALCulate<Measurement>[:POWer]:TGATe<Gate>[:AVG]:OFFSet[:TIME]	1: 25 µs 2: 5.358 ms
Timegate length	CALCulate<Measurement>[:POWer]:TGATe<Gate>[:AVG]:TIME	1: 601.667 µs 2: 602 µs
Timegate fence	CALCulate<Measurement>[:POWer]:TGATe<Gate>[:AVG][:EXCLude]:MID[:STATe]	OFF
Trace offset time	CALCulate<Measurement>:TRACe:X[:SCALe]:LEFT	-200 µs
Trace capture time	CALCulate<Measurement>:TRACe:X[:SCALe]:LENGTh	10.250 ms
Trace number of points	CALCulate<Measurement>:TRACe:X:POINTs	261
Trace realtime	[SENSe<Sensor>:]TRACe:REALtime	OFF
Trigger delay	TRIGger<Measurement>[:CHANnel<Channel>]:DELay[:VALue]	0 s
Trigger level	TRIGger<Measurement>[:CHANnel<Channel>]:LEVel	-30 dBm
Trigger source	TRIGger<Measurement>[:CHANnel<Channel>]:SOURce	INT
Trigger slope	TRIGger<Measurement>[:CHANnel<Channel>]:SLOPe	POS

Sensor parameter	Remote control command	Value
Trigger holdoff	TRIGger<Measurement>[:CHANnel<Channel>]: HOLDoff	19.9 ms
Trigger dropout time	TRIGger<Measurement>[:CHANnel<Channel>]:DTIME	0 s
Trigger hysteresis	TRIGger<Measurement>[:CHANnel<Channel>]: HYSTeresis	3 dB

Table 14-10: WCDMA/3GPP TDD UL

Sensor parameter	Remote control command	Value
Sensor mode	CALCulate<Measurement>:TYPE	TRACe
Aperture time	CALCulate<Measurement>[:CHANnel<Channel>][: POWer][:AVG]:APERture[:VALue]	10 ms
Duty cycle	CALCulate<Measurement>[:CHANnel<Channel>]: CORRection:DCYCLE[:VALue]	6.420 %
Duty cycle correction	CALCulate<Measurement>[:CHANnel<Channel>]: CORRection:DCYCLE:STATE	ON
Smoothing	CALCulate<Measurement>[:CHANnel<Channel>][: POWer][:AVG]:SMOothing[:STATE]	OFF
Dropout tolerance	CALCulate<Measurement>[:CHANnel<Channel>][: POWer]:BURSt:DTOLerance	666.667 $\mu$ s
Exclude time start	CALCulate<Measurement>:TSLot:TIMing:EXCLude: START	15 $\mu$ s
Exclude time end	CALCulate<Measurement>:TSLot:TIMing:EXCLude: STOP	40 $\mu$ s
Timeslot count	CALCulate<Measurement>[:POWer]:TSLot[:AVG]: COUNT	15
Timeslot fence	CALCulate<Measurement>[:POWer]:TSLot[:AVG][: EXCLude]:MID[:STATE]	OFF
Timeslot width	CALCulate<Measurement>[:POWer]:TSLot[:AVG]: WIDTH	666.667 $\mu$ s
Timegate offset	CALCulate<Measurement>[:POWer]:TGATE<Gate>[: AVG]:OFFSet[:TIME]	1: 15 $\mu$ s 2: 5.348 ms
Timegate length	CALCulate<Measurement>[:POWer]:TGATE<Gate>[: AVG]:TIME	1: 611.667 $\mu$ s 2: 612 $\mu$ s
Timegate fence	CALCulate<Measurement>[:POWer]:TGATE<Gate>[: AVG][:EXCLude]:MID[:STATE]	OFF
Trace offset time	CALCulate<Measurement>:TRACe:X[:SCALe]:LEFT	-200 $\mu$ s
Trace capture time	CALCulate<Measurement>:TRACe:X[:SCALe]:LENGth	10.250 ms
Trace number of points	CALCulate<Measurement>:TRACe:X:POINTs	261
Trace realtime	[SENSe<Sensor>:]TRACe:REALtime	OFF



Sensor parameter	Remote control command	Value
Trigger delay	TRIGger<Measurement>[:CHANnel<Channel>]: DELay[:VALue]	0 s
Trigger level	TRIGger<Measurement>[:CHANnel<Channel>]:LEVel	-30 dBm
Trigger source	TRIGger<Measurement>[:CHANnel<Channel>]: SOURce	INT
Trigger slope	TRIGger<Measurement>[:CHANnel<Channel>]:SLOPe	POS
Trigger holdoff	TRIGger<Measurement>[:CHANnel<Channel>]: HOLDoff	19.9 ms
Trigger dropout time	TRIGger<Measurement>[:CHANnel<Channel>]:DTIME	0 s
Trigger hysteresis	TRIGger<Measurement>[:CHANnel<Channel>]: HYSTeresis	3 dB

Table 14-11: TD-SCDMA

Sensor parameter	Remote control command	Value
Sensor mode	CALCulate<Measurement>:TYPE	TRACe
Aperture time	CALCulate<Measurement>[:CHANnel<Channel>][: POWer][:AVG]:APERture[:VALue]	5 ms
Duty cycle	CALCulate<Measurement>[:CHANnel<Channel>]: CORRection:DCYCLE[:VALue]	13.250 %
Duty cycle correction	CALCulate<Measurement>[:CHANnel<Channel>]: CORRection:DCYCLE:STATE	ON
Smoothing	CALCulate<Measurement>[:CHANnel<Channel>][: POWer][:AVG]:SMOothing[:STATE]	OFF
Dropout tolerance	CALCulate<Measurement>[:CHANnel<Channel>][: POWer]:BURSt:DTOLerance	366 $\mu$ s
Exclude time start	CALCulate<Measurement>:TSLot:TIMing:EXCLude: START	10 $\mu$ s
Exclude time end	CALCulate<Measurement>:TSLot:TIMing:EXCLude: STOP	15 $\mu$ s
Timegate offset	CALCulate<Measurement>[:POWer]:TGATe<Gate>[: AVG]:OFFSet[:TIME]	1: 20 $\mu$ s 2: 710 $\mu$ s 3: 835 $\mu$ s 4: 5.970 ms
Timegate length	CALCulate<Measurement>[:POWer]:TGATe<Gate>[: AVG]:TIME	1: 620 $\mu$ s 2: 30 $\mu$ s 3: 85 $\mu$ s 4: 620 $\mu$ s
Timegate fence	CALCulate<Measurement>[:POWer]:TGATe<Gate>[: AVG][:EXCLude]:MID[:STATE]	OFF
Trace offset time	CALCulate<Measurement>:TRACe:X[:SCALE]:LEFT	-200 $\mu$ s

Sensor parameter	Remote control command	Value
Trace capture time	CALCulate<Measurement>:TRACe:X[:SCALE]:LENGth	10.250 ms
Trace number of points	CALCulate<Measurement>:TRACe:X:POINTs	261
Trace realtime	[SENSe<Sensor>:]TRACe:REALtime	OFF
Trigger delay	TRIGger<Measurement>[:CHANnel<Channel>]:DELay[:VALue]	0 s
Trigger level	TRIGger<Measurement>[:CHANnel<Channel>]:LEVel	-30 dBm
Trigger source	TRIGger<Measurement>[:CHANnel<Channel>]:SOURce	INT
Trigger slope	TRIGger<Measurement>[:CHANnel<Channel>]:SLOPe	POS
Trigger holdoff	TRIGger<Measurement>[:CHANnel<Channel>]:HOLDoff	19.9 ms
Trigger dropout time	TRIGger<Measurement>[:CHANnel<Channel>]:DTIME	0 s
Trigger hysteresis	TRIGger<Measurement>[:CHANnel<Channel>]:HYSTeresis	3 dB

Table 14-12: Bluetooth DH1

Sensor parameter	Remote control command	Value
Sensor mode	CALCulate<Measurement>:TYPE	TRACe
Aperture time	CALCulate<Measurement>[:CHANnel<Channel>][:POWER][:AVG]:APERture[:VALue]	1.25 ms
Duty cycle	CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:DCYCLE[:VALue]	29.28 %
Duty cycle correction	CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:DCYCLE:STATE	ON
Smoothing	CALCulate<Measurement>[:CHANnel<Channel>][:POWER][:AVG]:SMOothing[:STATE]	OFF
Dropout tolerance	CALCulate<Measurement>[:CHANnel<Channel>][:POWER]:BURSt:DTOLerance	366 µs
Exclude time start	CALCulate<Measurement>:TSLot:TIMing:EXCLude:START	10 µs
Exclude time end	CALCulate<Measurement>:TSLot:TIMing:EXCLude:STOP	15 µs
Timegate offset	CALCulate<Measurement>[:POWER]:TGATe<Gate>[:AVG]:OFFSet[:TIME]	1: 10 µs 2: 660 µs
Timegate length	CALCulate<Measurement>[:POWER]:TGATe<Gate>[:AVG]:TIME	1: 341 µs 2: 341 µs
Timegate fence	CALCulate<Measurement>[:POWER]:TGATe<Gate>[:AVG][:EXCLude]:MID[:STATE]	OFF

Sensor parameter	Remote control command	Value
Trace offset time	CALCulate<Measurement>:TRACe:X[:SCALE]:LEFT	-30 µs
Trace capture time	CALCulate<Measurement>:TRACe:X[:SCALE]:LENGTh	1.28 ms
Trace number of points	CALCulate<Measurement>:TRACe:X:POINts	261
Trace realtime	[SENSe<Sensor>:]TRACe:REALtime	OFF
Trigger delay	TRIGGer<Measurement>[:CHANnel<Channel>]:DELay[:VALue]	0 s
Trigger level	TRIGGer<Measurement>[:CHANnel<Channel>]:LEVel	-30 dBm
Trigger source	TRIGGer<Measurement>[:CHANnel<Channel>]:SOURce	INT
Trigger slope	TRIGGer<Measurement>[:CHANnel<Channel>]:SLOPe	POS
Trigger holdoff	TRIGGer<Measurement>[:CHANnel<Channel>]:HOLDoff	2.480 ms
Trigger dropout time	TRIGGer<Measurement>[:CHANnel<Channel>]:DTIME	0 s
Trigger hysteresis	TRIGGer<Measurement>[:CHANnel<Channel>]:HYSTeresis	3 dB

Table 14-13: Bluetooth DH3

Sensor parameter	Remote control command	Value
Sensor mode	CALCulate<Measurement>:TYPE	TRACe
Aperture time	CALCulate<Measurement>[:CHANnel<Channel>][:POWER][:AVG]:APERture[:VALue]	2.50 ms
Duty cycle	CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:DCYCLE[:VALue]	64.88 %
Duty cycle correction	CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:DCYCLE:STATe	ON
Smoothing	CALCulate<Measurement>[:CHANnel<Channel>][:POWER][:AVG]:SMOothing[:STATe]	OFF
Dropout tolerance	CALCulate<Measurement>[:CHANnel<Channel>][:POWER]:BURSt:DTOLerance	1.622 ms
Exclude time start	CALCulate<Measurement>:TSLot:TIMing:EXCLude:START	10 µs
Exclude time end	CALCulate<Measurement>:TSLot:TIMing:EXCLude:STOP	15 µs
Timegate offset	CALCulate<Measurement>[:POWER]:TGATe<Gate>[:AVG]:OFFSet[:TIME]	1: 10 µs 2: 1.885 ms
Timegate length	CALCulate<Measurement>[:POWER]:TGATe<Gate>[:AVG]:TIME	1: 1.597 ms 2: 351 µs

Sensor parameter	Remote control command	Value
Timegate fence	CALCulate<Measurement>[:POWER]:TGATE<Gate>[:AVG][:EXCLude]:MID[:STATE]	OFF
Trace offset time	CALCulate<Measurement>:TRACe:X[:SCALE]:LEFT	-30 µs
Trace capture time	CALCulate<Measurement>:TRACe:X[:SCALE]:LENGTh	2.530 ms
Trace number of points	CALCulate<Measurement>:TRACe:X:POINts	261
Trace realtime	[SENSe<Sensor>:]TRACe:REALtime	OFF
Trigger delay	TRIGger<Measurement>[:CHANnel<Channel>]:DELay[:VALue]	0 s
Trigger level	TRIGger<Measurement>[:CHANnel<Channel>]:LEVel	-30 dBm
Trigger source	TRIGger<Measurement>[:CHANnel<Channel>]:SOURce	INT
Trigger slope	TRIGger<Measurement>[:CHANnel<Channel>]:SLOPe	POS
Trigger holdoff	TRIGger<Measurement>[:CHANnel<Channel>]:HOLDoff	4.980 ms
Trigger dropout time	TRIGger<Measurement>[:CHANnel<Channel>]:DTIME	0 s
Trigger hysteresis	TRIGger<Measurement>[:CHANnel<Channel>]:HYSTeresis	3 dB

Table 14-14: Bluetooth DH5

Sensor parameter	Remote control command	Value
Sensor mode	CALCulate<Measurement>:TYPE	TRACe
Aperture time	CALCulate<Measurement>[:CHANnel<Channel>][:POWER][:AVG]:APERture[:VALue]	3.75 ms
Duty cycle	CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:DCYCLe[:VALue]	76.533 %
Duty cycle correction	CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:DCYCLe:STATE	ON
Smoothing	CALCulate<Measurement>[:CHANnel<Channel>][:POWER][:AVG]:SMOothing[:STATE]	OFF
Dropout tolerance	CALCulate<Measurement>[:CHANnel<Channel>][:POWER]:BURSt:DTOLerance	2.870 ms
Exclude time start	CALCulate<Measurement>:TSLot:TIMing:EXCLude:START	10 µs
Exclude time end	CALCulate<Measurement>:TSLot:TIMing:EXCLude:STOP	15 µs
Timegate offset	CALCulate<Measurement>[:POWER]:TGATE<Gate>[:AVG]:OFFSet[:TIME]	1: 10 µs 2: 3.135 ms

Sensor parameter	Remote control command	Value
Timegate length	CALCulate<Measurement>[:POWER]:TGATE<Gate>[:AVG]:TIME	1: 2.845 ms 2: 351 µs
Timegate fence	CALCulate<Measurement>[:POWER]:TGATE<Gate>[:AVG][:EXCLUDE]:MID[:STATE]	OFF
Trace offset time	CALCulate<Measurement>:TRACE:X[:SCALE]:LEFT	-30 µs
Trace capture time	CALCulate<Measurement>:TRACE:X[:SCALE]:LENGTH	3.780 ms
Trace number of points	CALCulate<Measurement>:TRACE:X:POINTS	261
Trace realtime	[SENSE<Sensor>:]TRACE:REALtime	OFF
Trigger delay	TRIGger<Measurement>[:CHANNEL<Channel>]:DELAY[:VALUE]	0 s
Trigger level	TRIGger<Measurement>[:CHANNEL<Channel>]:LEVEL	-30 dBm
Trigger source	TRIGger<Measurement>[:CHANNEL<Channel>]:SOURCE	INT
Trigger slope	TRIGger<Measurement>[:CHANNEL<Channel>]:SLOPE	POS
Trigger holdoff	TRIGger<Measurement>[:CHANNEL<Channel>]:HOLDoff	7.480 ms
Trigger dropout time	TRIGger<Measurement>[:CHANNEL<Channel>]:DTIME	0 s
Trigger hysteresis	TRIGger<Measurement>[:CHANNEL<Channel>]:HYSTERESIS	3 dB

Table 14-15: CDMA2000

Sensor parameter	Remote control command	Value
Sensor mode	CALCulate<Measurement>:TYPE	CONTAv
Aperture time	CALCulate<Measurement>[:CHANNEL<Channel>][:POWER][:AVG]:APERture[:VALUE]	80 ms
Duty cycle correction	CALCulate<Measurement>[:CHANNEL<Channel>]:CORREction:DCYCLE:STATE	OFF
Smoothing	CALCulate<Measurement>[:CHANNEL<Channel>][:POWER][:AVG]:SMOothing[:STATE]	OFF
Filter auto	CALCulate<Measurement>[:CHANNEL<Channel>]:AVERAge:COUNT:AUTO[:STATE]	OFF
Filter length	CALCulate<Measurement>[:CHANNEL<Channel>]:AVERAge:COUNT[:VALUE]	16
Trigger source	TRIGger<Measurement>[:CHANNEL<Channel>]:SOURCE	EXT

### 14.8.6.3 Display Configuration

You can choose whether you want to preserve the display settings when loading the parameter set using:

- [Preserve Window Settings](#)
- `SYSTem:STANdard:PWSettings`

If you do not preserve the display settings, they are changed as follows for all standards.

R&S NRX parameter	Remote control command	Value
Result resolution	<code>CALCulate&lt;Measurement&gt;:RESolution</code>	OOI
Lower power limit	<code>CALCulate&lt;Measurement&gt;: METer&lt;DirectionalChannel&gt;:LOWer[:DATA][: POWER]</code>	-90 dBm
Upper power limit	<code>CALCulate&lt;Measurement&gt;: METer&lt;DirectionalChannel&gt;:UPPer[:DATA][: POWER]</code>	30 dBm
Lower power ratio limit	<code>CALCulate&lt;Measurement&gt;: METer&lt;DirectionalChannel&gt;:LOWer[:DATA]: RATio[:VALue]</code>	-120 dB
Upper power ratio limit	<code>CALCulate&lt;Measurement&gt;: METer&lt;DirectionalChannel&gt;:UPPer[:DATA]: RATio[:VALue]</code>	60 dB
Relative measurement status	<code>CALCulate&lt;Measurement&gt;: RELative&lt;DirectionalChannel&gt;:STATe</code>	OFF
NRT measurement reference value	<code>CALCulate&lt;Measurement&gt;: RELative&lt;DirectionalChannel&gt;:POWER[: MAGNitude]</code>	1.0 dBm
NRT measurement reference value (ratio)	<code>CALCulate&lt;Measurement&gt;: RELative&lt;DirectionalChannel&gt;:RATio[: MAGNitude]</code>	1.0 dBm
Measurement function	<code>CALCulate&lt;Measurement&gt;:MATH[:EXPReSSion]</code>	Depends on suffix: 1: "(SENS1)" 2: "(SENS2)" ...
Measurement type	<code>CALCulate&lt;Measurement&gt;[:CHANnel&lt;Channel&gt;]: FEED&lt;Channel&gt;</code>	"POWER: AVERAge"
Output unit	<code>UNIT&lt;Measurement&gt;:POWER[:VALue]</code>	DBM
Output unit (ratio)	<code>UNIT&lt;Measurement&gt;:POWER:RATio</code>	DB
Upper limit check	<code>CALCulate&lt;Measurement&gt;: LIMit&lt;DirectionalChannel&gt;:UPPer:STATe</code>	OFF
Lower limit check	<code>CALCulate&lt;Measurement&gt;: LIMit&lt;DirectionalChannel&gt;:LOWer:STATe</code>	OFF

R&S NRX parameter	Remote control command	Value
Upper power limit	<code>CALCulate&lt;Measurement&gt;: LIMit&lt;DirectionalChannel&gt;:UPPer[:DATA]:POWer</code>	0 dBm
Lower power limit	<code>CALCulate&lt;Measurement&gt;: LIMit&lt;DirectionalChannel&gt;:LOWer[:DATA]:POWer</code>	0 dBm
Upper power ratio limit	<code>CALCulate&lt;Measurement&gt;: LIMit&lt;DirectionalChannel&gt;:UPPer[:DATA]: RATio[:VALue]</code>	1.0 dB
Lower power ratio limit	<code>CALCulate&lt;Measurement&gt;: LIMit&lt;DirectionalChannel&gt;:LOWer[:DATA]: RATio[:VALue]</code>	1.0 dB

### 14.8.7 Frequency Selective Power Sensors

<code>CALCulate&lt;Measurement&gt;[:CHANnel&lt;Channel&gt;]:ROSCillator:REFio:FREQUency</code> .....	359
<code>CALCulate&lt;Measurement&gt;[:CHANnel&lt;Channel&gt;]:ROSCillator:REFio:OUTPut[:STATe]</code> .....	359
<code>CALCulate&lt;Measurement&gt;[:CHANnel&lt;Channel&gt;]:ROSCillator:SOURce</code> .....	360
<code>[SENSe&lt;Sensor&gt;:]BANDwidth[:RESolution]:TYPE:AUTO[:STATe]</code> .....	360
<code>[SENSe&lt;Sensor&gt;:]BANDwidth[:RESolution]:TYPE[:VALue]</code> .....	360
<code>[SENSe&lt;Sensor&gt;:]BANDwidth[:RESolution][:VALue]</code> .....	361

---

#### `CALCulate<Measurement>[:CHANnel<Channel>]:ROSCillator:REFio:FREQUency` <freq>

Effective for:

- R&S frequency selective power sensors
- `CALCulate<Measurement>[:CHANnel<Channel>]:ROSCillator:SOURce` on page 360 `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 8  
                            Measurement

<Channel>            1 to 2  
                            1 = primary sensor, 2 = secondary sensor

#### Parameters:

<freq>                Range:      1.0e+7 to 1.2e+8  
                            \*RST:      1.0e+7

---

#### `CALCulate<Measurement>[:CHANnel<Channel>]:ROSCillator:REFio:OUTPut[:` `STATe]` <state>

Effective for 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 8  
Measurement

<Channel>            1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<state>                \*RST:        OFF

**CALCulate<Measurement>[:CHANnel<Channel>]:ROSCillator:SOURce <source>**

Effective for R&S NRP series power sensors and R&S frequency selective power sensors.

Sets the source of the reference oscillator.

**Suffix:**

<Measurement>      1 to 8  
Measurement

<Channel>            1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<source>              HOST | INTernal | REFio  
\*RST:                INTernal

**[SENSe<Sensor>:]BANDwidth[:RESolution]:TYPE:AUTO[:STATe] <state>**

Effective for 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>**

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>`

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

## 14.8.8 NRT Measurement Type

- [NRT Mode Settings](#)..... 361
- [NRT Correction Settings](#)..... 365
- [NRT Filter Settings](#)..... 368

### 14.8.8.1 NRT Mode Settings

Further information:

- [Chapter 8.5.1, "NRT Mode Settings"](#), on page 128

<code>CALCulate&lt;Measurement&gt;[:CHANnel&lt;Channel&gt;]:NRT:BURSt:MODE</code> .....	362
<code>CALCulate&lt;Measurement&gt;[:CHANnel&lt;Channel&gt;]:NRT:BURSt:PERiod</code> .....	362
<code>CALCulate&lt;Measurement&gt;[:CHANnel&lt;Channel&gt;]:NRT:BURSt:WIDTh</code> .....	363
<code>CALCulate&lt;Measurement&gt;[:CHANnel&lt;Channel&gt;]:NRT:CCDF:THReshold</code> .....	363
<code>CALCulate&lt;Measurement&gt;[:CHANnel&lt;Channel&gt;]:NRT:DIRection</code> .....	363
<code>CALCulate&lt;Measurement&gt;[:CHANnel&lt;Channel&gt;]:NRT:PEP:HOLD:TIME</code> .....	364
<code>INPut&lt;Sensor&gt;:PORT:SOURce:AUTO</code> .....	364
<code>INPut&lt;Sensor&gt;:PORT:SOURce[:VALue]</code> .....	365

**CALCulate<Measurement>[:CHANnel<Channel>]:NRT:BURSt:MODE <mode>**

Defines how the average burst power is determined.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<mode> AUTO | USER

**AUTO**

Not supported by all 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 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 128

**CALCulate<Measurement>[:CHANnel<Channel>]:NRT:BURSt:PERiod <value>**

Effective if `CALCulate<Measurement>[:CHANnel<Channel>]:NRT:BURSt:MODE` USER is set.

Sets the burst period.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value> Range: 0.0 to 1.0  
\*RST: 0.1  
Default unit: s

**Manual operation:** See "[Burst Period](#)" on page 128

---

**CALCulate<Measurement>[:CHANnel<Channel>]:NRT:BURSt:WIDTh <value>**

Effective if [CALCulate<Measurement>\[:CHANnel<Channel>\]:NRT:BURSt:MODE USER](#) is set.

Sets the burst width.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value> Range: 0.0 to 1.0  
\*RST: 0.01  
Default unit: s

**Manual operation:** See "[Burst Width](#)" on page 129

---

**CALCulate<Measurement>[:CHANnel<Channel>]:NRT:CCDF:THReshold <value>**

Sets the threshold for the complementary cumulative distribution function (CCDF).

If you enter a value without unit, the unit is defined by [UNIT<Measurement>:POWER\[:VALue\]](#). For further information, see [Chapter 14.6.1.3, "Units"](#), on page 245.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<value> Range: -290.0 to +110.0  
\*RST: +0.0  
Default unit: dBm

**Manual operation:** See "[CCDF Threshold](#)" on page 129

---

**CALCulate<Measurement>[:CHANnel<Channel>]:NRT:DIRection <direction>**

Defines how the forward power is determined.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<direction> AUTO | FORWard | REVerse

**AUTO**

Determines the power flow direction automatically. The greater value of two measured values is automatically assigned as forward power.

**FORWard | REVerse**

Sets a fixed direction of the forward power, either from port 1 to port 2 (FORWard), or from port 2 to port 1 (REVerse).

\*RST: AUTO

**Manual operation:** See "[Direction](#)" on page 129

**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 8  
Measurement

<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 129

**INPut<Sensor>:PORT:SOURce:AUTO <auto>**

Enables or disables the automatic assignment of the forward direction.

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<auto> **ON**  
The direction in which the greater power flows is taken as the forward direction.  
**OFF**  
The forward direction is defined by [INPut<Sensor>:PORT:SOURce\[:VALue\]](#).

\*RST: 0

**Manual operation:** See "[Direction](#)" on page 129

---

**INPut<Sensor>:PORT:SOURce[:VALue] <val>**

Effective if `INPut<Sensor>:PORT:SOURce:AUTO OFF` is set.

Sets a fixed direction of the forward power.

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<val> **1**  
Port 1 to port 2  
**2**  
Port 2 to port 1  
Range: 1 to 2  
\*RST: 1

**Manual operation:** See "[Direction](#)" on page 129

#### 14.8.8.2 NRT Correction Settings

Further information:

- [Chapter 8.5.2, "NRT Correction Settings"](#), on page 129

<code>[SENSe&lt;Sensor&gt;:]DM:STATe</code> .....	365
<code>[SENSe&lt;Sensor&gt;:]DM:STANdard</code> .....	366
<code>CALCulate&lt;Measurement&gt;[:CHANnel&lt;Channel&gt;]:CORRection:OFFSet:RPLane</code> .....	366
<code>CALCulate&lt;Measurement&gt;[:CHANnel&lt;Channel&gt;]:NRT:DMODulation[:VALue]</code> .....	366
<code>CALCulate&lt;Measurement&gt;[:CHANnel&lt;Channel&gt;]:NRT:DMODulation:WCDMa:CRATe</code> .....	367
<code>INPut&lt;Sensor&gt;:PORT:OFFSet</code> .....	367
<code>INPut&lt;Sensor&gt;:PORT:POSition</code> .....	367

---

**[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  
R&S NRT directional power sensor

**Parameters:**

<state> OFF | ON  
\*RST: 0

**Manual operation:** See "[Modulation](#)" on page 130

---

**[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  
R&S NRT directional power sensor

**Parameters:**

<standard>                IS95 | WCDMa | DVBT | DAB  
\*RST:                    IS95

**Manual operation:** See "[Modulation](#)" on page 130

---

**CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:OFFSet:RPLane**  
<plane>

Selects the power sensor port to which the measurement results are referred to.

**Suffix:**

<Measurement>            1 to 8  
Measurement

<Channel>                    1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<plane>                    SOURce | LOAD  
\*RST:                    SOURce

**Manual operation:** See "[Offset Reference Plane](#)" on page 130

---

**CALCulate<Measurement>[:CHANnel<Channel>]:NRT:DMODulation[:VALue]**  
<modulation>

Sets a communication standard for the modulation correction to reduce systematic deviations occurring in power measurements.

**Suffix:**

<Measurement>            1 to 8  
Measurement

<Channel>                    1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<modulation> OFF | IS95 | WCDMA | DVBT | DAB  
 \*RST: OFF

**Manual operation:** See "[Modulation](#)" on page 130

**CALCulate<Measurement>[:CHANnel<Channel>]:NRT:DMODulation:WCDMA:  
 CRATe <value>**

Effective if [CALCulate<Measurement>\[:CHANnel<Channel>\]:NRT:  
 DMODulation\[:VALue\]](#) WCDMA is set.

Sets the chip rate for the WCDMA communication standard.

**Suffix:**

<Measurement> 1 to 8  
 Measurement  
 <Channel> 1 to 2  
 1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 =  
 reflection (reverse)

**Parameters:**

<value> Range: 0.0 to 8.2e6  
 \*RST: 1.0e6  
 Default unit: Hz

**Manual operation:** See "[WCDMA Chip Rate](#)" on page 131

**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 130

**INPut<Sensor>:PORT:POSition <pos>**

Selects the power sensor port to which the measurement results are referred to.

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<pos> SOURce | LOAD  
\*RST: SOURce

**Manual operation:** See "[Offset Reference Plane](#)" on page 130

**14.8.8.3 NRT Filter Settings**

Further information:

- [Chapter 8.5.3, "NRT Filter Settings"](#), on page 131

CALCulate<Measurement>[:CHANnel<Channel>]:AVERAge:COUNT:AUTO[:STATE].....	368
CALCulate<Measurement>[:CHANnel<Channel>]:AVERAge:COUNT[:VALue].....	369
CALCulate<Measurement>[:CHANnel<Channel>]:AVERAge:COUNT:ENUM.....	369
CALCulate<Measurement>[:CHANnel<Channel>]:NRT:APERture:MODE.....	369
CALCulate<Measurement>[:CHANnel<Channel>]:NRT:APERture[:VALue].....	370
CALCulate<Measurement>[:CHANnel<Channel>]:NRT:VBWidth[:VALue].....	370
[SENSe<Sensor>:]BWIDth:VIDeo:FNUMber.....	371
[SENSe<Sensor>:]BANDwidth:VIDeo:FNUMber.....	371

---

**CALCulate<Measurement>[:CHANnel<Channel>]:AVERAge:COUNT:AUTO[:STATE] <state>**

Sets the averaging mode.

**Suffix:**

<Measurement> 1 to 8  
Measurement

<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor

**Parameters:**

<state> **OFF**  
Uses the value set by `CALCulate<Measurement>[:CHANnel<Channel>]:AVERAge:COUNT[:VALue]`

**ON**  
Determines the average count automatically from the level of the input signal.

**ONCE**  
Automatically adapts the average count once.

\*RST: ON

**Manual operation:** See "[Recalc Filter Length](#)" on page 123  
See "[Averaging Mode](#)" on page 132



---

**CALCulate<Measurement>[:CHANnel<Channel>]:AVERAge:COUNT[:VALue]**  
 <value>

Effective if **CALCulate<Measurement>[:CHANnel<Channel>]:AVERAge:COUNT:AUtO[:STATe]** OFF is set.

Sets the number of readings that are averaged for one measured value. The higher the count, the lower the noise, and the longer it takes to obtain a measured value.

**Suffix:**

<Measurement>      1 to 8  
                          Measurement

<Channel>            1 to 2  
                          1 = primary sensor, 2 = secondary sensor

**Parameters:**

<value>              Range:      1 to 1048576  
                          \*RST:       4

**Manual operation:**    See "[Filter Length](#)" on page 122  
                               See "[Averaging Count](#)" on page 132

---

**CALCulate<Measurement>[:CHANnel<Channel>]:AVERAge:COUNT:ENUM**  
 <value>

See **CALCulate<Measurement>[:CHANnel<Channel>]:AVERAge:COUNT[:VALue]** on page 369.

**Suffix:**

<Measurement>      1 to 8  
                          Measurement

<Channel>            1 to 2  
                          1 = primary sensor, 2 = secondary sensor

**Parameters:**

<value>              E1 | E2 | E4 | E8 | E16 | E32 | E64 | E128 | E256  
                          \*RST:       E4

---

**CALCulate<Measurement>[:CHANnel<Channel>]:NRT:APERture:MODE <mode>**

Specifies which integration time is used for a single measurement.

**Suffix:**

<Measurement>      1 to 8  
                          Measurement

<Channel>            1 to 2  
                          1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)

**Parameters:**

<mode>               DEFault | USER

**DEfault**

Default setting

**USER**Value defined by `CALCulate<Measurement>[:CHANnel<Channel>]:NRT:APERture[:VALue]`.

\*RST: USER

**Manual operation:** See "[Integration Time Mode](#)" on page 132**CALCulate<Measurement>[:CHANnel<Channel>]:NRT:APERture[:VALue] <value>**Effective if `CALCulate<Measurement>[:CHANnel<Channel>]:NRT:APERture:MODE USER` is set.

Defines the integration time for a single measurement.

**Suffix:**<Measurement> 1 to 8  
Measurement<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor**Parameters:**<value> Range: 0.005 to 0.111  
\*RST: 0.037  
Default unit: s**Manual operation:** See "[Integration Time](#)" on page 132**CALCulate<Measurement>[:CHANnel<Channel>]:NRT:VBWidth[:VALue] <value>**

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

**Suffix:**<Measurement> 1 to 8  
Measurement<Channel> 1 to 2  
1 = primary sensor, 2 = secondary sensor or 1 = forward, 2 = reflection (reverse)**Parameters:**<value> **0**  
4 kHz  
**1**  
200 kHz  
**2**  
Maximum bandwidth of the power sensor  
Range: 0 to 2  
\*RST: 2

**Manual operation:** See ["Video Bandwidth"](#) on page 132

---

**[SENSe<Sensor>:]BWiDth:ViDeo:FNUMber <fnum>**  
**[SENSe<Sensor>:]BANDwidth:ViDeo:FNUMber <fnum>**

Requires the sensor interface for R&S NRT (R&S NRX-B9).

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

**Suffix:**

<Sensor>                    101  
                                   R&S NRT directional power sensor

**Parameters:**

<fnum>                        Sets the bandwidth of the power sensor as follows:  
                                   0 = 4 kHz, 1 = 200 kHz, 2 = maximum bandwidth

Range:                    0 to 2

\*RST:                      0

**Manual operation:** See ["Video Bandwidth"](#) on page 132

## 14.9 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 3.2.1.2, "Module Bay"](#), on page 24
- ["Sensor Check Source tab"](#) on page 145

<a href="#">OUTPut:SOURce:STATe.....</a>	<a href="#">371</a>
<a href="#">SOURce:OUTPut:STATe.....</a>	<a href="#">371</a>
<a href="#">SOURce:POWer[:VALue].....</a>	<a href="#">372</a>
<a href="#">SOURce:PULM:STATe.....</a>	<a href="#">372</a>
<a href="#">SOURce[:RF]:FREQuency[:VALue].....</a>	<a href="#">372</a>

---

**OUTPut:SOURce:STATe <state>**

**SOURce:OUTPut:STATe <state>**

Requires the sensor check source (R&S NRX-B1)

Enables or disables the signal output.

**Parameters:**

<state>                      \*RST:                    0

**Manual operation:** See ["Signal Output"](#) on page 145

---

**SOURce:POWer[:VALue]** <value>

Requires the sensor check source (R&S NRX-B1)

Sets the power level for the output signal.

If you enter a value without unit, the unit is defined by **SOURce:UNIT:POWer**. For further information, see [Chapter 14.6.1.3, "Units"](#), on page 245.

**Parameters:**

<value>	Range:	-40.0 to +20.0
	*RST:	+0.0
	Default unit:	dBm

**Manual operation:** See ["Power Level"](#) on page 146

---

**SOURce:PULM:STATe** <state>

Requires the sensor check source (R&S NRX-B1)

Effective if the output signal is enabled, using **SOURce:OUTPut:STATe** or **OUTPut:SOURce:STATe**.

Sets the signal type of the output signal.

**Parameters:**

<state>	OFF   ON
	<b>OFF</b>
	Continuous wave
	<b>ON</b>
	Pulse modulation
	*RST: 0

**Manual operation:** See ["Signal Output"](#) on page 145

---

**SOURce[:RF]:FREQuency[:VALue]** <freq>

Requires the sensor check source (R&S NRX-B1)

Sets the frequency of the output signal.

**Parameters:**

<freq>	Range:	50.0e6 to 1.0e9
	*RST:	50.0e6
	Default unit:	Hz

**Manual operation:** See ["Frequency"](#) on page 145

## 14.10 Configuring the Analog Signal Output and the Trigger Input/Output

Configures the two multifunctional BNC connectors at the rear of the R&S NRX.

Further Information:

- [Chapter 3.2.2.1, "Trig In / Out 2 and Out 1 / Trig Out Connectors"](#), on page 28
- ["I/O 1, I/O 2 tabs"](#) on page 146

INPut<undef>:TRIGger:IMPedance.....	373
OUTPut:LIMit:FAIL.....	374
OUTPut:LIMit:FEED:INDEX.....	374
OUTPut:MODE<output>.....	374
OUTPut:REcorder<output>:FEED:INDEX.....	375
OUTPut:REcorder<output>:LIMit:LOWer:CCDF.....	375
OUTPut:REcorder<output>:LIMit:LOWer:[VALue].....	376
OUTPut:REcorder<output>:LIMit:LOWer:POWER.....	376
OUTPut:REcorder<output>:LIMit:LOWer:RATio:RCOefficient.....	376
OUTPut:REcorder<output>:LIMit:LOWer:RATio:RFRatio.....	377
OUTPut:REcorder<output>:LIMit:LOWer:RATio:RLOSs.....	377
OUTPut:REcorder<output>:LIMit:LOWer:RATio:SWR.....	377
OUTPut:REcorder<output>:LIMit:LOWer:RATio:[VALue].....	378
OUTPut:REcorder<output>:LIMit:UPPer:CCDF.....	378
OUTPut:REcorder<output>:LIMit:UPPer:[VALue].....	379
OUTPut:REcorder<output>:LIMit:UPPer:POWER.....	379
OUTPut:REcorder<output>:LIMit:UPPer:RATio:RCOefficient.....	379
OUTPut:REcorder<output>:LIMit:UPPer:RATio:RFRatio.....	380
OUTPut:REcorder<output>:LIMit:UPPer:RATio:RLOSs.....	380
OUTPut:REcorder<output>:LIMit:UPPer:RATio:SWR.....	381
OUTPut:REcorder<output>:LIMit:UPPer:RATio:[VALue].....	381
OUTPut:TRIGger:SOURce.....	381

---

### INPut<undef>:TRIGger:IMPedance <impedance>

Effective if `OUTPut:MODE<output>` TIN is set.

Sets the termination resistance of the external trigger signal that is supplied at the Trig In / Out 2 connector. Choose a setting that fits the impedance of the trigger source to minimize reflections on the trigger signals.

#### Suffix:

<undef>                    1 to n  
                               No suffix required.

#### Parameters:

<impedance>                HIGH | LOW  
                               \*RST:        HIGH

**Manual operation:** See ["Impedance for Trigger Input"](#) on page 149

**OUTPut:LIMit:FAIL** <mode>

Effective if **OUTPut:MODE**<output> is set to:

LIM, FLIMit or RLIMit

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

**Parameters:**

<mode>                   LOW | HIGH  
**HIGH**  
 Output voltage of 5 V.  
**LOW**  
 Output voltage of 0 V.  
 \*RST:           LOW

**Manual operation:** See "[Fail Voltage](#)" on page 149

**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 149

**OUTPut:MODE**<output> <mode>

Sets the functionality of the Out 1 / Trig Out and Trig In / Out 2 connectors.

**Suffix:**

<output>                   1 to 2  
 BNC connectors at the rear; 1 = Out 1 / Trig Out,  
 2 = Trig In / Out 2

**Parameters:**

<mode>                   OFF | RECorder | FRECorder | RRECorder | LIMit | FLIMit |  
 RLIMit | TOUT | TIN | OFF | RECorder | FRECorder |  
 RRECorder | LIMit | FLIMit | RLIMit | TOUT | TIN  
**OFF**  
 Disabled  
**RECorder**  
 Analog output  
**FRECorder**  
 Forward analog output  
**RRECorder**  
 Reflection analog output

## Configuring the Analog Signal Output and the Trigger Input/Output

**LIMit**

Limit violation

**FLIMit**

Forward limit violation

**RLIMit**

Reflection limit violation

**TOUT**

Trigger output

**TIN**

Trigger input

\*RST: OFF

**Manual operation:** See "[Mode](#)" on page 147**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 148**OUTPut:RECOder<output>:LIMit:LOWer:CCDF <value>**Effective if `OUTPut:MODE<output>` is set to:

REC, FREC or RREC

Sets the CCDF measurement value that corresponds to 0 V output voltage.

**Suffix:**

<output>                    1 to 2  
 BNC connectors at the rear; 1 = Out 1 / Trig Out,  
 2 = Trig In / Out 2

**Parameters:**

<value>                    Range:     0.0 to 100.0  
 \*RST:        0.0  
 Default unit: pct

**Manual operation:** See "[0 V Equivalent](#)" on page 148

**OUTPut:RECOOrder<output>:LIMit:LOWer[:VALue] <value>**

Effective if **OUTPut:MODE<output>** is set to REC, FREC or RREC.

Sets the measurement value that corresponds to 0 V output voltage.

If you enter a value without unit, the unit is defined by **UNIT<Measurement>:POWER[:VALue]**. For further information, see [Chapter 14.6.1.3, "Units"](#), on page 245.

**Suffix:**

<output>                    1 to 2  
                                  BNC connectors at the rear; 1 = Out 1 / Trig Out,  
                                  2 = Trig In / Out 2

**Parameters:**

<value>                    The range depends on the measurement.

**Manual operation:**    See "[0 V Equivalent](#)" on page 148

**OUTPut:RECOOrder<output>:LIMit:LOWer:POWER <value>**

Effective if **OUTPut:MODE<output>** is set to:

REC, FREC or RREC

Sets the power measurement value that corresponds to 0 V output voltage.

If you enter a value without unit, the unit is defined by **UNIT<Measurement>:POWER[:VALue]**. For further information, see [Chapter 14.6.1.3, "Units"](#), on page 245.

**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 148

**OUTPut:RECOOrder<output>:LIMit:LOWer:RATio:RCOefficient <value>**

Effective if **OUTPut:MODE<output>** is set to:

REC, FREC or RREC

Sets the reflection coefficient measurement value that corresponds to 0 V output voltage.

**Suffix:**

<output>                    1 to 2  
                                  BNC connectors at the rear; 1 = Out 1 / Trig Out,  
                                  2 = Trig In / Out 2



## Configuring the Analog Signal Output and the Trigger Input/Output

**Parameters:**

<value>                   Range:     -1e18 to 1e18  
                               \*RST:       0.0  
                               Default unit: -

**Manual operation:** See "[0 V Equivalent](#)" on page 148

**OUTPut:RECOder<output>:LIMit:LOWer:RATio:RFRatio <value>**

Effective if `OUTPut:MODE<output>` is set to:

REC, FREC or RREC

Sets the ratio of forward/reverse power that corresponds to 0 V output voltage.

**Suffix:**

<output>                   1 to 2  
                               BNC connectors at the rear; 1 = Out 1 / Trig Out,  
                               2 = Trig In / Out 2

**Parameters:**

<value>                   Range:     0.0 to 100.0  
                               \*RST:       0.0  
                               Default unit: pct

**Manual operation:** See "[0 V Equivalent](#)" on page 148

**OUTPut:RECOder<output>:LIMit:LOWer:RATio:RLOSS <value>**

Effective if `OUTPut:MODE<output>` is set to:

REC, FREC or RREC

Sets the return loss measurement value that corresponds to 0 V output voltage.

**Suffix:**

<output>                   1 to 2  
                               BNC connectors at the rear; 1 = Out 1 / Trig Out,  
                               2 = Trig In / Out 2

**Parameters:**

<value>                   Range:     -180.0 to 180.0  
                               \*RST:       0.0  
                               Default unit: dB

**Manual operation:** See "[0 V Equivalent](#)" on page 148

**OUTPut:RECOder<output>:LIMit:LOWer:RATio:SWR <value>**

Effective if `OUTPut:MODE<output>` is set to:

REC, FREC or RREC

## Configuring the Analog Signal Output and the Trigger Input/Output

Sets the standing wave ration (SWR) measurement value that corresponds to 0 V output voltage.

**Suffix:**

<output> 1 to 2  
BNC connectors at the rear; 1 = Out 1 / Trig Out,  
2 = Trig In / Out 2

**Parameters:**

<value> Range: -1e18 to 1e18  
\*RST: 1.0  
Default unit: -

**Manual operation:** See "[0 V Equivalent](#)" on page 148

**OUTPut:RECOder<output>:LIMit:LOWer:RATio[:VALue]** <value>

Effective if [OUTPut:MODE<output>](#) is set to:

REC, FREC or RREC

Sets the power ratio measurement value that corresponds to 0 V output voltage.

If you enter a value without unit, the unit is defined by [UNIT<Measurement>:POWER:RATio](#). For further information, see [Chapter 14.6.1.3, "Units"](#), on page 245.

**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 148

**OUTPut:RECOder<output>:LIMit:UPPer:CCDF** <value>

Effective if [OUTPut:MODE<output>](#) is set to:

REC, FREC or RREC

Sets the CCDF measurement value that corresponds to 2.5 V output voltage.

**Suffix:**

<output> 1 to 2  
BNC connectors at the rear; 1 = Out 1 / Trig Out,  
2 = Trig In / Out 2

**Parameters:**

<value> Range: 0.0 to 100.0  
\*RST: 1.0  
Default unit: pct

**Manual operation:** See ["2.5 V Equivalent"](#) on page 148

---

**OUTPut:RECOOrder<output>:LIMit:UPPer[:VALue] <value>**

Effective if `OUTPut:MODE<output>` is set to REC, FREC or RREC.

Sets the measurement value that corresponds to 2.5 V output voltage.

If you enter a value without unit, the unit is defined by `UNIT<Measurement>:POWER[:VALue]`. For further information, see [Chapter 14.6.1.3, "Units"](#), on page 245.

**Suffix:**

<output>                    1 to 2  
                                   BNC connectors at the rear; 1 = Out 1 / Trig Out,  
                                   2 = Trig In / Out 2

**Parameters:**

<value>                    The range depends on the measurement.

**Manual operation:** See ["2.5 V Equivalent"](#) on page 148

---

**OUTPut:RECOOrder<output>:LIMit:UPPer:POWER <value>**

Effective if `OUTPut:MODE<output>` is set to:

REC, FREC or RREC

Sets the power measurement value that corresponds to 2.5 V output voltage.

If you enter a value without unit, the unit is defined by `UNIT<Measurement>:POWER[:VALue]`. For further information, see [Chapter 14.6.1.3, "Units"](#), on page 245.

**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 148

---

**OUTPut:RECOOrder<output>:LIMit:UPPer:RATio:RCOefficient <value>**

Effective if `OUTPut:MODE<output>` is set to:

REC, FREC or RREC

Sets the reflection coefficient measurement value that corresponds to 2.5 V output voltage.

## Configuring the Analog Signal Output and the Trigger Input/Output

**Suffix:**

<output> 1 to 2  
BNC connectors at the rear; 1 = Out 1 / Trig Out,  
2 = Trig In / Out 2

**Parameters:**

<value> Range: -1e18 to 1e18  
\*RST: 1.0  
Default unit: -

**Manual operation:** See "2.5 V Equivalent" on page 148

**OUTPut:RECOder<output>:LIMit:UPPer:RATio:RFRatio <value>**

Effective if **OUTPut:MODE<output>** is set to:

REC, FREC or RREC

Sets the ratio of forward/reverse power that corresponds to 2.5 V output voltage.

**Suffix:**

<output> 1 to 2  
BNC connectors at the rear; 1 = Out 1 / Trig Out,  
2 = Trig In / Out 2

**Parameters:**

<value> Range: 0.0 to 100.0  
\*RST: 100.0  
Default unit: pct

**Manual operation:** See "2.5 V Equivalent" on page 148

**OUTPut:RECOder<output>:LIMit:UPPer:RATio:RLOSs <value>**

Effective if **OUTPut:MODE<output>** is set to:

REC, FREC or RREC

Sets the return loss measurement value that corresponds to 2.5 V output voltage.

**Suffix:**

<output> 1 to 2  
BNC connectors at the rear; 1 = Out 1 / Trig Out,  
2 = Trig In / Out 2

**Parameters:**

<value> Range: -180.0 to 180.0  
\*RST: 10.0  
Default unit: dB

**Manual operation:** See "2.5 V Equivalent" on page 148

---

**OUTPut:RECOder<output>:LIMit:UPPer:RATio:SWR <value>**

Effective if **OUTPut:MODE<output>** is set to:

REC, FREC or RREC

Sets the standing wave ratio (SWR) measurement value that corresponds to 2.5 V output voltage.

**Suffix:**

<output>                    1 to 2  
 BNC connectors at the rear; 1 = Out 1 / Trig Out,  
 2 = Trig In / Out 2

**Parameters:**

<value>                    Range:     -1e18 to 1e18  
                               \*RST:      10.0  
                               Default unit: -

**Manual operation:**    See "[2.5 V Equivalent](#)" on page 148

---

**OUTPut:RECOder<output>:LIMit:UPPer:RATio[:VALue] <value>**

Effective if **OUTPut:MODE<output>** is set to:

REC, FREC or RREC

Sets the power ratio measurement value that corresponds to 2.5 V output voltage.

If you enter a value without unit, the unit is defined by **UNIT<Measurement>:POWER:RATio**. For further information, see [Chapter 14.6.1.3, "Units"](#), on page 245.

**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 148

---

**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 149

## 14.11 Zeroing

Further Information:

- [Chapter 10, "Zeroing Sensors"](#), on page 135

<a href="#">CALibration&lt;Sensor&gt;:ZERO</a> .....	382
<a href="#">CALibration&lt;Sensor&gt;:ZERO:AUTO</a> .....	382
<a href="#">CALibration&lt;undef&gt;:ALL:ZERO:AUTO</a> .....	383
<a href="#">CALibration&lt;Sensor&gt;:ZERO:FAST:AUTO</a> .....	383
<a href="#">CALibration&lt;undef&gt;:ALL:ZERO:FAST:AUTO</a> .....	383

---

### **CALibration<Sensor>:ZERO** [<auto>]

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.

#### **Suffix:**

<Sensor>                    1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

#### **Parameters:**

<auto>                    ON | OFF | ONCE | LFR | UFR

**ON**  
Return value if a calibration is in progress.

**OFF**  
Return value if no calibration is in progress.

**ONCE**  
Starts zeroing.

**LFR | UFR**  
Starts zeroing in a lower frequency range (LRF) or upper frequency range (UFR), thus reducing the required time by half. Not accepted by all power sensors. Consult the manual of the power sensor concerned.

---

### **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:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<auto> ON | OFF | ONCE | LFR | UFR  
See `CALibration<Sensor>:ZERO` on page 382.

**CALibration<undef>:ALL:ZERO:AUTO** [<auto>]

Applies to all connected power sensors. See `CALibration<Sensor>:ZERO:AUTO` on page 382.

**Suffix:**

<undef> 1 to n  
No suffix required.

**Parameters:**

<auto> ON | OFF | ONCE | LFR | UFR

**CALibration<Sensor>:ZERO:FAST:AUTO** [<auto>]

Effective for trace measurements.

Performs fast zeroing. Since the commands are processed 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:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<auto> ON | OFF | ONCE | LFR | UFR  
See `CALibration<Sensor>:ZERO` on page 382.

**CALibration<undef>:ALL:ZERO:FAST:AUTO** [<auto>]

Applies to all connected power sensors. See `CALibration<Sensor>:ZERO:FAST:AUTO` on page 383.

<b>Suffix:</b>	
<undef>	1 to n No suffix required.
<b>Parameters:</b>	
<auto>	ON   OFF   ONCE   LFR   UFR

## 14.12 Running Selftests

Used for testing the connected power sensors and the R&S NRX.

Further information:

- [Chapter 11.4, "Test"](#), on page 166

<a href="#">CALibration&lt;Sensor&gt;:TEST?</a> .....	384
<a href="#">CALibration&lt;Sensor&gt;:TEST:DEVIation?</a> .....	384
<a href="#">CALibration&lt;Sensor&gt;:TEST:REFErence?</a> .....	385
<a href="#">DIAGnostic:INFO:OTIME?</a> .....	385
<a href="#">TEST:DEVIce:RESult?</a> .....	385
<a href="#">TEST:DEVIce[:ALL]</a> .....	385
<a href="#">TEST:USB:STORage?</a> .....	386
<a href="#">TEST:SENSor&lt;Sensor&gt;?</a> .....	386
<a href="#">SYSTem:SENSor&lt;Sensor&gt;:TEST?</a> .....	386

---

### **CALibration<Sensor>:TEST?**

Requires a thermal power sensor, equipped with an additional test heater.

Queries the power difference in W when measuring with the external heater enabled and disabled.

<b>Suffix:</b>	
<Sensor>	1 to 128 Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

<b>Usage:</b>	Query only
---------------	------------

---

### **CALibration<Sensor>:TEST:DEVIation?**

Requires a thermal power sensor, equipped with an additional test heater.

Queries the relative deviation of the current power difference from the reference value stored in the calibration data set. The relative deviation is calculated as follows:

$$\langle \text{relative deviation} \rangle = (\langle \text{current power difference} \rangle / \langle \text{reference value} \rangle) - 1$$

with

<current power difference>: [CALibration<Sensor>:TEST?](#)

<reference value>: [CALibration<Sensor>:TEST:REFErence?](#)



**Suffix:**  
 <Sensor> 1 to 128  
 Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Usage:** Query only

#### **CALibration<Sensor>:TEST:REfERENCE?**

Requires a thermal power sensor, equipped with an additional test heater.

Queries the reference value of the power difference in W when measuring with the external heater enabled and disabled. The reference value is determined during the calibration process and stored in the calibration data set.

**Suffix:**  
 <Sensor> 1 to 128  
 Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Usage:** Query only

#### **DIAGnostic:INFO:OTIME?**

Queries the count of the built-in elapsed-time meter. The count is always output in hours [h] and cannot be changed.

**Usage:** Query only

#### **TEST:DEvIce:RESult?**

Queries the test results of `TEST:DEvIce[:ALL]`.

**Usage:** Query only

#### **TEST:DEvIce[:ALL] [<argument>]**

Performs tests for the keyboard, display and touch panel.

**Parameters:**  
 <argument> The tests can be performed as single tests or as combined 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>	<b>0</b>	Test passed
	<b>1</b>	Test failed; no memory stick connected or memory stick does not respond.

**Usage:** Query only

**TEST:SENSor<Sensor>?**

Starts a selftest of the selected power sensor and returns the result. In contrast to [\\*TST?](#), this command returns detailed information that you can use for troubleshooting.

The response is sensor-dependent. It always contains an identification string for the power sensor with the type name and the firmware version number. If an error has occurred, the response also contains the error message in plain text.

**Suffix:**

<Sensor>	1 to 128	Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100
----------	----------	---

**Usage:** Query only

**Manual operation:** See "[Sensor Test](#)" on page 152

**SYSTem:SENSor<Sensor>:TEST?**

See [TEST:SENSor<Sensor>?](#) on page 386.

**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 "[Sensor Test](#)" on page 152

## 14.13 Managing Setups and Correction Tables

Manages setups and frequency-dependent correction tables.

Further information:

- [Chapter 9, "Saving and Recalling Settings"](#), on page 133

- "Frequency Dependent Offset" on page 119

MEMory:CATalog:STATe?	387
MEMory:CATalog:TABLE?	387
MEMory:CATalog[:ALL]?	388
MEMory:CLEar:TABLE	388
MEMory:CLEar[:NAME]	388
MEMory:FREE:STATe?	389
MEMory:FREE:TABLE?	389
MEMory:FREE[:ALL]?	389
MEMory:NSTates?	389
MEMory:STATe:CATalog?	389
MEMory:STATe:DEFine	390
MEMory:STATe:MAP	390
MEMory:STATe:RESet	390
MEMory:TABLE:DATA?	390
MEMory:TABLE:DATA:POINts?	391
MEMory:TABLE:FREQuency	391
MEMory:TABLE:FREQuency:POINts?	391
MEMory:TABLE:GAIN:POINts?	391
MEMory:TABLE:GAIN[:MAGNitude]	392
MEMory:TABLE:MAP	392
MEMory:TABLE:MOVE	392
MEMory:TABLE:RESet	393
MEMory:TABLE:SElect	393

---

### MEMory:CATalog:STATe?

Queries information on the available setups stored on the R&S NRX.

The response consists of:

<used disk space>, <remaining disk space>, "<setup 1>", "<setup 2>", "<setup 3>", ...

Each <setup> consists of:

<name>,<data type>,<required disk space in bytes>

Example: "Setup 1, STAT, 1212479"

**Usage:** Query only

---

### MEMory:CATalog:TABLE?

Queries information on the available frequency-dependent correction tables stored on the R&S NRX.

The response consists of:

<used disk space>, <remaining disk space>, "<table 1>", "<table 2>", "<table 3>", ...

Each <table> consists of:

<name>,<data type>,<required disk space in bytes>

Example: "Table 2, TABL, 84"

**Usage:** Query only

### MEMory:CATalog[:ALL]?

Queries information on the available setups and frequency-dependent correction tables stored on the R&S NRX. Combines the information queried by.

- [MEMory:CATalog:STATe?](#)
- [MEMory:CATalog:TABLE?](#)

The response consists of:

<used disk space>, <remaining disk space>, "<setup 1>", "<setup 2>", "<setup 3>", ..., "<table 1>", "<table 2>", "<table 3>", ...

Each <setup> and <table> consists of:

<name>, <data type>, <required disk space in bytes>

Example for <setup>: "Setup 1, STAT, 1212479"

Example for <table>: "Table 2, TABL, 84"

**Usage:** Query only

### MEMory:CLEar:TABLE

Deletes the content of the selected correction table.

Use [MEMory:TABLE:SElect](#) to select the table.

Notice: Once send, you cannot cancel this command. Cleared values are irretrievably lost.

Alternatively, you can use [MEMory:CLEar\[:NAME\]](#).

**Example:** MEM:CLE:TABL

**Usage:** Event

### MEMory:CLEar[:NAME] <name>>

Deletes the content of the correction table or setup carrying the specified name.

Notice: Once send, you cannot cancel this command. Cleared values are irretrievably lost.

#### Setting parameters:

<<name>> Name of the correction table or setup

**Example:** MEM:CLE "Setup 9"

**Usage:** Setting only

**MEMory:FREE:STATe?**

Queries the used and remaining disk space for setups.

**Example:**           MEM:FREE:STAT?  
                  Query  
                  1358442496,8337127  
                  Response

**Usage:**            Query only

---

**MEMory:FREE:TABLE?**

Queries the used and remaining disk space for frequency-dependent correction tables.

**Example:**           MEM:FREE:TABLE?  
                  Query  
                  1358442496,267  
                  Response

**Usage:**            Query only

---

**MEMory:FREE[:ALL]?**

Queries the used and remaining disk space for setups and frequency-dependent correction tables. Combines the information queried by:

- [MEMory:FREE:STATe?](#)
- [MEMory:FREE:TABLE?](#)

**Example:**           MEM:FREE?  
                  Query  
                  1358442496,8337394  
                  Response

**Usage:**            Query only

---

**MEMory:NStates?**

Queries the number of available setups.

**Example:**           MEM:NST?  
                  Query  
                  20  
                  Response

**Usage:**            Query only

---

**MEMory:STATe:CATalog?**

Queries the names of the available setups stored on the R&S NRX.

**Usage:**            Query only

---

---

**MEMory:STATe:DEFine** <register\_name>[, <register\_number>]

**MEMory:STATe:MAP** <register\_name>[, <register\_number>]

Assigns a name to the setup stored in the memory location.

Take care to use recognizable names. The R&S NRX does not check whether a name is unique. If you want to reset the factory default, use [MEMory:STATe:RESet](#).

The query returns the memory location that is assigned to the setup name.

**Parameters:**

<register\_name> Setup name; allowed are alphanumeric characters and special characters.

<register\_number> Memory location of the setup  
**0**  
 Factory-set setup, cannot be changed  
**1 to 19**  
 Available memory locations

**Example:** MEM:STAT:MAP "test",5

**Example:** MEM:STAT:MAP? "test"

**Manual operation:** See ["Save / Recall Setup"](#) on page 134  
 See ["Setup Name"](#) on page 134

---

**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 120

---

**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 120

---

**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 120

**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:TABLE: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 120

**MEMory:TABLE:MAP <register\_name>[, <register\_number>]**

Assigns a name to the correction table stored in the memory location.

Take care to use recognizable names. The R&S NRX does not check whether a name is unique. If you want to reset the factory default, use `MEMory:STATE:RESet`.

The query returns the memory location that is assigned to the setup name.

**Parameters:**

<register\_name>            Name of the correction table; allowed are alphanumeric characters and special characters.

<register\_number>        Memory location of the correction table  
**0**  
 Factory-set correction table, cannot be changed  
**1 to 9**  
 Available memory locations

**Example:**                `MEM:TABLE:MAP "test5",5`

**Example:**                `MEM:TABLE:MAP? "test5"`

**Manual operation:**    See "[Edit table name](#)" on page 120

**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 120

## 14.14 System Information and Configuration

The SYSTem subsystem contains a series of commands for general functions that do not directly affect the measurement.

Further information:

- [Chapter 11, "System Settings"](#), on page 137

### 14.14.1 Presetting

SYSTem:PRESet.....	394
SYSTem:SENSor<Sensor>:RESet.....	394

---

#### SYSTem:PRESet

Sets the R&S NRX to a defined initial state. The default settings are indicated in the description of commands as \*RST value.

With the exceptions listed in [Table 14-16](#), this command corresponds to \*RST.

*Table 14-16: Differences between \*RST and SYSTem:PRESet*

Command	*RST	SYSTem:PRESet
[SENSe<Sensor>:]AVERAge:TCOnTrol	REPeat	MOVing
CALCulate<Measurement>[: CHANnel<Channel>]:AVERAge:TCOnTrol[:ENUM]	REPeat	MOVing
CALCulate<Measurement>[: CHANnel<Channel>]:TRACe:AVERAge: TCOnTrol[:ENUM]	REPeat	MOVing
INITiate<Measurement>:CONTinuous	OFF	ON

**Usage:** Event

**Manual operation:** See "Preset" on page 134

---

#### SYSTem:SENSor<Sensor>:RESet

Sets the selected 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

### 14.14.2 Shutdown and Reboot

SYSTem:REBoot.....	394
SYSTem:SENSor<Sensor>:REBoot.....	395
SYSTem:SHUTdown.....	395

---

#### SYSTem:REBoot

Reboots the R&S NRX.

**Usage:** Event

**SYSTem:SENSor<Sensor>:REBoot**

Reboots 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

**Usage:** Event

**SYSTem:SHUTdown**

Shuts down the R&S NRX.

**Usage:** Event

**14.14.3 Firmware Update**

If you want to integrate a firmware update function in an application, use [SYSTem:FWUPdate](#).

**Example**

You want to update your R&S NRX with the `NRX_18.01.22.02.rsu` file. This file has a size of 10242884 bytes.

To send the file to the R&S NRX for updating the firmware, your application has to assemble a memory block containing:

```
SYST:FWUP <block_data>
```

The <block\_data> are definite length arbitrary block data as described in [SYSTem:FWUPdate](#) on page 396.

The size of the file is 10242884. This number has 8 digits. Thus, the <block\_data> consist of the following:

- #
- 8  
How many digits follow to specify the file size.
- 10242884  
Number that specifies the file size.
- <file\_contents>  
Contents of the \*.rsu file, byte-by-byte
- 0x0a  
Delimiter

In this example, you write exactly 10242905 bytes to the R&S NRX, for example by using a 'viWrite()' function.

The 10242905 bytes result from the values of the list above:

9 + 1 + 1 + 1 + 8 + 10242884 + 1

In a (pseudo) string notation, the memory block looks as follows:

SYST:FWUP #810242884<file\_contents>0x0a,

SYSTem:FWUPdate..... 396  
 SYSTem:FWUPdate:STATus?..... 396

#### SYSTem:FWUPdate <fwudata>>

Loads new operating firmware into the R&S NRX. Rohde & Schwarz provides the update file. For further details, see [Chapter 13, "Firmware Update"](#), on page 170.

If you want to integrate a firmware update function in an application, see the example given in [Chapter 14.14.3, "Firmware Update"](#), on page 395.

#### Setting parameters:

<<fwudata>>            <block\_data>  
                           Definite length arbitrary block data containing the direct copy of the binary \* .rsu file in the following format:  
                           #  
                           Single digit indicating how many digits follow to specify the size of the binary file.  
                           Number that specifies the size of the binary file.  
                           Binary data  
                           0x0a as appended delimiter for line feed

**Usage:**                Setting only

#### SYSTem:FWUPdate:STATus?

Queries the result of the firmware update, returned as a readable string.

Further information.

- [SYSTem:FWUPdate](#) on page 396
- [Chapter 13, "Firmware Update"](#), on page 170

**Example:**                SYST:FWUP:STAT?  
                           Query  
                           "Success"  
                           Response

**Usage:**                Query only

### 14.14.4 Network Settings

SYSTem:COMMunicate:INET[:SELF]:ADDRess..... 397  
 SYSTem:COMMunicate:NETWork[:IPADdress][:ADDRess]..... 397  
 SYSTem:COMMunicate:INET[:SELF]:DNS:ADDRess..... 397  
 SYSTem:COMMunicate:NETWork[:IPADdress]:DNS..... 397  
 SYSTem:COMMunicate:INET[:SELF]:DNS:SUFFix..... 397

<code>SYSTem:COMMunicate:NETWork[:COMMOn]:DOMain</code> .....	397
<code>SYSTem:COMMunicate:INET[:SELF]:GATeway:ADDRess</code> .....	398
<code>SYSTem:COMMunicate:NETWork[:IPADdress]:GATeway</code> .....	398
<code>SYSTem:COMMunicate:INET[:SELF]:MODE</code> .....	398
<code>SYSTem:COMMunicate:NETWork[:IPADdress]:MODE</code> .....	398
<code>SYSTem:COMMunicate:INET[:SELF]:SUBNetmask:ADDRess</code> .....	398
<code>SYSTem:COMMunicate:NETWork[:IPADdress]:SUBNet:MASK</code> .....	398
<code>SYSTem:COMMunicate:NETWork[:COMMOn]:HOSTName</code> .....	398
<code>SYSTem:COMMunicate:NETWork[:COMMOn]:WORKGroup</code> .....	399
<code>SYSTem:COMMunicate:NETWork:MACAddress?</code> .....	399
<code>SYSTem:COMMunicate:NETWork:REStart</code> .....	399
<code>SYSTem:COMMunicate:NETWork:STATus?</code> .....	399

---

**SYSTem:COMMunicate:INET[:SELF]:ADDRess** <address>  
**SYSTem:COMMunicate:NETWork[:IPADdress][:ADDRess]** <IPaddress>  
 Effective if `SYSTem:COMMunicate:NETWork[:IPADdress]:MODE` `STATic` is set.

Sets the IP address of the R&S NRX

**Parameters:**

<IPaddress> Consists of four blocks separated by dots, consisting of up to 3 digits. Example: 108.0.0.255  
 Range: 0 to 255 for each block

**Manual operation:** See "[IPv4 Address](#)" on page 140

---

**SYSTem:COMMunicate:INET[:SELF]:DNS:ADDRess** <server>  
**SYSTem:COMMunicate:NETWork[:IPADdress]:DNS** <DNS>  
 Effective if `SYSTem:COMMunicate:NETWork[:IPADdress]:MODE` `STATic` is set.

Sets the DNS server address of your local subnet.

**Parameters:**

<DNS> Consists of four blocks separated by dots, consisting of up to 3 digits. Example: 123.456.0.1  
 Range: 0 to 255 for each block

**Manual operation:** See "[DNS Server](#)" on page 141

---

**SYSTem:COMMunicate:INET[:SELF]:DNS:SUFFix** <suffix>  
**SYSTem:COMMunicate:NETWork[:COMMOn]:DOMain** <Domain>  
 Sets the primary DNS suffix, that means the domain name. DNS uses the suffix for registration and name resolution to identify the R&S NRX uniquely in the entire network.

**Parameters:**

<Domain>

**Manual operation:** See "[DNS Suffix](#)" on page 140

---

**SYSTem:COMMunicate:INET[:SELF]:GATeway:ADDRess** <gateway>

**SYSTem:COMMunicate:NETWork[:IPADdress]:GATeway** <Gateway>

Effective if **SYSTem:COMMunicate:NETWork[:IPADdress]:MODE** **STATic** is set.

Sets the IP address of the default gateway.

**Parameters:**

<Gateway> Consists of four blocks separated by dots, consisting of up to 3 digits. Example: 192.168.10.254

Range: 0 to 255 for each block

**Manual operation:** See "[Default Gateway](#)" on page 141

---

**SYSTem:COMMunicate:INET[:SELF]:MODE** <state>

**SYSTem:COMMunicate:NETWork[:IPADdress]:MODE** <mode>

Sets how the IP address is assigned.

**Parameters:**

<mode> AUTO | STATic

**AUTO**

Assigns the IP address automatically, provided the network supports the dynamic host configuration protocol (DHCP).

**STATic**

Enables assigning the IP address manually.

\*RST: AUTO

**Manual operation:** See "[Address Mode](#)" on page 140

---

**SYSTem:COMMunicate:INET[:SELF]:SUBNetmask:ADDRess** <netmask>

**SYSTem:COMMunicate:NETWork[:IPADdress]:SUBNet:MASK** <Mask>

Effective if **SYSTem:COMMunicate:NETWork[:IPADdress]:MODE** **STATic** is set.

Sets the subnet mask of your local subnet.

**Parameters:**

<Mask> Consists of four blocks separated by dots, consisting of up to 3 digits. Example: 255.255.255.0

Range: 0 to 255 for each block

**Manual operation:** See "[Subnet Mask](#)" on page 141

---

**SYSTem:COMMunicate:NETWork[:COMMON]:HOSTName** <Hostname>

Sets the individual hostname of the R&S NRX.

It is recommended that you do not change the default hostname to avoid problems with the network connection. However, if you change the hostname, be sure to use a unique name.

**Parameters:**

&lt;Hostname&gt;

**Manual operation:** See "[Host Name](#)" on page 139

---

**SYSTem:COMMunicate:NETWork[:COMMon]:WORKgroup** <Workgroup>

Sets an individual workgroup name for the R&amp;S NRX.

**Parameters:**

&lt;Workgroup&gt;

---

**SYSTem:COMMunicate:NETWork:MACaddress?**

Queries the MAC address of the network adapter.

**Usage:** Query only

---

**SYSTem:COMMunicate:NETWork:REStart**

Restarts the network connection to the R&amp;S NRX, i.e. terminates the connection and sets it up again.

**Usage:** Event

---

**SYSTem:COMMunicate:NETWork:STATus?**

Queries the network configuration state.

**Usage:** Query only

### 14.14.5 Remote Settings

<a href="#">SYSTem:COMMunicate:GPIB[:SELF]:ADDRess</a> .....	399
<a href="#">SYSTem:HELP:HEADers?</a> .....	400
<a href="#">SYSTem:HELP:SYNTax?</a> .....	400
<a href="#">SYSTem:HELP:SYNTax:ALL?</a> .....	400
<a href="#">SYSTem:IDN:ANSWer</a> .....	400
<a href="#">SYSTem:IDN:AUTO</a> .....	401
<a href="#">SYSTem:IDN:MODE</a> .....	401
<a href="#">SYSTem:LANGuage</a> .....	401
<a href="#">SYSTem:OPT:ANSWer</a> .....	402
<a href="#">SYSTem:OPT:AUTO</a> .....	402
<a href="#">SYSTem:OPT:MODE</a> .....	402
<a href="#">SYSTem:VERSion?</a> .....	402

---

**SYSTem:COMMunicate:GPIB[:SELF]:ADDRess** <address>

Sets the GPIB address.

**Parameters:**

<address>                    Range:     1 to 30  
                                  \*RST:     20

**Manual operation:**    See "[GPIB Address](#)" on page 143

**SYSTem:HELP:HEADers?** [<Parser>]

Returns a list of all SCPI commands supported by the R&S NRX.

**Query parameters:**

<Parser>

**Return values:**

<Headers>                    <dblock>

**Usage:**                      Query only

**SYSTem:HELP:SYNTax?** <Header>

Returns the relevant parameter information for the specified SCPI command.

**Query parameters:**

<Header>                      Long or short form of the SCPI command. See also [Chapter 15.2.2, "Syntax for Device-Specific Commands"](#), on page 462.

**Return values:**

<Syntax>                      <dblock>

**Example:**

```
SYST:HELP:SYNT? "SYST:KLOC"
Query
"SYSTem:KLOCK[?] <boolean>"
Response
```

**Usage:**                      Query only

**SYSTem:HELP:SYNTax:ALL?**

Queries the implemented SCPI commands and their parameters. Returns the result as a block data.

**Return values:**

<Syntax>                      <dblock>

**Usage:**                      Query only

**SYSTem:IDN:ANSWer** <string>

Effective if [SYSTem:IDN:MODE USER](#) is set.

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



You can query the defined string using `*IDN?`.

**Parameters:**

<string> Identification string. Maximum string length is 128 characters.

**Manual operation:** See "[Custom IDN String](#)" on page 144

**SYSTem:IDN:AUTO** <status>

Enables or disables the automatic instrument identification for `*IDN?`.

**Parameters:**

<status> ON | OFF  
\*RST: 1

**Manual operation:** See "[Customization of \\*IDN?](#)" on page 143

**SYSTem:IDN:MODE** <mode>

Sets which identification string is used.

**Parameters:**

<mode> AUTO | USER  
**AUTO**  
Automatic instrument identification.  
**USER**  
Customized identification string. Define the string using  
[SYSTem:IDN:ANSWer](#).  
\*RST: AUTO

**Manual operation:** See "[Customization of \\*IDN?](#)" on page 143

**SYSTem:LANGUage** <language>

Sets the native remote command set or an emulation of a predecessor or a power meter from another manufacturer. See also [Chapter 14.16, "Remote Emulation"](#), on page 417.

**Setting parameters:**

<language> String  
**SCPI | NRX**  
Native remote command set of the R&S NRX.  
**NRP2 | NRP**  
Emulation of the selected predecessors.  
**N432A | N1911A | N1912A | E4418B | E4419B**  
Requires the NRX KS emulation mode (R&S NRX-K301) option.  
Emulation of the selected Keysight power meter.

**Query parameters:**

<language> String  
**SCPI | NRP2 | NRP | N432A | N1911A | N1912A | E4418B | E4419B**  
 \*RST: SCPI

**Manual operation:** See "[Language](#)" on page 143

---

**SYSTem:OPT:ANSWer** <string>

Effective if [SYSTem:OPT:MODE](#) USER is set.

Sets the customized option identification string.

You can query the defined string using [\\*OPT?](#).

**Parameters:**

<string> Option string. Maximum string length is 128 characters.

**Manual operation:** See "[Custom OPT String](#)" on page 144

---

**SYSTem:OPT:AUTO** <status>

Enables or disables the automatic instrument identification for [\\*OPT?](#).

**Parameters:**

<status> ON | OFF  
 \*RST: 1

**Manual operation:** See "[Customization of \\*OPT?](#)" on page 144

---

**SYSTem:OPT:MODE** <mode>

Sets which option string is used.

**Parameters:**

<mode> AUTO | USER  
**AUTO**  
 Automatic option identification string.  
**USER**  
 Customized option string. Define the string using [SYSTem:OPT:ANSWer](#).  
 \*RST: AUTO

**Manual operation:** See "[Customization of \\*OPT?](#)" on page 144

---

**SYSTem:VERSion?**

Queries the SCPI version that the command set of the R&S NRX complies with.

**Return values:**

&lt;version&gt;

**Usage:** Query only**14.14.6 Managing Sensors**

[SENSe<Sensor>:]ADD.....	403
SYSTem:SENSor<Sensor>:INFO?.....	403

**[SENSe<Sensor>:]ADD <sensor>**

Adds a LAN power sensor. See ["To add a LAN power sensor"](#) on page 150.

**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;sensor&gt; Hostname of the power sensor.

**Example:** ADD "NRQ6-101435"**Usage:** Setting only**Manual operation:** See ["Add Sensor"](#) on page 151**SYSTem:SENSor<Sensor>:INFO? [<argument>]**

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

**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;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 151  
 See ["Hide Sensor Overload Message"](#) on page 168

### 14.14.7 Instrument Information

<a href="#">SYSTem:DID?</a> .....	404
<a href="#">SYSTem:DEVIce:ID?</a> .....	404
<a href="#">SYSTem:DFPRint</a> .....	405
<a href="#">SYSTem:DFPRint:HISTory:COUNT?</a> .....	405
<a href="#">SYSTem:DFPRint:HISTory:ENTRY?</a> .....	405
<a href="#">SYSTem:INFO:TERMchar</a> .....	405
<a href="#">SYSTem:INFO[;INFO]?</a> .....	405

---

#### SYSTem:DID?

#### SYSTem:DEVIce:ID?

Queries the Rohde & Schwarz instrument ID.

#### Return values:

<DeviceID>

**Usage:**            Query only

**Manual operation:** See ["System Info"](#) on page 154

---

**SYSTem:DFPRint** [<Path>]

Generates the device footprint.

**Setting parameters:**

<Path>

**Return values:**

<XMLDeviceFootprint><dblock>

---

**SYSTem:DFPRint:HISTory:COUNT?**

Queries the number of device footprints in the history.

**Return values:**

<Count>

**Usage:**                      Query only

---

**SYSTem:DFPRint:HISTory:ENTRY?** <index>

Queries a device footprint from the history.

**Query parameters:**

<index>                      **0**  
                                    Most recent device footprint

**Return values:**

<XmlDeviceFootprint><dblock>

**Usage:**                      Query only

---

**SYSTem:INFO:TERMchar** <termination>

Selects the termination characters for information returned by:

- `SYSTem:INFO[:INFO]?`.
- `[SENSe<Sensor>:]CATalog?`
- `[SENSe<Sensor>:]INformation?`

**Parameters:**

<termination>              CR | LF | CRLF | STRS  
                                    \*RST:        STRS

---

**SYSTem:INFO[:INFO]?** [<argument>]

Queries information on the R&S NRX. See "[System Info](#)" on page 154.

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 154

## 14.14.8 Date and Time Settings

SYSTem:DATE.....	406
SYSTem:DATE:UTC.....	406
SYSTem:DATE:LOCAl.....	406
SYSTem:TIME.....	407
SYSTem:TIME:UTC.....	407
SYSTem:TIME:LOCAl.....	407
SYSTem:TIME:DSTime:MODE.....	407
SYSTem:TIME:DSTime:RULE.....	407
SYSTem:TIME:DSTime:RULE:CATalog?.....	408
SYSTem:TIME:HRTimer:ABSolute:SET.....	408
SYSTem:TZONE.....	408

---

**SYSTem:DATE** <year>, <month>, <day>

**SYSTem:DATE:UTC** <year>, <month>, <day>

Sets the date in coordinated universal time (UTC).

[SYSTem:DATE:LOCAl](#) is changed accordingly.

**Parameters:**

<year>                YYYY

<month>              Range:     1 to 12

<day>                 Range:     1 to 31

**Manual operation:**   See "[Date](#)" on page 155

---

**SYSTem:DATE:LOCAl** <year>, <month>, <day>

Sets the local date.

[SYSTem:DATE:UTC](#) is changed accordingly.

**Parameters:**

<year>                YYYY

<month> Range: 1 to 12

<day> Range: 1 to 31

**Manual operation:** See "Date" on page 155

**SYSTem:TIME** <hour>, <min>, <sec>

**SYSTem:TIME:UTC** <hour>, <minute>, <second>

Sets the time in the coordinated universal time (UTC).

[SYSTem:TIME:LOCa1](#) is changed accordingly.

**Parameters:**

<hour> hh

<minute> mm

<second> ss

**Manual operation:** See "Time" on page 155

**SYSTem:TIME:LOCa1** <hour>, <minute>, <second>

Sets the local time.

[SYSTem:TIME:UTC](#) is changed accordingly.

**Parameters:**

<hour> hh

<minute> mm

<second> ss

**Manual operation:** See "Time" on page 155

**SYSTem:TIME:DSTime:MODE** <dst>

Enables or disables the automatic clock adjustment for daylight saving time (DST). The automatic clock adjustment depends on configured time zone, see [SYSTem:TIME:DSTime:RULE](#) on page 407.

If disabled, the local time is calculated as:

Local time = UTC + time zone offset

**Parameters:**

<dst> OFF | ON

**SYSTem:TIME:DSTime:RULE** <rule>

Sets the time zone. You can query the list of the available time zones with [SYSTem:TIME:DSTime:RULE:CATa1og?](#).

**Parameters:**

&lt;rule&gt;

**Manual operation:** See ["Time Zone Region"](#) on page 155  
See ["Time Zone"](#) on page 156

**SYSTem:TIME:DSTime:RULE:CATalog?**

Queries the list of available time zones.

**Return values:**

&lt;cat&gt;

**Usage:** Query only

**Manual operation:** See ["Time Zone Region"](#) on page 155  
See ["Time Zone"](#) on page 156

**SYSTem:TIME:HRTimer:ABSolute:SET**

Sets the start time for an absolute timer.

**Return values:**

&lt;year&gt; YYYY

&lt;month&gt; MM

&lt;day&gt; DD

&lt;hour&gt; hh

&lt;min&gt; mm

&lt;sec&gt; ss

&lt;msec&gt;

**SYSTem:TZONE <hour>, <minute>**

Sets the offset of the local time to the UTC time, due to the time zone. There can be an additional offset due to daylight saving time (DST).

**Parameters:**

&lt;hour&gt; Range: -12 to 15

&lt;minute&gt; Range: -59 to 59

## 14.14.9 Notifications and Errors

The R&S NRX handles events and errors in 2 different queues, depending on their context:

- [System Event Queue](#)  
SYSTem:SERRor commands



- [SCPI Communication Error Queue](#)

SYSTem:ERRor commands

In the following, the expressions "error number" and "error code" are used synonymously.

#### 14.14.9.1 System Event Queue

This system list contains notices, warnings and static errors that happen in setup.

A static error remains in the queue until you solve it. It prevents the execution of normal measurements. For example, if a power sensor overload occurs, you need to lower the input power to the power sensor. When you have done that, the static error disappears.

Warnings and static errors, you can remove from the queue using [SYSTem:SERRor:REMove](#).

For further information, see [Chapter 16.2.1, "Interpreting Notifications and Their Number"](#), on page 492.

Currently, the event type is not included in the description of the event.

[SYSTem:SERRor\[:ALL\]?.....](#)409

[SYSTem:SERRor:REMove.....](#)409

---

#### **SYSTem:SERRor[:ALL]?**

Queries all events from the system event queue.

Returns a comma-separated list of unique event numbers.

**Usage:**                      Query only

---

#### **SYSTem:SERRor:REMove <num>**

Removes a notice or warning from the system event queue. You identify it by its unique number. To find out the unique number of an event, use [SYSTem:SERRor\[:ALL\]?](#).

#### **Setting parameters:**

<num>                      Unique number of the event

\*RST:                      0

**Example:**                      SYST:SERR:REM 3004

Removes the notice that a newer version of the sensor check source (R&S NRX-B1) is available: [#3004 - version <no.> available for sensor check source \(R&S NRX-B1\)](#)

**Example:**                      SYST:SERR:REM 2007

This number belongs to a static error: [#2007 - sensor overload](#)  
You cannot remove a static error from the queue, thus a "Parameter not allowed" error condition occurs. See also [Chapter 14.14.9.1, "System Event Queue"](#), on page 409.

**Usage:** Setting only

#### 14.14.9.2 Changes in the System Event Queue

This SCPI list reports change in the system event queue. An entry is created when an event is reported or removed. Thus, deleting an event using `SYSTem:SERRor:REMove` also causes an entry in this list.

<code>SYSTem:SERRor:LIST:ALL?</code> .....	410
<code>SYSTem:SERRor:LIST:NEXT?</code> .....	410

---

##### **SYSTem:SERRor:LIST:ALL?**

Queries all changes in the system event queue that have not been read yet and removes them from the queue.

**Usage:** Query only

---

##### **SYSTem:SERRor:LIST:NEXT?**

Queries the list of system event changes for the oldest entry and removes it from the queue.

Returns an error number and a short description of the error. 0 means that no errors have occurred since the error queue was last read out.

**Usage:** Query only

#### 14.14.9.3 SCPI Communication Error Queue

This list contains errors in SCPI communication, for example, unknown commands or syntax errors. Generally, a single parameter or setting is affected.

<code>SYSTem:ERRor:ALL?</code> .....	410
<code>SYSTem:ERRor:CODE:ALL?</code> .....	411
<code>SYSTem:ERRor:CODE[:NEXT]?</code> .....	411
<code>SYSTem:ERRor:COUNt?</code> .....	411
<code>SYSTem:ERRor:EXTended[:STATe]</code> .....	412
<code>SYSTem:ERRor[:NEXT]?</code> .....	412

---

##### **SYSTem:ERRor:ALL?**

Queries all errors in SCPI communication that have not been read yet and removes them from the queue.

Returns a comma-separated list of error numbers and a short error description in the first-in first-out order.

**Return values:**

<ErrorNumber>     <n>  
                               Number as defined in the SCPI standard

**0**

No errors have occurred since the error queue was last read out.

&lt;ErrorText&gt; Short error description

**Usage:** Query only**SYSTem:ERRor:CODE:ALL?**

Queries all errors in SCPI communication that have not been read yet and removes them from the queue.

Returns a comma-separated list of error numbers, but no error description.

**Return values:**

<ErrorCode> <n>  
Number as defined in the SCPI standard

**0**

No errors have occurred since the error queue was last read out.

**Usage:** Query only**SYSTem:ERRor:CODE[:NEXT]?**

Queries the SCPI communication error queue for the oldest entry and removes it from the queue.

Returns the error number, but no error description.

**Return values:**

<Error> <n>  
Number as defined in the SCPI standard

**0**

No errors have occurred since the error queue was last read out.

**Usage:** Query only**SYSTem:ERRor:COUNT?**

Queries the number of entries in the SCPI communication error queue.

**Return values:**

<ErrorCount> Total number of entries

**Example:**

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 that provide more information than [SYSTem:ERRor\[:NEXT\]?](#). The location of errors in the parsed command strings is also shown.

**Parameters:**

<state>                    \*RST:        ON

---

**SYSTem:ERRor[:NEXT]?**

Queries the SCPI communication error queue for the oldest entry and removes it from the queue.

Returns an error number and a short description of the error.

**Return values:**

<ErrorCode>                <n>  
                                   Number as defined in the SCPI standard  
**0**  
                                   No errors have occurred since the error queue was last read out.

<ErrorDescription>        Short error description

**Usage:**                    Query only

### 14.14.10 Locking

---

**SYSTem:KLOCK <klock>**

Disables or enables the front panel keyboard of the instrument including the [LOCAL] key.

**Parameters:**

<klock>                    OFF | ON

---

**SYSTem:LOCK:SHARed:STRing?**

Queries the lock string assigned to the locking group if shared locking is enabled.

Writes an error in the error queue if shared locking is not enabled.

**Return values:**

<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:**

&lt;timeout&gt;

**Return values:**

&lt;result&gt;

## 14.15 Using the Status Register

Further information:

- [Chapter 15.4.2, "Structure of a SCPI Status Register"](#), on page 470
- [General Status Register Commands](#)..... 413
- [Reading Out the CONDition Part](#)..... 414
- [Reading Out the EVENt Part](#)..... 414
- [Controlling the ENABle Part](#)..... 415
- [Controlling the Negative Transition Part](#)..... 415
- [Controlling the Positive Transition Part](#)..... 416

### 14.15.1 General Status Register Commands

<a href="#">STATus:PRESet</a> .....	413
<a href="#">STATus:QUEue[:NEXT]?</a> .....	413

---

**STATus:PRESet**Resets the edge detectors and `ENABle` parts of all registers to a defined value.**Usage:**                   Event

---

**STATus:QUEue[:NEXT]?**

Queries the most recent error queue entry and deletes it.

**Return values:**

<ErrorCode>	Numeric value
	<b>&lt;positive error number&gt;</b>
	Sensor-specific error
	<b>&lt;negative error number&gt;</b>
	SCPI error message
	<b>0</b>
	Error queue is empty.
<ErrorDescription>	String describing the error, example:
	<b>"No error"</b>
	Error queue is empty.
<b>Usage:</b>	Query only

### 14.15.2 Reading Out the CONDition Part

Further information:

- ["CONDition status register part"](#) on page 470

---

**STATus:DEVice:CONDition?**  
**STATus:OPERation:BIT<bitno>:CONDition?**  
**STATus:OPERation:CALibrating[:SUMMary]:CONDition?**  
**STATus:OPERation:CONDition?**  
**STATus:OPERation:LLFail<RegisterIndex>[:SUMMary]:CONDition?**  
**STATus:OPERation:MEASuring[:SUMMary]:CONDition?**  
**STATus:OPERation:MEASuring:EXTension<RegisterIndex>:CONDition?**  
**STATus:OPERation:SENSe[:SUMMary]:CONDition?**  
**STATus:OPERation:TRIGger[:SUMMary]:CONDition?**  
**STATus:OPERation:TRIGger:EXTension<RegisterIndex>:CONDition?**  
**STATus:OPERation:ULFail<RegisterIndex>[:SUMMary]:CONDition?**  
**STATus:QUEStionable:BIT<bitno>:CONDition?**  
**STATus:QUEStionable:CALibration[:SUMMary]:CONDition?**  
**STATus:QUEStionable:CONDition?**  
**STATus:QUEStionable:MEASure<RegisterIndex>:CONDition?**  
**STATus:QUEStionable:POWer[:SUMMary]:CONDition?**  
**STATus:QUEStionable:WINDow<RegisterIndex>:CONDition?**

**Suffix:**

<RegisterIndex>      1 to 8  
                                  Register

**Usage:**                      Query only

### 14.15.3 Reading Out the EVENt Part

Further information:

- ["EVENt status register part"](#) on page 471

---

**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

#### 14.15.4 Controlling the ENABLE Part

Further information:

- ["ENABLE status register part"](#) on page 471

---

**STATus:DEvIce:ENABle** <value>  
**STATus:OPERation:BIT<bitno>:ENABle** <RegisterBit>  
**STATus:OPERation:CALibrating[:SUMMARY]:ENABle** <value>  
**STATus:OPERation:ENABle** <RegisterValue>  
**STATus:OPERation:LLFail<RegisterIndex>[:SUMMARY]:ENABle** <value>  
**STATus:OPERation:MEASuring[:SUMMARY]:ENABle** <value>  
**STATus:OPERation:MEASuring:EXTension<RegisterIndex>:ENABle** <value>  
**STATus:OPERation:SENSe[:SUMMARY]:ENABle** <value>  
**STATus:OPERation:TRIGger[:SUMMARY]:ENABle** <value>  
**STATus:OPERation:TRIGger:EXTension<RegisterIndex>:ENABle** <value>  
**STATus:OPERation:ULFail<RegisterIndex>[:SUMMARY]:ENABle** <value>  
**STATus:QUESTionable:BIT<bitno>:ENABle** <RegisterBit>  
**STATus:QUESTionable:CALibration[:SUMMARY]:ENABle** <value>  
**STATus:QUESTionable:ENABle** <RegisterValue>  
**STATus:QUESTionable:MEASure<RegisterIndex>:ENABle** <value>  
**STATus:QUESTionable:POWER[:SUMMARY]:ENABle** <value>  
**STATus:QUESTionable:WINDOW<RegisterIndex>:ENABle** <value>  
**Suffix:**  
 <RegisterIndex> 1 to 8  
 Register  
**Parameters:**  
 <value> \*RST: 0

#### 14.15.5 Controlling the Negative Transition Part

Further information:

- ["PTRansition / NTRansition status register part"](#) on page 471

---

**STATus:DEvIce:NTRansition** <value>  
**STATus:OPERation:BIT<bitno>:NTRansition** <RegisterBit>  
**STATus:OPERation:CALibrating[:SUMMARY]:NTRansition** <value>  
**STATus:OPERation:LLFail<RegisterIndex>[:SUMMARY]:NTRansition** <value>  
**STATus:OPERation:MEASuring[:SUMMARY]:NTRansition** <value>  
**STATus:OPERation:MEASuring:EXTension<RegisterIndex>:NTRansition** <value>

**STATus:OPERation:NTRansition** <RegisterValue>  
**STATus:OPERation:SENSe[:SUMMARY]:NTRansition** <value>  
**STATus:OPERation:TRIGger[:SUMMARY]:NTRansition** <value>  
**STATus:OPERation:TRIGger:EXTension<RegisterIndex>:NTRansition** <value>  
**STATus:OPERation:ULFail<RegisterIndex>[:SUMMARY]:NTRansition** <value>  
**STATus:QUESTionable:BIT<bitno>:NTRansition** <RegisterBit>  
**STATus:QUESTionable:CALibration[:SUMMARY]:NTRansition** <value>  
**STATus:QUESTionable:NTRansition** <RegisterValue>  
**STATus:QUESTionable:MEASure<RegisterIndex>:NTRansition** <value>  
**STATus:QUESTionable:POWER[:SUMMARY]:NTRansition** <value>  
**STATus:QUESTionable:WINDow<RegisterIndex>:NTRansition** <value>  
**Suffix:**  
 <RegisterIndex>      1 to 8  
                                  Register  
  
**Parameters:**  
 <value>                      \*RST:      0

#### 14.15.6 Controlling the Positive Transition Part

Further information:

- ["PTRansition / NTRansition status register part"](#) on page 471

---

**STATus:DEvice:PTRansition** <value>  
**STATus:OPERation:BIT<bitno>:PTRansition** <RegisterBit>  
**STATus:OPERation:CALibrating[:SUMMARY]:PTRansition** <value>  
**STATus:OPERation:LLFail<RegisterIndex>[:SUMMARY]:PTRansition** <value>  
**STATus:OPERation:MEASuring[:SUMMARY]:PTRansition** <value>  
**STATus:OPERation:PTRansition** <RegisterValue>  
**STATus:OPERation:MEASuring:EXTension<RegisterIndex>:PTRansition** <value>  
**STATus:OPERation:SENSe[:SUMMARY]:PTRansition** <value>  
**STATus:OPERation:TRIGger[:SUMMARY]:PTRansition** <value>  
**STATus:OPERation:TRIGger:EXTension<RegisterIndex>:PTRansition** <value>  
**STATus:OPERation:ULFail<RegisterIndex>[:SUMMARY]:PTRansition** <value>  
**STATus:QUESTionable:BIT<bitno>:PTRansition** <RegisterBit>  
**STATus:QUESTionable:CALibration[:SUMMARY]:PTRansition** <value>  
**STATus:QUESTionable:MEASure<RegisterIndex>:PTRansition** <value>  
**STATus:QUESTionable:POWER[:SUMMARY]:PTRansition** <value>  
**STATus:QUESTionable:PTRansition** <RegisterValue>  
**STATus:QUESTionable:WINDow<RegisterIndex>:PTRansition** <value>  
**Suffix:**  
 <RegisterIndex>      1 to 8  
                                  Register  
  
**Parameters:**  
 <value>                      \*RST:      65535



## 14.16 Remote Emulation

The R&S NRX offers a remote emulation feature that makes it possible to control the instrument by commands other than the built-in native SCPI commands. This feature allows you to replace power meters, e.g. power meters from other manufacturers or predecessors, with the R&S NRX without having to change the remote control code.

The supported remote commands of the predecessors are described here:

- [Chapter 14.16.1, "R&S NRP2 Compatibility"](#), on page 417

### To select an emulation of a different command set

- ▶ [System] > "Connections" > "Remote" > [Emulations tab](#)
- ▶ Remote control: `SYSTem:LANGuage`



For emulating Keysight power meters, you need the NRX KS emulation mode (R&S NRX-K301) option.

### 14.16.1 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.

#### 14.16.1.1 CALCulate Commands

<code>CALCulate&lt;Measurement&gt;:LIMit&lt;undef&gt;:BEEP[:STATe]</code> .....	417
<code>CALCulate&lt;Measurement&gt;:STATistics:MARKer:HORIZontal:POSition[X]:POWER</code> .....	418
<code>CALCulate&lt;Measurement&gt;:STATistics:MARKer:VERTical:POSition[Y]</code> .....	418
<code>CALCulate&lt;Measurement&gt;:TRACe:MARKer&lt;Marker&gt;:XPOSition</code> .....	418

---

#### `CALCulate<Measurement>:LIMit<undef>:BEEP[:STATe] <state>`

Available for R&S NRP2 compatibility, but the command has no functionality in the R&S NRX.

##### Suffix:

<code>&lt;Measurement&gt;</code>	1 to 8 Measurement
<code>&lt;undef&gt;</code>	1 to n No suffix required.

##### Parameters:

<code>&lt;state&gt;</code>	*RST:      OFF
----------------------------	----------------

---

**CALCulate<Measurement>:STATistics:MARKer:HORizontal:POSition[:X][:POWER] <value>**

Available for compatibility. Recommended 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 8 Measurement
---------------	-----------------------

**Parameters:**

<value>

---

**CALCulate<Measurement>:STATistics:MARKer:VERTical:POSition[:Y] <value>**

Available for 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 8 Measurement
---------------	-----------------------

**Parameters:**

<value>

---

**CALCulate<Measurement>:TRACe:MARKer<Marker>:XPOSITION <value>**

Available for compatibility. Recommended R&S NRX command:

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

**Suffix:**

<Measurement>	1 to 8 Measurement
<Marker>	1 to 4 Marker (M1 to M4)

**Parameters:**

<value>	Default unit: s
---------	-----------------

### 14.16.1.2 DISPlay Commands

DISPlay:ILLumination.....	419
DISPlay[:WINDow<Undef>]:SElect.....	419
DISPlay[:WINDow<Undef>]:SIZE.....	419
DISPlay[:WINDow<Window>]:ANALog:LOWer:POWer.....	420
DISPlay[:WINDow<Window>]:ANALog:LOWer:RATio.....	420
DISPlay[:WINDow<Window>]:ANALog:UPPer:POWer.....	420
DISPlay[:WINDow<Window>]:ANALog:UPPer:RATio.....	420
DISPlay[:WINDow<Window>]:AVALue.....	421
DISPlay[:WINDow<Window>]:FORMat.....	421
DISPlay[:WINDow<Window>]:METer:LOWer:POWer.....	421
DISPlay[:WINDow<Window>]:METer:LOWer:RATio.....	422
DISPlay[:WINDow<Window>]:METer:UPPer:POWer.....	422
DISPlay[:WINDow<Window>]:METer:UPPer:RATio.....	422
DISPlay[:WINDow<Window>][:NUMeric<Numeric>]:RESolution.....	422
DISPlay[:WINDow<Window>]:TRACe:LOWer.....	423
DISPlay[:WINDow<Window>]:TRACe:UPPer.....	423
DISPlay[:WINDow<Window>]:TSLot.....	424

---

#### DISPlay:ILLumination <state>

Available for compatibility. Recommended R&S NRX command:

DISPlay:BRIGthness

#### Parameters:

<state>                    \*RST:        ON

---

#### DISPlay[:WINDow<Undef>]:SElect <window>

Available for 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 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 compatibility. Recommended R&S NRX command:

[CALCulate<Measurement>:METer<DirectionalChannel>:LOWer\[:DATA\]\[:POWer\]](#) on page 235

**Suffix:**

<Window>                1 to 8  
                              Measurement

**Parameters:**

<value>

**DISPlay[:WINDow<Window>]:ANALog:LOWer:RATio <value>**

Available for compatibility. Recommended R&S NRX command:

[CALCulate<Measurement>:METer<DirectionalChannel>:LOWer\[:DATA\]:RATio\[:VALue\]](#) on page 235

**Suffix:**

<Window>                1 to 8  
                              Measurement

**Parameters:**

<value>

**DISPlay[:WINDow<Window>]:ANALog:UPPer:POWer <value>**

Available for compatibility. Recommended R&S NRX command:

[CALCulate<Measurement>:METer<DirectionalChannel>:UPPer\[:DATA\]\[:POWer\]](#) on page 238

**Suffix:**

<Window>                1 to 8  
                              Measurement

**Parameters:**

<value>                    <block\_data>

**DISPlay[:WINDow<Window>]:ANALog:UPPer:RATio <value>**

Available for compatibility. Recommended R&S NRX command:

[CALCulate<Measurement>:METer<DirectionalChannel>:UPPer\[:DATA\]:RATio\[:VALue\]](#) on page 238

**Suffix:**  
 <Window>            1 to 8  
                          Measurement

**Parameters:**  
 <value>                <block\_data>

**DISPlay[:WINDow<Window>]:AVALue <auxiliaries>**

Available for compatibility. Recommended R&S NRX command:

[CALCulate<Measurement>:AVALue](#)

**Suffix:**  
 <Window>            1 to 4  
                          Measurement pane

**Parameters:**  
 <auxiliaries>        NONE | NORMal | EXTRemes | STATistics  
 \*RST:                NONE

**DISPlay[:WINDow<Window>]:FORMat <format>**

Available for compatibility. Recommended 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 pane

**Parameters:**  
 <format>              DIGital | ANALog | GRAPhical  
 \*RST:                DIGital

**DISPlay[:WINDow<Window>]:METer:LOWer:POWER <value>**

Available for compatibility. Recommended R&S NRX command:

[CALCulate<Measurement>:METer<DirectionalChannel>:LOWer\[:DATA\] \[:POWER\]](#) on page 235

**Suffix:**  
 <Window>            1 to 4  
                          Measurement pane

**Parameters:**  
 <value>

---

**DISPlay[:WINDow<Window>]:METer:LOWer:RATio <value>**

Available for compatibility. Recommended R&S NRX command:

`CALCulate<Measurement>:METer<DirectionalChannel>:LOWer[:DATA]:RATio[:VALue]` on page 235

**Suffix:**

<Window>                    1 to 4  
                                 Measurement pane

**Parameters:**

<value>

---

**DISPlay[:WINDow<Window>]:METer:UPPer:POWer <value>**

Available for compatibility. Recommended R&S NRX command:

`CALCulate<Measurement>:METer<DirectionalChannel>:UPPer[:DATA][:POWer]` on page 238

**Suffix:**

<Window>                    1 to 4  
                                 Measurement pane

**Parameters:**

<value>

---

**DISPlay[:WINDow<Window>]:METer:UPPer:RATio <value>**

Available for compatibility. Recommended R&S NRX command:

`CALCulate<Measurement>:METer<DirectionalChannel>:UPPer[:DATA]:RATio[:VALue]` on page 238

**Suffix:**

<Window>                    1 to 4  
                                 Measurement pane

**Parameters:**

<value>

---

**DISPlay[:WINDow<Window>][:NUMeric<Numeric>]:RESolution <resolution>**

Available for compatibility. Recommended R&S NRX command:

`CALCulate<Measurement>:RESolution`

**Suffix:**

<Window>                    1 to 4  
                                 Measurement pane

<Numeric>

1 to 2  
No suffix required.

**Parameters:**

<resolution>            Range:     0.001 | 0.01 | 0.1 | 1  
                              \*RST:     0.01

**DISPlay[:WINDow<Window>]:TRACe:LOWer <value>**

Available for compatibility. Recommended 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 pane

**Parameters:**

<value>

**DISPlay[:WINDow<Window>]:TRACe:UPPer <value>**

Available for 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 pane

**Parameters:**

<value>

**DISPlay[:WINDow<Window>]:TSLot <slot>**

Available for compatibility. Recommended R&S NRX command:

CALCulate<Measurement>[:POWER]:TSLot[:AVG]:SElection

**Suffix:**

<Window>                    1 to 8  
                                 Measurement

**Parameters:**

<slot>                        Range:     1 to 4  
                                 \*RST:     1

### 14.16.1.3 OUTPut Commands

OUTPut:REcorder<output>[:STATe].....	424
OUTPut:REcorder<output>:FEED[:VALue].....	425
OUTPut:ROSCillator[:STATe].....	425
OUTPut:TRIGger[:STATe].....	425
OUTPut:TTL<output>:ACTive.....	425
OUTPut:TTL<output>:FAIL.....	425
OUTPut:TTL<output>:FEED.....	426
OUTPut:TTL<output>[:STATe].....	426

**OUTPut:REcorder<output>[:STATe] <state>**

Available for 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 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 compatibility. Recommended R&S NRX command:

`OUTPut:SOURce:STATe`

**Parameters:**

<state>

---

**OUTPut:TRIGger[:STATe]** <state>

Available for compatibility. Recommended R&S NRX command:

`OUTPut:MODE<output>`

**Parameters:**

<state>

---

**OUTPut:TTL<output>:ACTive** <mode>

Available for compatibility. Recommended R&S NRX command:

`OUTPut:LIMit:FAIL`

**Suffix:**

<output>                    1...2  
                              1 to 2

**Parameters:**

<mode>                      LOW | HIGH

---

**OUTPut:TTL<output>:FAIL** <mode>

Available for compatibility. Recommended R&S NRX command:

`OUTPut:LIMit:FAIL`

**Suffix:**

<output>                    1...2  
                              1 to 2

**Parameters:**

&lt;mode&gt;                   LOW | HIGH

**OUTPut:TTL<output>:FEED <feed>**

Available for compatibility. Recommended R&amp;S NRX command:

`OUTPut:LIMit:FEED:INDex`**Suffix:**<output>                   1...2  
                              1 to 2**Parameters:**

&lt;feed&gt;

**OUTPut:TTL<output>[:STATe] <state>**

Available for compatibility. Recommended R&amp;S NRX command:

`OUTPut:MODE<output>`**Suffix:**<output>                   1...2  
                              1 to 2**Parameters:**

&lt;state&gt;

**14.16.1.4 SENSE Commands**

[SENSe<Sensor>:]AVERAge:COUNT:AUTO:MTIME.....	428
[SENSe<Sensor>:]AVERAge:COUNT:AUTO:NSRatio.....	428
[SENSe<Sensor>:]AVERAge:COUNT:AUTO:SLOT.....	429
[SENSe<Sensor>:]AVERAge:COUNT:AUTO:TYPE.....	429
[SENSe<Sensor>:]AVERAge:COUNT:AUTO[:STATe].....	429
[SENSe<Sensor>:]AVERAge:COUNT:ENUM.....	430
[SENSe<Sensor>:]AVERAge:COUNT[:VALue].....	430
[SENSe<Sensor>:]AVERAge:TCONtrol.....	430
[SENSe<Sensor>:]AVERAge:TYPE.....	431
[SENSe<Sensor>:]AVERAge[:STATe].....	431
[SENSe<Sensor>:]BANDwidth:VIDeo.....	431
[SENSe<Sensor>:]BURSt:MODE.....	432
[SENSe<Sensor>:]BURSt:PERiod.....	432
[SENSe<Sensor>:]BURSt:WIDTh.....	432
[SENSe<Sensor>:]BWIDth:VIDeo.....	432
[SENSe<Sensor>:]CORRection:DCYClE:STATe.....	433
[SENSe<Sensor>:]CORRection:DCYClE[:INPut][:MAGNitude].....	433
[SENSe<Sensor>:]CORRection:DCYClE[:VALue].....	433
[SENSe<Sensor>:]CORRection:FDOFFset[:INPut][:MAGNitude]?.....	434
[SENSe<Sensor>:]CORRection:FDOTable:STATe.....	434

[SENSe<Sensor>:]CORRection:FDOTable[:SElect]	434
[SENSe<Sensor>:]CORRection:OFFSet:STATe	434
[SENSe<Sensor>:]CORRection:OFFSet[:VALue]	435
[SENSe<Sensor>:]DATA?	435
[SENSe<Sensor>:]DM:WCDMa:CRATe	435
[SENSe<Sensor>:]FUNCTion[:ON]	436
[SENSe<Sensor>:]INFormation?	436
[SENSe<Sensor>:]INPut:ATTenuation:AUTO	436
[SENSe<Sensor>:]INPut:ATTenuation[:VALue]	437
[SENSe<Sensor>:]INTErnal:TRIGger:JITTer:METHod	437
[SENSe<Sensor>:][]POWer:[]AVG:[]APERture[:VALue]	437
[SENSe<Sensor>:][]POWer:[]AVG:[]SMOothing:STATe	437
[SENSe<Sensor>:][]POWer:[]BURSt:DTOLerance	438
[SENSe<Sensor>:][]POWer:[]NCORrection[:STATe]	438
[SENSe<Sensor>:][]POWer:[]TGATe:SELect	438
[SENSe<Sensor>:][]POWer:[]TGATe<Gate>:OFFSet:TIME	439
[SENSe<Sensor>:][]POWer:[]TGATe<Gate>:TIME	439
[SENSe<Sensor>:][]POWer:[]TGATe<Gate>[:EXCLude]:MID:OFFSet[:TIME]	439
[SENSe<Sensor>:][]POWer:[]TGATe<Gate>[:EXCLude]:MID:TIME	440
[SENSe<Sensor>:][]POWer:[]TGATe[:EXCLude]:MID[:STATe]	440
[SENSe<Sensor>:][]POWer:[]TSLot[:AVG]:COUNT	440
[SENSe<Sensor>:][]POWer:[]TSLot[:AVG]:WIDTh	441
[SENSe<Sensor>:][]POWer:[]TSLot[:AVG][:EXCLude]:MID:OFFSet[:TIME]	441
[SENSe<Sensor>:][]POWer:[]TSLot[:AVG][:EXCLude]:MID:TIME	441
[SENSe<Sensor>:][]POWer:[]TSLot[:AVG][:EXCLude]:MID[:STATe]	441
[SENSe<Sensor>:]POWer:CCDFunction:REFerence	442
[SENSe<Sensor>:]POWer:PEP:HOLD	442
[SENSe<Sensor>:]RANGe:AUTO	442
[SENSe<Sensor>:]RANGe:CLEVel	443
[SENSe<Sensor>:]RANGe[:VALue]	443
[SENSe<Sensor>:]ROSCillator:REFio:FREQuency	443
[SENSe<Sensor>:]ROSCillator:REFio:OUTPut[:STATe]	444
[SENSe<Sensor>:]ROSCillator:SOURce	444
[SENSe<Sensor>:]SAMPLing	444
[SENSe<Sensor>:]SGAMma:CORRection:STATe	445
[SENSe<Sensor>:]SGAMma:PHASe	445
[SENSe<Sensor>:]SGAMma[:MAGNitude]	445
[SENSe<Sensor>:]STATistics:SAMPles[:MINimum]	445
[SENSe<Sensor>:]STATistics:SCALE:X:POINTs	446
[SENSe<Sensor>:]STATistics:SCALE:X:RANGe	446
[SENSe<Sensor>:]STATistics:SCALE:X:RLEVel	446
[SENSe<Sensor>:]STATistics:TIME	447
[SENSe<Sensor>:]STATistics[:EXCLude]:MID:OFFSet[:TIME]	447
[SENSe<Sensor>:]STATistics[:EXCLude]:MID:TIME	447
[SENSe<Sensor>:]TIMing:EXCLude:START	448
[SENSe<Sensor>:]TIMing:EXCLude:STOP	448
[SENSe<Sensor>:]TRACe:AVERAge:COUNT	448
[SENSe<Sensor>:]TRACe:AVERAge:TCONtrol	449
[SENSe<Sensor>:]TRACe:AVERAge[:STATe]	449
[SENSe<Sensor>:]TRACe:ESAMPLing:AUTO	449

[SENSe<Sensor>:]TRACe:MEASurement:ALGorithm.....	449
[SENSe<Sensor>:]TRACe:MEASurement:DEFine:DURation:REFerence.....	450
[SENSe<Sensor>:]TRACe:MEASurement:DEFine:TRANSition:HEReference.....	450
[SENSe<Sensor>:]TRACe:MEASurement:DEFine:TRANSition:LREFerence.....	450
[SENSe<Sensor>:]TRACe:MEASurement:POWER:AVG?	451
[SENSe<Sensor>:]TRACe:MEASurement:POWER:HEReference?	451
[SENSe<Sensor>:]TRACe:MEASurement:POWER:LREFerence?	451
[SENSe<Sensor>:]TRACe:MEASurement:POWER:MAX?	452
[SENSe<Sensor>:]TRACe:MEASurement:POWER:MIN?	452
[SENSe<Sensor>:]TRACe:MEASurement:POWER:PULSe:BASE?	452
[SENSe<Sensor>:]TRACe:MEASurement:POWER:PULSe:TOP?	453
[SENSe<Sensor>:]TRACe:MEASurement:POWER:REFerence?	453
[SENSe<Sensor>:]TRACe:MEASurement:PULSe:DCYClE?	453
[SENSe<Sensor>:]TRACe:MEASurement:PULSe:DURation?	453
[SENSe<Sensor>:]TRACe:MEASurement:PULSe:PERiod?	454
[SENSe<Sensor>:]TRACe:MEASurement:PULSe:SEParation?	454
[SENSe<Sensor>:]TRACe:MEASurement:TRANSition:ESAMpling:AUTO[:STATe]	454
[SENSe<Sensor>:]TRACe:MEASurement:TRANSition:NEGative:DURation?	454
[SENSe<Sensor>:]TRACe:MEASurement:TRANSition:NEGative:OCCurrence?	455
[SENSe<Sensor>:]TRACe:MEASurement:TRANSition:NEGative:OVERshoot?	455
[SENSe<Sensor>:]TRACe:MEASurement:TRANSition:POSitive:DURation?	455
[SENSe<Sensor>:]TRACe:MEASurement:TRANSition:POSitive:OCCurrence?	455
[SENSe<Sensor>:]TRACe:MEASurement:TRANSition:POSitive:OVERshoot?	456
[SENSe<Sensor>:]TRACe:MEASurement:TRANSition:SPERiod?	456
[SENSe<Sensor>:]TRACe:POINts.....	456

---

#### [SENSe<Sensor>:]AVERage:COUNT:AUTO:MTIME <maximum\_time>

Available for 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 <nsrc>

Available for 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 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 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 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> | OFF | ON | ONCE

**[SENSe<Sensor>:]AVERAge:COUNT:ENUM <value>**

Available for 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 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 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

If you use `SYSTem:PRESet` instead of `*RST`, the RST value differs. See [Table 14-16](#).

\*RST:                   REPeat

**[SENSe<Sensor>:]AVERAge:TYPE** <type>

Available for 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 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 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>:]BURSt:MODE <mode>**

Available for compatibility. Recommended R&S NRX command:

```
CALCulate<Measurement>[:CHANnel<Channel>]:NRT:BURSt:MODE
```

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<mode> AUTO | USER  
\*RST: AUTO

---

**[SENSe<Sensor>:]BURSt:PERiod <value>**

Available for compatibility. Recommended R&S NRX command:

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

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<value> Range: 0.0 to 1.0  
\*RST: 0.1  
Default unit: s

---

**[SENSe<Sensor>:]BURSt:WIDTh <width>**

Available for compatibility. Recommended R&S NRX command:

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

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<width> Range: 0.0 to 1.0  
\*RST: 0.01  
Default unit: s

---

**[SENSe<Sensor>:]BWIDth:VIDeo <mode>**

Available for 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 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 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 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 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 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 compatibility. Recommended R&S NRX command:

`CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:OFFSet:TABLE:INDEX`

**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:**

<table\_name>

**[SENSe<Sensor>:]CORRection:OFFSet:STATE <state>**

Available for compatibility. Recommended R&S NRX command:

CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:OFFSet:  
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>:]CORRection:OFFSet[:VALue] <offset>**

Available for 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

**Parameters:**

<offset> Range: -200.00 to 200.00  
\*RST: 0.0  
Default unit: dB

**[SENSe<Sensor>:]DATA? [<function>]**

Available for compatibility. Recommended R&S NRX command:

CALCulate<Measurement>:DATA?

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S  
NRX-B9 = 101, USB and LAN port = 5 to 100

**Query parameters:**

<function>

**Usage:** Query only

**[SENSe<Sensor>:]DM:WCDMa:CRATe <value>**

Available for compatibility. Recommended R&S NRX command:

CALCulate<Measurement>[:CHANnel<Channel>]:NRT:DMODulation:WCDMa:  
CRATe

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<value> Range: 0.0 to 8.2e6  
\*RST: 1.0e6  
Default unit: Hz

**[SENSe<Sensor>:]FUNction[:ON] <function>**

Available for compatibility. Recommended R&S NRX command:

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

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<function> \*RST: POWER:AVG

**[SENSe<Sensor>:]INFormation? [<argument>]**

Available for compatibility. Recommended R&S NRX command:

`SYSTem:SENSor<Sensor>:INFO?`

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Query parameters:**

<argument>

**Usage:** Query only

**[SENSe<Sensor>:]INPut:ATTenuation:AUTO <auto>**

Available for compatibility. Recommended 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 compatibility. Recommended R&S NRX command:

```
CALCulate<Measurement>[:CHANnel<Channel>]:INPut:ATTenuation[:VALue]
```

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<value> Range: 0.0 to 30.0  
\*RST: 30.0  
Default unit: dB

---

**[SENSe<Sensor>:]INTeRnal:TRIGger:JITTer:METHod <method>**

Available for compatibility. Recommended R&S NRX command:

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

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<method> COMPensate | MEASure | NONE  
\*RST: COMPensate

---

**[SENSe<Sensor>:][POWER:][AVG:]APERTure[:VALue] <integration\_time>**

Available for compatibility. Recommended R&S NRX command:

```
CALCulate<Measurement>[:CHANnel<Channel>][:POWER][:AVG]:APERTure[:VALue]
```

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<integration\_time> Range: 8.3e-9 to 30.0  
\*RST: 0.005  
Default unit: s

---

**[SENSe<Sensor>:][POWER:][AVG:]SMOothing:STATe <state>**

Available for compatibility. Recommended R&S NRX command:

```
CALCulate<Measurement>[:CHANnel<Channel>][:POWer][:AVG]:
SMOothing[:STATe]
```

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<state> ON | OFF  
\*RST: OFF

**[SENSe<Sensor>:][POWer:]BURSt:DTOLerance <tolerance>**

Available for compatibility. Recommended R&S NRX command:

```
CALCulate<Measurement>[:CHANnel<Channel>][:POWer]:BURSt:
DTOLerance
```

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<tolerance> Range: 0.00 to 0.30  
\*RST: 1.000e-6  
Default unit: s

**[SENSe<Sensor>:][POWer:]NCORrection[:STATe] <state>**

Available for compatibility. Recommended R&S NRX command:

```
CALCulate<Measurement>[:CHANnel<Channel>][:POWer]:NCORrection[:
STATe]
```

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<state> \*RST: OFF

**[SENSe<Sensor>:][POWer:]TGATe:SElect <gate>**

Available for compatibility. Recommended R&S NRX command:

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

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<gate>

**[SENSe<Sensor>:][POWER:]TGATe<Gate>:OFFSet:TIME <time>**

Available for compatibility. Recommended R&S NRX command:

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

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

<Gate> 1 to 4  
Time gate

**Parameters:**

<time> Default unit: s

**[SENSe<Sensor>:][POWER:]TGATe<Gate>:TIME <time>**

Available for compatibility. Recommended R&S NRX command:

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

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

<Gate> 1 to 4  
Time gate

**Parameters:**

<time> Default unit: s

**[SENSe<Sensor>:][POWER:]TGATe<Gate>[:EXCLude]:MID:OFFSet[:TIME]  
<time\_interval>**

Available for compatibility. Recommended R&S NRX command:

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

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

<Gate> 1 to 4  
Time gate

**Parameters:**

<time\_interval> Default unit: s

**[SENSe<Sensor>:][POWER:]TGATe<Gate>[:EXCLude]:MID:TIME** <time\_interval>

Available for compatibility. Recommended 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 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 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 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 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 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 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 compatibility. Recommended R&S NRX command:

CALCulate<Measurement>[:CHANnel<Channel>]:NRT:CCDF:THReshold  
on page 363

If you enter a value without unit, the unit is defined by [SENSe<Sensor>:]UNIT:POWER[:VALue]. For further information, see [Chapter 14.6.1.3, "Units"](#), on page 245.

**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 compatibility. Recommended R&S NRX command:

CALCulate<Measurement>[:CHANnel<Channel>]:NRT:PEP:HOLD:TIME

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<time> Range: 1.0e-3 to 1.0e-1  
\*RST: 6.0e-2  
Default unit: s

**[SENSe<Sensor>:]RANGE:AUTO <state>**

Available for 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 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 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 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 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 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 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 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 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 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 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 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 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 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:**

<lev>                    Range:        -280.0 to 220.0  
                           \*RST:        -30.0  
                           Default unit: dBm

**[SENSe<Sensor>:]STATistics:TIME <time>**

Available for 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:**

<Sensor>                1 to 128  
                           Configured sensor connected at: port A = 1, ... , port D = 4, R&S  
                           NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<time>                    Range:        10.0e-6 to 0.3  
                           \*RST:        0.01  
                           Default unit: s

**[SENSe<Sensor>:]STATistics[:EXCLude]:MID:OFFSet[:TIME] <time>**

Available for compatibility. Recommended R&S NRX command:

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

**Suffix:**

<Sensor>                1 to 128  
                           Configured sensor connected at: port A = 1, ... , port D = 4, R&S  
                           NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<time>                    Range:        0.0 to 0.3  
                           \*RST:        0.0  
                           Default unit: s

**[SENSe<Sensor>:]STATistics[:EXCLude]:MID:TIME <time>**

Available for 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

**Parameters:**

<time>                   Range:     0.0 to 0.3  
                           \*RST:       0.0  
                           Default unit: s

**[SENSe<Sensor>:]TIMing:EXCLude:STARt <exclude\_start>**

Available for 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 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 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 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 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 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 compatibility. Recommended R&S NRX command:

```
CALCulate<Measurement>:TRACe:MEASurement:ALGorithm
```

**Suffix:**

&lt;Sensor&gt;

1 to 128

Configured sensor connected at: port A = 1, ... , port D = 4, R&amp;S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

&lt;value&gt;

HISTogram | INTegration | PEAK

\*RST: HISTogram

**[SENSe<Sensor>:]TRACe:MEASurement:DEFine:DURation:REFerence <value>**

Available for compatibility. Recommended R&amp;S NRX command:

`CALCulate<Measurement>:TRACe:MEASurement:DEFine:DURation:REFerence`**Suffix:**

&lt;Sensor&gt;

1 to 128

Configured sensor connected at: port A = 1, ... , port D = 4, R&amp;S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

&lt;value&gt;

Range: Depends on sensor.

\*RST: Depends on sensor.

Default unit: pct

**[SENSe<Sensor>:]TRACe:MEASurement:DEFine:TRANSition:HREFerence <value>**

Available for compatibility. Recommended R&amp;S NRX command:

`CALCulate<Measurement>:TRACe:MEASurement:DEFine:TRANSition:HREFerence`**Suffix:**

&lt;Sensor&gt;

1 to 128

Configured sensor connected at: port A = 1, ... , port D = 4, R&amp;S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

&lt;value&gt;

Range: Depends on the sensor.

\*RST: Depends on the sensor.

Default unit: pct

**[SENSe<Sensor>:]TRACe:MEASurement:DEFine:TRANSition:LREFerence <value>**

Available for compatibility. Recommended R&amp;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 compatibility. Recommended R&S NRX command:

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

If you enter a value without unit, the unit is defined by `[SENSe<Sensor>:]UNIT:POWer[:VALue]`. For further information, see [Chapter 14.6.1.3, "Units"](#), on page 245.

**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 compatibility. Recommended R&S NRX command:

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

If you enter a value without unit, the unit is defined by `[SENSe<Sensor>:]UNIT:POWer[:VALue]`. For further information, see [Chapter 14.6.1.3, "Units"](#), on page 245.

**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 compatibility. Recommended R&S NRX command:

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

If you enter a value without unit, the unit is defined by `[SENSe<Sensor>:]UNIT:POWer[:VALue]`. For further information, see [Chapter 14.6.1.3, "Units"](#), on page 245.

**Suffix:**

&lt;Sensor&gt;

1 to 128

Configured sensor connected at: port A = 1, ... , port D = 4, R&amp;S NRX-B9 = 101, USB and LAN port = 5 to 100

**Usage:**

Query only

**[SENSe<Sensor>:]TRACe:MEASurement:POWer:MAX?**

Available for compatibility. Recommended R&amp;S NRX command:

`CALCulate<Measurement>:TRACe:MEASurement:POWer:MAX?`If you enter a value without unit, the unit is defined by `[SENSe<Sensor>:]UNIT:POWer[:VALue]`. For further information, see [Chapter 14.6.1.3, "Units"](#), on page 245.**Suffix:**

&lt;Sensor&gt;

1 to 128

Configured sensor connected at: port A = 1, ... , port D = 4, R&amp;S NRX-B9 = 101, USB and LAN port = 5 to 100

**Usage:**

Query only

**[SENSe<Sensor>:]TRACe:MEASurement:POWer:MIN?**

Available for compatibility. Recommended R&amp;S NRX command:

`CALCulate<Measurement>:TRACe:MEASurement:POWer:MIN?`If you enter a value without unit, the unit is defined by `[SENSe<Sensor>:]UNIT:POWer[:VALue]`. For further information, see [Chapter 14.6.1.3, "Units"](#), on page 245.**Suffix:**

&lt;Sensor&gt;

1 to 128

Configured sensor connected at: port A = 1, ... , port D = 4, R&amp;S NRX-B9 = 101, USB and LAN port = 5 to 100

**Usage:**

Query only

**[SENSe<Sensor>:]TRACe:MEASurement:POWer:PULSe:BASE?**

Available for compatibility. Recommended R&amp;S NRX command:

`CALCulate<Measurement>:TRACe:MEASurement:POWer:PULSe:BASE?`If you enter a value without unit, the unit is defined by `[SENSe<Sensor>:]UNIT:POWer[:VALue]`. For further information, see [Chapter 14.6.1.3, "Units"](#), on page 245.**Suffix:**

&lt;Sensor&gt;

1 to 128

Configured sensor connected at: port A = 1, ... , port D = 4, R&amp;S NRX-B9 = 101, USB and LAN port = 5 to 100

**Usage:**

Query only

**[SENSe<Sensor>:]TRACe:MEASurement:POWer:PULSe:TOP?**

Available for compatibility. Recommended R&S NRX command:

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

If you enter a value without unit, the unit is defined by `[SENSe<Sensor>:]UNIT:POWer[:VALue]`. For further information, see [Chapter 14.6.1.3, "Units"](#), on page 245.

**Suffix:**

<Sensor>                    1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Usage:**                    Query only

**[SENSe<Sensor>:]TRACe:MEASurement:POWer:REFerence?**

Available for compatibility. Recommended R&S NRX command:

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

If you enter a value without unit, the unit is defined by `[SENSe<Sensor>:]UNIT:POWer[:VALue]`. For further information, see [Chapter 14.6.1.3, "Units"](#), on page 245.

**Suffix:**

<Sensor>                    1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Usage:**                    Query only

**[SENSe<Sensor>:]TRACe:MEASurement:PULSe:DCYCLe?**

Available for compatibility. Recommended 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 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 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 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 compatibility. Recommended R&S NRX command:

[CALCulate<Measurement>:TRACe:MEASurement:TRANSition:ESAMpling:AUTO\[:STATe\]](#) on page 330

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Parameters:**

<value> \*RST: ON

---

**[SENSe<Sensor>:]TRACe:MEASurement:TRANSition:NEGative:DURation?**

Available for compatibility. Recommended R&S NRX command:

[CALCulate<Measurement>:TRACe:MEASurement:TRANSition:NEGative:DURation?](#)

**Suffix:**

&lt;Sensor&gt;

1 to 128

Configured sensor connected at: port A = 1, ... , port D = 4, R&amp;S NRX-B9 = 101, USB and LAN port = 5 to 100

**Usage:**

Query only

**[SENSe<Sensor>:]TRACe:MEASurement:TRANSition:NEGative:OCCurrence?**

Available for compatibility. Recommended R&amp;S NRX command:

[CALCulate<Measurement>:TRACe:MEASurement:TRANSition:NEGative:OCCurrence?](#)**Suffix:**

&lt;Sensor&gt;

1 to 128

Configured sensor connected at: port A = 1, ... , port D = 4, R&amp;S NRX-B9 = 101, USB and LAN port = 5 to 100

**Usage:**

Query only

**[SENSe<Sensor>:]TRACe:MEASurement:TRANSition:NEGative:OVERshoot?**

Available for compatibility. Recommended R&amp;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&amp;S NRX-B9 = 101, USB and LAN port = 5 to 100

**Usage:**

Query only

**[SENSe<Sensor>:]TRACe:MEASurement:TRANSition:POSitive:DURation?**

Available for compatibility. Recommended R&amp;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&amp;S NRX-B9 = 101, USB and LAN port = 5 to 100

**Usage:**

Query only

**[SENSe<Sensor>:]TRACe:MEASurement:TRANSition:POSitive:OCCurrence?**

Available for compatibility. Recommended R&amp;S NRX command:

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

Available for compatibility. Recommended R&S NRX command:

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

**Suffix:**

<Sensor> 1 to 128  
Configured sensor connected at: port A = 1, ... , port D = 4, R&S NRX-B9 = 101, USB and LAN port = 5 to 100

**Usage:** Query only

`[SENSe<Sensor>:]TRACe:MEASurement:TRANSition:SPERiod?`

Available for 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 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

- [Remote Control Interfaces and Protocols](#)..... 457
- [SCPI Command Structure](#)..... 461
- [Command Sequence and Synchronization](#)..... 468
- [Status Reporting System](#)..... 468

## 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="">::&lt;product ID&gt;::<serial number="">::[INSTR]</serial></vendor>	VISA	<a href="#">Chapter 15.1.1, "USB Interface"</a> , on page 457
Ethernet	VXI-11	TCPIP::host address>::LAN device name>::[INSTR]	VISA	<a href="#">Chapter 15.1.2.2, "VXI-11 Protocol"</a> , on page 460
	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 460
	Socket communication (SCPI raw)	TCPIP::host address>::LAN device name>::<port>::SOCKET		<a href="#">Chapter 15.1.2.4, "Socket Communication"</a> , on page 461
GPIB/ IEEE488 interface (R&S NRX-B8)	GPIB/IEEE 488	GPIB:: <primary address="">::INSTR</primary>		<a href="#">Chapter 15.1.3, "GPIB Interface"</a> , on page 461
<p>*) VISA is a standardized software interface library providing input and output functions to communicate with instruments. A VISA installation on the controller is a prerequisite for remote control over LAN (when using VXI-11 or HiSLIP protocol) and USBTMC interfaces. See also <a href="#">Chapter 15.1.2.1, "VISA Resource Strings"</a>, on page 459.</p>				

### 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::*<vendor ID>*::*<product ID>*::*<serial number>*[::INSTR]

- *<vendor ID>* is the vendor ID for Rohde & Schwarz.
- *<product ID>* is the product ID for the R&S NRX.
- *<serial number>* is the individual serial number of the R&S NRX, printed on the casing.

### Example:

USB::0x0AAD::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::*<IP address or hostname>*[:*<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::*<IP address or hostname>*[:*inst0*][:INSTR]

- *inst0* is the LAN device name, indicating that the VXI-11 protocol is used (optional)

*inst0* currently selects the VXI-11 protocol by default and can be omitted.

For further details, see [Chapter 15.1.2.2, "VXI-11 Protocol"](#), on page 460.

#### HiSLIP

TCPIP::*<IP address or hostname>*::*hislip0*[:INSTR]

- *hislip0* is the HiSLIP device name, designates that the interface protocol HiSLIP is used (mandatory)

*hislip0* is composed of [*HiSLIP device name*[,*HiSLIP port*]] and must be assigned.

For further details, see [Chapter 15.1.2.3, "HiSLIP Protocol"](#), on page 460.

#### Socket communication

TCPIP::*<IP address or hostname>*::*port*::SOCKET

- *port* determines the used port number

- *SOCKET* indicates the raw network socket resource class

Socket communication requires the specification of the port (commonly referred to as port number) and of "SOCKET" to complete the VISA resource string with the associated protocol used.

The default port for socket communication is port 5025.

For further details, see [Chapter 15.1.2.4, "Socket Communication"](#), on page 461.

**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 (keywords). 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 463.

### 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 14.6.1.3, "Units"](#), on page 245.

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: #45168xxxxxxxx
```

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

## 15.3 Command Sequence and Synchronization

A sequential command finishes the execution before the next command is starting. To make sure that commands are carried out in a certain order, each command must be sent in a separate command line.



As a rule, send commands and queries in different program messages.

### 15.3.1 Preventing Overlapping Execution

To prevent an overlapping execution of commands, you can use one of the commands \*OPC, \*OPC? or \*WAI. All three commands cause a certain action only to be carried out after the hardware has been set. The controller can be forced to wait for the corresponding action to occur.

**Table 15-3: Synchronization using \*OPC, \*OPC?, \*WAI**

Com-mand	Action	Programming the controller
*OPC	Sets the Operation Complete bit in the ESR after all previous commands have been executed.	<ul style="list-style-type: none"> <li>Setting bit 0 in the ESE</li> <li>Setting bit 5 in the SRE</li> <li>Waiting for service request (SRQ)</li> </ul>
*OPC?	Stops command processing until 1 is returned. Occurs when all pending operations are completed.	Send *OPC? directly after the command whose processing must be terminated before other commands can be executed.
*WAI	Stops further command processing until all commands sent before *WAI have been executed.	Send *WAI directly after the command whose processing must be terminated before other commands are executed.

Command synchronization using \*WAI or \*OPC? is a good choice if the overlapped command takes only little time to process. The two synchronization commands simply block overlapped execution of the command. Append the synchronization command to the overlapping command.

Measurements, for example, run concurrent. The order, in which the power sensors trigger, has not to correspond to the order of the remote commands.

## 15.4 Status Reporting System

The status reporting system stores all information on the current operating state of the instrument, and on errors which have occurred. This information is stored in the status

registers and in the error queue. You can query both with the commands of the `STATUS` subsystem.

### 15.4.1 Hierarchy of the Status Registers

Figure 15-1 shows the hierarchical structure of information in the status registers.

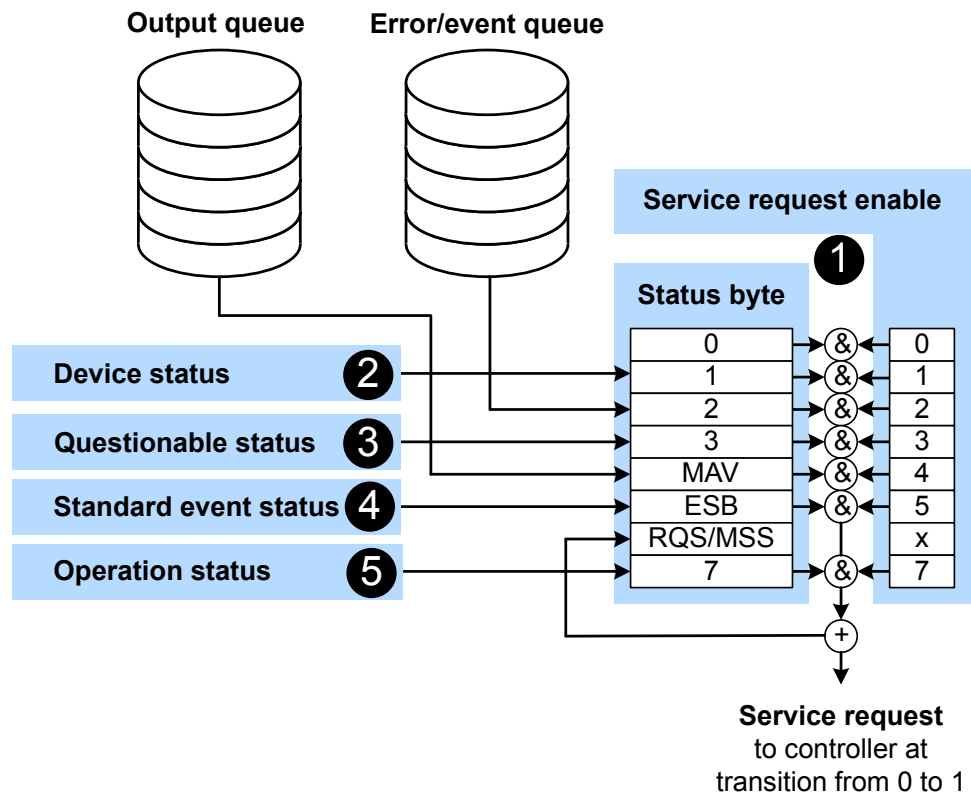


Figure 15-1: Status registers overview

1 = Chapter 15.4.3, "Status Byte (STB) and Service Request Enable Register (SRE)", on page 472

2 = Chapter 15.4.5, "Device Status Register", on page 473

3 = Chapter 15.4.6, "Questionable Status Register", on page 475

4 = Chapter 15.4.7, "Standard Event Status and Enable Register (ESR, ESE)", on page 479

5 = Chapter 15.4.8, "Operation Status Register", on page 480

The highest level is formed by the status byte register (STB) and the associated service request enable (SRE) register.

The status byte register (STB) receives its information from:

- Standard event status register (ESR)
- Associated standard event status enable register (ESE)
- SCPI-defined operation status register
- Questionable status register, which contains detailed information on the device.

The R&S NRX works with several status register levels to support a high number of measurements. 8 measurements are grouped on one status register. The first status register groups the measurements 1 to 8. The next lower status register groups the measurements 9 to 16, and so on. Thus, the suffixes (m+1), (m+2), ... read as follows:

Status register	SCPI suffix	Value of suffix m	Measurement covered (m+1) to (m+8)
First hierarchy	1	0	1 to 8
Second hierarchy	2	8	9 to 16
Third hierarchy	3	16	17 to 24
...	...	...	...
8th hierarchy	8	56	57 to 64

The SCPI suffix of the status register is always (m+1). The suffix of the CALC command corresponds to the measurement channel, (m+x). Bit 0 summarizes the status of the next lower status register.

### 15.4.2 Structure of a SCPI Status Register

Each SCPI register consists of five 16-bit registers that have different functions, see Figure 15-2. The individual bits are independent of each other, i.e. each hardware status is assigned a bit number which is the same for all five registers. Bit 15, the most-significant bit, is set to 0 in all registers, thus preventing problems some controllers have with the processing of unsigned integers.

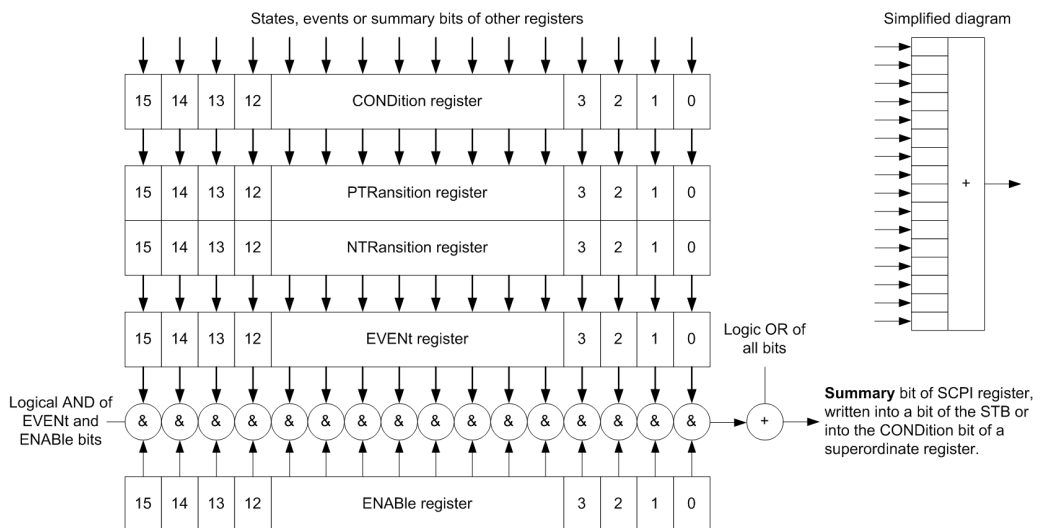


Figure 15-2: Standard SCPI status register

#### CONDition status register part

The five parts of a SCPI register have different properties and functions:

The `CONDition` part is written into directly by the hardware or the sum bit of the next lower register. Its contents reflect the current instrument status. This register part can only be read, but not written into or cleared. Its contents are not affected by reading.

### **PTRansition / NTRansition status register part**

The two transition register parts define which state transition of the `CONDition` part (none, 0 to 1, 1 to 0 or both) is stored in the `EVENT` part.

The *Positive TRansition* part acts as a transition filter. When a bit of the `CONDition` part is changed from 0 to 1, the associated `PTR` bit decides whether the `EVENT` bit is set to 1.

- `PTR` bit = 1: The `EVENT` bit is set.
- `PTR` bit = 0: The `EVENT` bit is not set.

This part can be written into and read as required. Its contents are not affected by reading.

The *Negative TRansition* part also acts as a transition filter. When a bit of the `CONDition` part is changed from 1 to 0, the associated `NTR` bit decides whether the `EVENT` bit is set to 1.

- `NTR` bit = 1: The `EVENT` bit is set.
- `NTR` bit = 0: The `EVENT` bit is not set.

This part can be written into and read as required. Its contents are not affected by reading.

### **EVENT status register part**

The `EVENT` part indicates whether an event has occurred since the last reading, it is the "memory" of the condition part. It only indicates events passed on by the transition filters. It is permanently updated by the instrument.

You can only read this part. Reading the register clears it. This part is often equated with the entire register.

### **ENABLE status register part**

The `ENABLE` part determines whether the associated `EVENT` bit contributes to the sum bit (see below). Each bit of the `EVENT` part is "ANDed" with the associated `ENABLE` bit (symbol '&'). The results of all logical operations of this part are passed on to the sum bit via an "OR" function (symbol '+').

`ENABLE` bit = 0: The associated `EVENT` bit does not contribute to the sum bit.

`ENABLE` bit = 1: If the associated `EVENT` bit is 1, the sum bit is set to 1 as well.

You can read and write as required. Its contents are not affected by reading.

### **Sum bit**

The sum bit is obtained from the `EVENT` and `ENABLE` part for each register. The result is then entered into a bit of the `CONDition` part of the higher-order register.

The instrument automatically generates the sum bit for each register. Thus an event can lead to a service request throughout all levels of the hierarchy.

### 15.4.3 Status Byte (STB) and Service Request Enable Register (SRE)

The status byte register is already defined in IEEE 488.2. It gives a rough overview of the instrument status, collecting information from the lower-level registers. It is comparable with the `CONDition` register of a SCPI defined register and is at the highest level of the SCPI hierarchy. Its special feature is that bit 6 acts as the summary bit of all other bits of the status byte register.

The status byte register is read by `*STB?` or a serial poll. The service request enable register is associated with the status byte register. The function of the service request enable register corresponds to that of the `ENABLE` register of the SCPI registers. Each bit of the status byte register is assigned a bit in the service request enable register. Bit 6 of the service request enable register is ignored. If a bit is set in the service request enable register and the associated bit in the status byte register changes from 0 to 1, a service request (SRQ) is generated on the IEC/IEEE bus. This service request triggers an interrupt in the controller configured for this purpose, and can be further processed by the controller.

Set and read the service request enable register using `*SRE`.

See [Figure 15-1](#).

**Table 15-4: Used status byte bits and their meaning**

Bit no.	Short description	Bit is set if
1	Device status register summary	A instrument is connected or disconnected or when an error has occurred in a instrument, depending on the configuration of the instrument status register. <a href="#">Chapter 15.4.5, "Device Status Register"</a> , on page 473
2	Error queue not empty	The error queue has an entry. If this bit is enabled by the service request enable register, each entry of the error queue generates a service request. An error can thus be recognized and specified in detail by querying the error queue. The query yields a conclusive error message. This procedure is recommended since it considerably reduces the problems of IEC/IEEE-bus control.
3	Questionable status register summary	An <code>EVENT</code> bit is set in the <code>QUESTIONable</code> status register and the associated <code>ENABLE</code> bit is set to 1. A set bit denotes a questionable device status which can be specified in greater detail by querying the questionable status register. <a href="#">Chapter 15.4.6, "Questionable Status Register"</a> , on page 475
4	MAV Message available	A readable message is in the output queue. This bit can be used to automate reading of data from the instrument into the controller.



Bit no.	Short description	Bit is set if
5	ESB Standard event status register summary	One of the bits in the standard event status register is set and enabled in the event status enable register. Setting this bit denotes a serious error which can be specified in greater detail by querying the standard event status register. <a href="#">Chapter 15.4.7, "Standard Event Status and Enable Register (ESR, ESE)", on page 479.</a>
6	MSS Master status summary	The instrument triggers a service request, which happens if one of the other bits of this register is set together with its enable bit in the service request enable register (SRE).
7	Operation status register summary	An <code>EVENT</code> bit is set in the operation status register and the associated <code>ENABLE</code> bit is set to 1. A set bit denotes that an action is being performed by the instrument. Information on the type of action can be obtained by querying the operation status register. <a href="#">Chapter 15.4.8, "Operation Status Register", on page 480</a>

#### 15.4.4 IST Flag and Parallel Poll Enable Register (PPE)

Similar to the service request (SRQ), the IST flag combines the complete status information in a single bit. It can be queried by a parallel poll or by `*IST?`.

The parallel poll enable register (PPE) determines which bits of the STB affect the IST flag. The bits of the STB are ANDed with the corresponding bits of the PPE; bit 6 is also used, in contrast to the service request enable register. The IST flag is obtained by ORing all results together.

Set and read the parallel poll enable register using `*PRE`.

#### 15.4.5 Device Status Register

Contains information on current instrument states, `CONDition` register, or states that occurred since the last query, `EVENT` register.

0	0	+
Sensor A connected	1	
Sensor B connected	2	
Sensor A error	3	
Sensor B error	4	
Sensor A Front/Rear	5	
Sensor B Front/Rear	6	
Sensor C connected	7	
Sensor D connected	8	
Sensor C error	9	
Sensor D error	10	
Sensor C Front/Rear	11	
Sensor D Front/Rear	12	
NRT Sensor connected	13	
Key pressed	14	
not used	15	

Figure 15-3: Device status register

Querying the register:

- `STATUS:DEVICE:CONDITION?`
- `STATUS:DEVICE[:EVENT]?`

Table 15-5: Used device status bits and their meaning

Bit no.	Short description	Bit is set if
1	Sensor A connected	
2	Sensor B connected	
3	Sensor A error	
4	Sensor B error	
5	Sensor A front/rear	Sensor A connected at the rear.
6	Sensor B front/rear	Sensor B connected at the rear.
7	Sensor C connected	
8	Sensor D connected	
9	Sensor C error	
10	Sensor D error	
11	Sensor C front/rear	Sensor C connected at the rear.
12	Sensor D front/rear	Sensor D connected at the rear.

Bit no.	Short description	Bit is set if
13	NRT sensor connected	
14	Key pressed	Front panel key pressed.

### 15.4.6 Questionable Status Register

Contains information on questionable instrument states that occur if the instrument is not operated in compliance with its specifications.

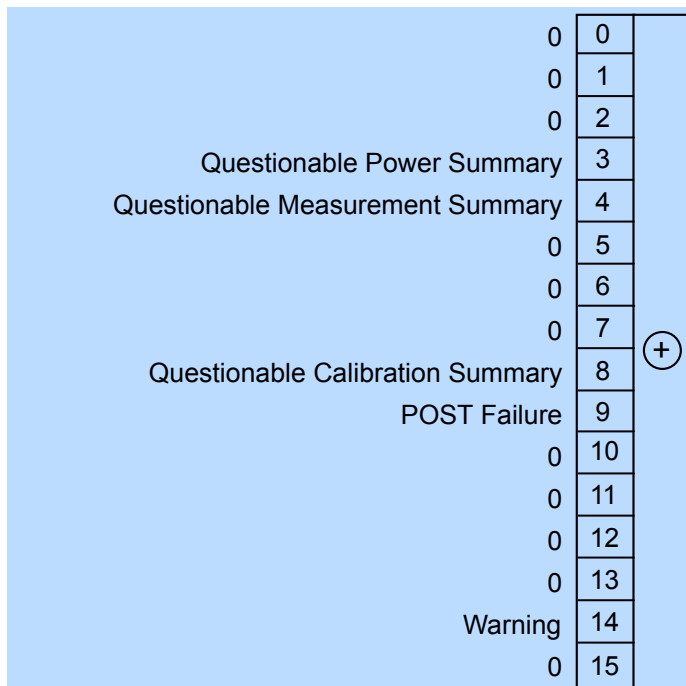


Figure 15-4: Questionable status register

Querying the register:

- `STATUS:QUESTIONable:CONDition?`
- `STATUS:QUESTIONable[:EVENT]?`

Table 15-6: Used questionable status bits and their meaning

Bit no.	Short description	Bit is set if
3	Questionable power summary	Summary of <a href="#">Questionable Power Status Register</a> exists.
4	Questionable measurement summary	Summary of <a href="#">Questionable Measurement Status Registers</a> exists.
8	Questionable calibration summary	Summary of <a href="#">Questionable Calibration Status Register</a> exists.

Bit no.	Short description	Bit is set if
9	POST failure	Built-in test of the R&S NRX that is carried out automatically upon power-up has generated an error.
14	Warning	

#### 15.4.6.1 Questionable Power Status Register

Contains information whether the measured power values are questionable.

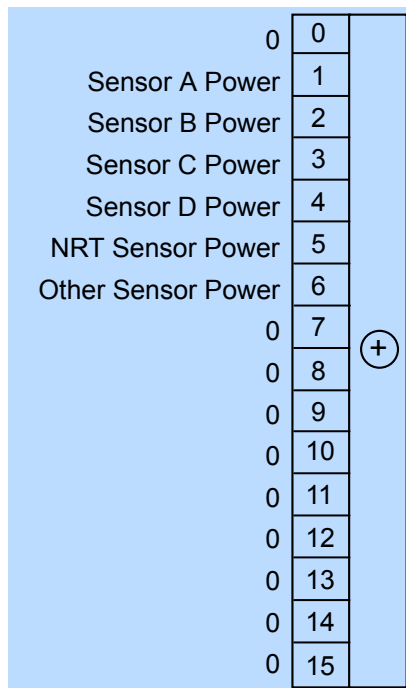


Figure 15-5: Questionable power status register

Querying the register:

- `STATUS:QUESTIONABLE:POWER[:SUMMARY]:CONDITION?`
- `STATUS:QUESTIONABLE:POWER[:SUMMARY][:EVENT]?`

Table 15-7: Used questionable power status bits and their meaning

Bit no.	Short description	Bit is set if measurement data of a sensor are corrupt.
1	Sensor A power	Sensor A
2	Sensor B power	Sensor B
3	Sensor C power	Sensor C
4	Sensor D power	Sensor D
5	NRT sensor power	R&S NRT-Zxx power sensor
6	Other sensor power	USB or LAN power sensor

### 15.4.6.2 Questionable Measurement Status Registers

Contain information whether the displayed data or the calculated power is questionable.

For information on index *m*, see [Chapter 15.4.1, "Hierarchy of the Status Registers"](#), on page 469.

Extension Summary	0	+
Measurement m+1 Power	1	
Measurement m+2 Power	2	
Measurement m+3 Power	3	
Measurement m+4 Power	4	
Measurement m+5 Power	5	
Measurement m+6 Power	6	
Measurement m+7 Power	7	
Measurement m+8 Power	8	
0	9	
0	10	
0	11	
0	12	
0	13	
0	14	
0	15	

**Figure 15-6: Questionable measurement status registers**

Querying the register:

- `STATUS:QUESTIONABLE:MEASURE<RegisterIndex>:CONDITION?`
- `STATUS:QUESTIONABLE:MEASURE<RegisterIndex>[:SUMMARY][:EVENT]?`
- `STATUS:QUESTIONABLE:WINDOW<RegisterIndex>:CONDITION?`
- `STATUS:QUESTIONABLE:WINDOW<RegisterIndex>[:SUMMARY][:EVENT]?`

**Table 15-8: Used questionable measurement status bits and their meaning**

Bit no.	Short description	Bit is set if measured values of a measurement channel are corrupt or for the extension summary.
0	Extension summary	Sum bit of the next lower status register.
1	Measurement m+1 power	Channel 1
2	Measurement m+2 power	Channel 2
3	Measurement m+3 power	Channel 3
4	Measurement m+4 power	Channel 4
5	Measurement m+5 power	Channel 5

Bit no.	Short description	Bit is set if measured values of a measurement channel are corrupt or for the extension summary.
6	Measurement m+6 power	Channel 6
7	Measurement m+7 power	Channel 7
8	Measurement m+8 power	Channel 8

### 15.4.6.3 Questionable Calibration Status Register

Contains information whether the zeroing of a power sensor was successful.

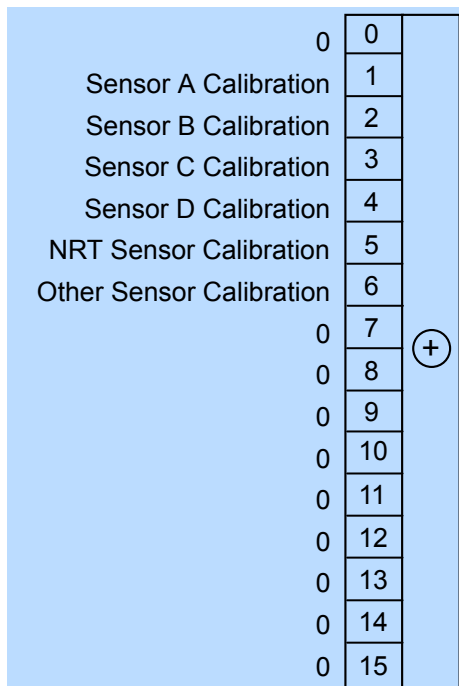


Figure 15-7: Questionable calibration status register

Querying the register:

- `STATUS:QUESTionable:CALibration[:SUMMARY]:CONDition?`
- `STATUS:QUESTionable:CALibration[:SUMMARY][:EVENT]?`

Table 15-9: Used questionable calibration status bits and their meaning

Bit no.	Short description	Bit is set if zeroing of a sensor is not successful.
1	Sensor A calibration	Sensor A
2	Sensor B calibration	Sensor B
3	Sensor C calibration	Sensor C
4	Sensor D calibration	Sensor D

Bit no.	Short description	Bit is set if zeroing of a sensor is not successful.
5	NRT sensor calibration	R&S NRT-Zxx power sensor
6	Other sensor calibration	USB or LAN power sensor

### 15.4.7 Standard Event Status and Enable Register (ESR, ESE)

The `ESR` is already defined in the IEEE 488.2 standard. It is comparable to the `EVENT` register of a SCPI register. The standard event status register can be read out by `*ESR?`.

The `ESE` forms the associated `ENABLE` register. It can be set and read by `*ESE`.

Operation Complete	0	+
0	1	
Query Error	2	
Device-Dependent Error	3	
Execution Error	4	
Command Error	5	
User Request	6	
Power On	7	

Figure 15-8: Standard event status register (ESR)

Table 15-10: Used standard event status bits and their meaning

Bit no.	Short description	Bit is set if
0	Operation complete	All previous commands have been executed and <code>*OPC</code> is received.
2	Query error	The controller wants to read data from the instrument but has not sent a query, or it sends new commands to the instrument before it retrieves existing requested data. A frequent cause is a faulty query which cannot be executed.
3	Device-dependent error	A instrument-dependent error occurs. An error message with a number between -300 and -399 or a positive error number denoting the error in greater detail is entered in the error queue.
4	Execution error	The syntax of a received command is correct but the command cannot be executed due to various marginal conditions. An error message with a number between -200 and -300 denoting the error in greater detail is entered in the error queue.
5	Command error	An undefined command or a command with incorrect syntax is received. An error message with a number between -100 and -200 denoting the error in greater detail is entered in the error queue.
6	User request	The instrument is switched over to manual control.
7	Power on	The instrument is switched on.

### 15.4.8 Operation Status Register

Contains information on current operations, `CONDition` register, or operations performed since the last query, `EVENT` register.

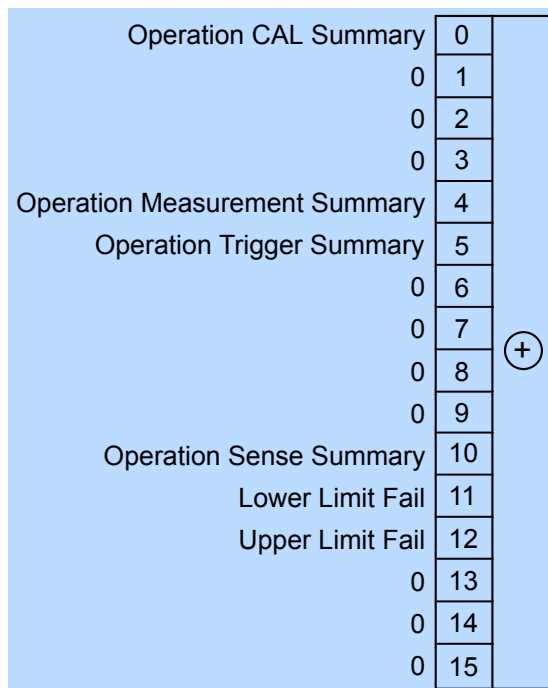


Figure 15-9: Operation status register

Querying the register:

- `STATUS:OPERation:CONDition?`
- `STATUS:OPERation[:EVENT]?`

Table 15-11: Used operation status bits and their meaning

Bit no.	Short description	Bit is set if
0	Operation CAL summary	Summary of <a href="#">Operation Calibrating Status Register</a> exists.
4	Operation measurement summary	Summary of <a href="#">Operation Measuring Status Register</a> exists.
5	Operation trigger summary	Summary of <a href="#">Operation Trigger Status Register</a> exists.
10	Operation sense summary	Summary of <a href="#">Operation Sense Status Register</a> exists.
11	Lower limit fail	Summary of <a href="#">Operation Lower Limit Fail Status Registers</a> exists.
12	Upper limit fail	Summary of <a href="#">Operation Upper Limit Fail Status Registers</a> exists.



### 15.4.8.1 Operation Calibrating Status Register

The `CONDition` register contains information whether a power sensor is being calibrated. The `EVENT` register contains information whether a calibration was started or completed since the last query.

0	0	+
Sensor A calibrating	1	
Sensor B calibrating	2	
Sensor C calibrating	3	
Sensor D calibrating	4	
NRT Sensor calibrating	5	
Other Sensor calibrating	6	
0	7	
0	8	
0	9	
0	10	
0	11	
0	12	
0	13	
0	14	
0	15	

Figure 15-10: Operation calibrating status register

Querying the register:

- `STATUS:OPERation:CALibrating[:SUMMARY]:CONDition?`
- `STATUS:OPERation:CALibrating[:SUMMARY][:EVENT]?`

Table 15-12: Used operation calibrating status bits and their meaning

Bit no.	Short description	Bit is set if a sensor is zeroing.
1	Sensor A calibrating	Sensor A
2	Sensor B calibrating	Sensor B
3	Sensor C calibrating	Sensor C
4	Sensor D calibrating	Sensor D
5	NRT sensor calibrating	R&S NRT-Zxx power sensor
6	Other sensor calibrating	USB or LAN power sensor

### 15.4.8.2 Operation Measuring Status Register

The `CONDition` register contains information whether a power sensor is measuring. The `EVENT` register contains information whether a measurement was started or completed since the last query.

Extension Summary	0	+
Sensor A measuring	1	
Sensor B measuring	2	
Sensor C measuring	3	
Sensor D measuring	4	
NRT Sensor measuring	5	
Other Sensor measuring	6	
0	7	
0	8	
0	9	
0	10	
0	11	
0	12	
0	13	
0	14	
0	15	

Figure 15-11: Operation measuring status register

Querying the register:

- `STATUS:OPERation:MEASuring[:SUMMARY]:CONDition?`
- `STATUS:OPERation:MEASuring[:SUMMARY][:EVENT]?`

Table 15-13: Used operation measuring status bits and their meaning

Bit no.	Short description	Bit is set if a sensor is measuring or for the extension summary.
0	Extension summary	Summary of <a href="#">Operation Measuring Extended Status Registers</a> exists.
1	Sensor A measuring	Sensor A
2	Sensor B measuring	Sensor B
3	Sensor C measuring	Sensor C
4	Sensor D measuring	Sensor D
5	NRT sensor measuring	R&S NRT-Zxx power sensor
6	Other sensor measuring	USB or LAN power sensor

### 15.4.8.3 Operation Measuring Extended Status Registers

The `CONDition` registers contain information whether a measurement channel is used. The `EVENT` registers contain information whether a measurement channel was used since the last query.

For information on index `m`, see [Chapter 15.4.1, "Hierarchy of the Status Registers"](#), on page 469.

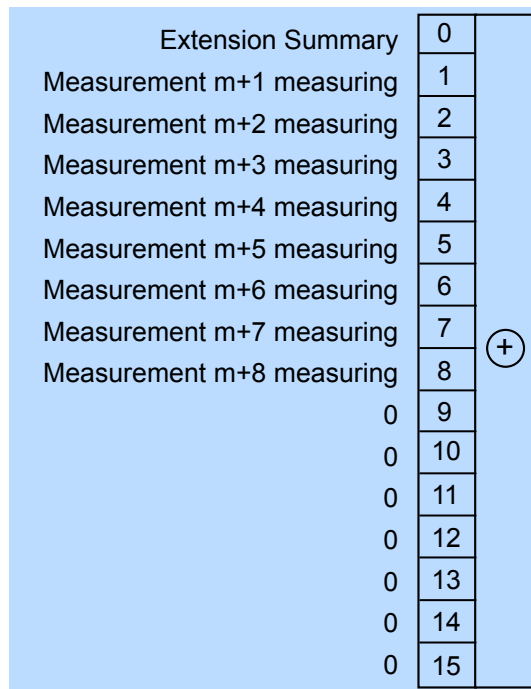


Figure 15-12: Operation measuring extended status registers

Querying the register:

- `STATUS:OPERation:MEASuring:EXTension<RegisterIndex>:CONDition?`
- `STATUS:OPERation:MEASuring:EXTension<RegisterIndex>[:SUMMARY][:EVENT]?`

Table 15-14: Used operation measuring extended status bits and their meaning

Bit no.	Short description	Bit is set if a measurement channel is active or for the extension summary.
0	Extension summary	Sum bit of the next lower status register.
1	Measurement m+1 measuring	Channel 1
2	Measurement m+2 measuring	Channel 2
3	Measurement m+3 measuring	Channel 3
4	Measurement m+4 measuring	Channel 4
5	Measurement m+5 measuring	Channel 5

Bit no.	Short description	Bit is set if a measurement channel is active or for the extension summary.
6	Measurement m+6 measuring	Channel 6
7	Measurement m+7 measuring	Channel 7
8	Measurement m+8 measuring	Channel 8

#### 15.4.8.4 Operation Trigger Status Register

The `CONDition` register contains information whether a power sensor is waiting for a trigger event. The `EVENT` register contains information whether the power sensor has been waiting for a trigger event since the last query.

Extension Summary	0	+
Sensor A wait for trigger	1	
Sensor B wait for trigger	2	
Sensor C wait for trigger	3	
Sensor D wait for trigger	4	
NRT Sensor wait for trigger	5	
Other Sensor wait for trigger	6	
0	7	
0	8	
0	9	
0	10	
0	11	
0	12	
0	13	
0	14	
0	15	

Figure 15-13: Operation trigger status register

Querying the register:

- `STATUS:OPERation:TRIGger[:SUMMARY]:CONDition?`
- `STATUS:OPERation:TRIGger[:SUMMARY][:EVENT]?`

Table 15-15: Used operation trigger status bits and their meaning

Bit no.	Short description	Bit is set if a sensor is waiting for trigger event or for the extension summary.
0	Extension summary	Summary of <a href="#">Operation Trigger Extended Status Registers</a> exists.
1	Sensor A wait for trigger	Sensor A
2	Sensor B wait for trigger	Sensor B

Bit no.	Short description	Bit is set if a sensor is waiting for trigger event or for the extension summary.
3	Sensor C wait for trigger	Sensor C
4	Sensor D wait for trigger	Sensor D
5	NRT sensor wait for trigger	R&S NRT-Zxx power sensor
6	Other sensor wait for trigger	USB or LAN power sensor

### 15.4.8.5 Operation Trigger Extended Status Registers

The `CONDition` registers contain information whether a measurement channel is waiting for a trigger event. The `EVENTt` registers contain information whether a measurement channel has been waiting for a trigger event since the last query.

For information on index *m*, see [Chapter 15.4.1, "Hierarchy of the Status Registers"](#), on page 469.

Extension Summary	0	+
Measurement m+1 wait for trigger	1	
Measurement m+2 wait for trigger	2	
Measurement m+3 wait for trigger	3	
Measurement m+4 wait for trigger	4	
Measurement m+5 wait for trigger	5	
Measurement m+6 wait for trigger	6	
Measurement m+7 wait for trigger	7	
Measurement m+8 wait for trigger	8	
0	9	
0	10	
0	11	
0	12	
0	13	
0	14	
0	15	

Figure 15-14: Operation trigger extended status registers

Querying the register:

- `STATUS:OPERation:TRIGger:EXTension<RegisterIndex>:CONDition?`
- `STATUS:OPERation:TRIGger:EXTension<RegisterIndex>[:SUMMARY][:EVENT]?`

**Table 15-16: Used operation trigger extended status bits and their meaning**

Bit no.	Short description	Bit is set if a measurement channel is waiting for trigger event or for the extension summary.
0	Extension summary	Sum bit of the next lower status register.
1	Measurement m+1 wait for trigger	Channel 1
2	Measurement m+2 wait for trigger	Channel 2
3	Measurement m+3 wait for trigger	Channel 3
4	Measurement m+4 wait for trigger	Channel 4
5	Measurement m+5 wait for trigger	Channel 5
6	Measurement m+6 wait for trigger	Channel 6
7	Measurement m+7 wait for trigger	Channel 7
8	Measurement m+8 wait for trigger	Channel 8

#### 15.4.8.6 Operation Sense Status Register

The `CONDition` register contains information whether a power sensor is being initialized. The `EVENT` register contains information whether an initialization was started or completed since the last query.

A power sensor is initialized if:

- Supply voltage is switched on (power-up).
- Sensor was connected.
- Reset was performed, `*RST` or `SYSTEM:PRESet`.

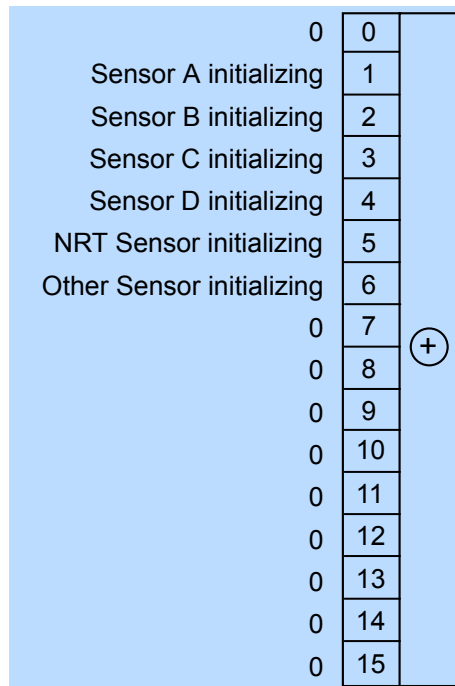


Figure 15-15: Operation sense status register

Querying the register:

- `STATUS:OPERation:SENSe[:SUMMARY]:CONDition?`
- `STATUS:OPERation:SENSe[:SUMMARY][:EVENT]?`

Table 15-17: Used operation sense status bits and their meaning

Bit no.	Short description	Bit is set if a sensor is initializing.
1	Sensor A initializing	Sensor A
2	Sensor B initializing	Sensor B
3	Sensor C initializing	Sensor C
4	Sensor D initializing	Sensor D
5	NRT sensor initializing	R&S NRT-Zxx power sensor
6	Other sensor initializing	USB or LAN power sensor

#### 15.4.8.7 Operation Lower Limit Fail Status Registers

The `CONDition` registers contain information whether a measured value is below a configured lower limit. The `EVENT` registers contain information whether a measured value dropped below a limit value since the last query.

For information on index *m*, see [Chapter 15.4.1, "Hierarchy of the Status Registers"](#), on page 469.

Extension Summary	0	+
Measurement m+1 Lower Limit Fail	1	
Measurement m+2 Lower Limit Fail	2	
Measurement m+3 Lower Limit Fail	3	
Measurement m+4 Lower Limit Fail	4	
Measurement m+5 Lower Limit Fail	5	
Measurement m+6 Lower Limit Fail	6	
Measurement m+7 Lower Limit Fail	7	
Measurement m+8 Lower Limit Fail	8	
0	9	
0	10	
0	11	
0	12	
0	13	
0	14	
0	15	

**Figure 15-16: Operation lower limit fail status registers**

Querying the register:

- `STATUS:OPERation:LLFail<RegisterIndex>[:SUMMARY]:CONDITION?`
- `STATUS:OPERation:LLFail<RegisterIndex>[:SUMMARY][:EVENT]?`

**Table 15-18: Used operation lower limit fail status bits and their meaning**

Bit no.	Short description	Bit is set if measured values of a measurement channel are below the lower limit value or for the summary.
0	Extension summary	Sum bit of the next lower status register.
1	Measurement m+1 lower limit fail	Channel 1
2	Measurement m+2 lower limit fail	Channel 2
3	Measurement m+3 lower limit fail	Channel 3
4	Measurement m+4 lower limit fail	Channel 4
5	Measurement m+5 lower limit fail	Channel 5
6	Measurement m+6 lower limit fail	Channel 6
7	Measurement m+7 lower limit fail	Channel 7
8	Measurement m+8 lower limit fail	Channel 8



### 15.4.8.8 Operation Upper Limit Fail Status Registers

The `CONDition` registers contain information whether a measured value currently exceeds a configured upper limit. The `EVENT` registers contain information whether a measured value exceeded an upper limit value since the last query.

For information on index `m`, see [Chapter 15.4.1, "Hierarchy of the Status Registers"](#), on page 469.

Extension Summary	0	+
Measurement m+1 Upper Limit Fail	1	
Measurement m+2 Upper Limit Fail	2	
Measurement m+3 Upper Limit Fail	3	
Measurement m+4 Upper Limit Fail	4	
Measurement m+5 Upper Limit Fail	5	
Measurement m+6 Upper Limit Fail	6	
Measurement m+7 Upper Limit Fail	7	
Measurement m+8 Upper Limit Fail	8	
0	9	
0	10	
0	11	
0	12	
0	13	
0	14	
0	15	

**Figure 15-17: Operation upper limit fail status registers**

Querying the register:

- `STATUS:OPERation:ULFail<RegisterIndex>[:SUMMARY]:CONDition?`
- `STATUS:OPERation:ULFail<RegisterIndex>[:SUMMARY][:EVENT]?`

**Table 15-19: Used operation upper limit fail status bits and their meaning**

Bit no.	Short description	Bit is set if measured values of a measurement channel exceed the upper limit value or for the summary.
0	Extension summary	Sum bit of the next lower status register.
1	Measurement m+1 upper limit fail	Channel 1
2	Measurement m+2 upper limit fail	Channel 2
3	Measurement m+3 upper limit fail	Channel 3
4	Measurement m+4 upper limit fail	Channel 4
5	Measurement m+5 upper limit fail	Channel 5
6	Measurement m+6 upper limit fail	Channel 6

Bit no.	Short description	Bit is set if measured values of a measurement channel exceed the upper limit value or for the summary.
7	Measurement m+7 upper limit fail	Channel 7
8	Measurement m+8 upper limit fail	Channel 8

# 16 Troubleshooting

- [Displaying Information](#).....491
- [Notifications](#).....491
- [Performing Tests](#).....495
- [Collecting Information for Technical Support](#).....496
- [Contacting Customer Support](#).....496

## 16.1 Displaying Information

### Status information

Status information is displayed in the title bar of the graphical user interface. See [Chapter 4, "Operating Concepts"](#), on page 31.

In remote control, the status reporting system stores all information on the current operating state and occurred errors. See:

- [Chapter 14.15, "Using the Status Register"](#), on page 413
- [Chapter 15.4, "Status Reporting System"](#), on page 468

### Instrument information

Instrument information, including the installed hardware and software options, is available under [Chapter 11.2, "Instrument Info"](#), on page 153.

The hardware configuration is provided separately under [Chapter 11.3, "Hardware Configuration"](#), on page 165.

In remote control, use the commands described in [Chapter 14.14.7, "Instrument Information"](#), on page 404.

### Sensor information

You can display information about one of the connected power sensors. See ["Sensor Info"](#) on page 151.

In remote control, use the commands described in [Chapter 14.14.7, "Instrument Information"](#), on page 404.

## 16.2 Notifications

The graphical user interface has a notification center where all information, warning and error messages are collected. See [Chapter 4.1.4, "Notification Center"](#), on page 35.

In remote control, use the commands described in [Chapter 14.14.9, "Notifications and Errors"](#), on page 408.

## 16.2.1 Interpreting Notifications and Their Number

In the following, important notifications and their meaning are explained. For all other notifications, perform tests to find out whether it is a hardware or software problem, and report the problem to the R&S customer support. See [Chapter 16.3, "Performing Tests"](#), on page 495.

In remote control, notifications and errors are associated with a unique number. Positive numbers are instrument-dependent. Negative numbers are reserved by the SCPI standard.

The notification types are grouped in number ranges. In the following description, both the number used in remote control and the description is given to help identify the problem.

### 16.2.1.1 System Notifications

Number range: 1000 to 1999. Described notifications:

1004 - firmware update error.....	492
1005 - settings conflict.....	492
1007 - target descriptor error.....	492
1008 - temperature alert.....	492
1009 - fan failure alert.....	493

#### 1004 - firmware update error

Firmware update failed.

Possible reasons:

- You have used an \*.rsu file that is not designated for the R&S NRX. The name of a suitable \*.rsu file starts with "NRX".
- The firmware update was interrupted or otherwise faulty.

Solution: Perform the firmware update again. See [Chapter 13, "Firmware Update"](#), on page 170.

#### 1005 - settings conflict

Settings conflict of the R&S NRX occurred.

Reason: Contradictory settings are allowed so that you are not hampered in your workflow.

Solution: See [Chapter 5.5, "Settings Conflict"](#), on page 48.

#### 1007 - target descriptor error

Servicing required. You cannot resolve the problem yourself.

Solution: Contact customer support. See [Chapter 16.5, "Contacting Customer Support"](#), on page 496.

#### 1008 - temperature alert

R&S NRX is overheated. Overheating can damage the R&S NRX.

Possible reasons:

- Insufficient airflow. Follow the instructions in ["To place the R&S NRX on a bench top"](#) on page 18 or [Chapter 3.1.5, "Mounting in a Rack"](#), on page 19.
- The environmental temperature exceeds the suitable temperature range given in the data sheet under environmental conditions.
- The fan does not work properly. See [Chapter 16.5, "Contacting Customer Support"](#), on page 496.

#### **1009 - fan failure alert**

The fan does not work. Overheating can damage the R&S NRX.

Solution: Switch off the R&S NRX, and contact customer support. See [Chapter 16.5, "Contacting Customer Support"](#), on page 496.

### **16.2.1.2 Power Sensor Notifications**

Number range: 2000 to 2999.

The power sensors report their error states to the R&S NRX. The error states depend on the power sensor type. Described notifications:

<a href="#">2001 - sensor maximum allowed count</a> .....	493
<a href="#">2003 - sensor settings conflict</a> .....	493
<a href="#">2005 - sensor underrange</a> .....	493
<a href="#">2006 - sensor overrange</a> .....	494
<a href="#">2007 - sensor overload</a> .....	494
<a href="#">2008 - sensor protocol minor mismatch</a> .....	494
<a href="#">2009 - sensor protocol major mismatch</a> .....	494

#### **2001 - sensor maximum allowed count**

The maximum number of power sensors that you can use simultaneously is reached.

Solution: Install the second measurement channel (R&S NRX-K2) or the 3rd and 4th measurement channel (R&S NRX-K4).

See also:

- [Chapter 5.1, "Parallel Measurements"](#), on page 44
- [Chapter 12, "Option Management"](#), on page 169

#### **2003 - sensor settings conflict**

The current settings of the R&S NRX do not comply with the operating range of the connected power sensor.

Solution: Change the settings of the R&S NRX or use another power sensor that is suitable for the selected settings.

#### **2005 - sensor underrange**

Possible reasons:

- The detected signal is below the minimum value that the power sensor can correctly measure.
- The current settings of the R&S NRX undercut the specified operating range of the connected power sensor.

Solution: Change the settings of the R&S NRX or use another power sensor that is suitable for the selected settings.

#### 2006 - sensor overrange

Possible reasons:

- The detected signal is above the maximum value that the power sensor can correctly measure.
- The current settings of the R&S NRX exceed the specified operating range of the connected power sensor.

Solution: Change the settings of the R&S NRX or use another power sensor that is suitable for the selected settings.

#### 2007 - sensor overload

The RF input power exceeds the measurement range by far.

Solution: Immediately disconnect the power sensor from the RF source to avoid damage. Use an attenuator or another power sensor that is suitable for the input level.

#### 2008 - sensor protocol minor mismatch

The firmware version of the connected power sensor is out-of-date.

Solution: An update of the power sensor firmware is recommended.

#### 2009 - sensor protocol major mismatch

The firmware version of the connected power sensor is not supported any more.

Solution: Update the firmware of the connected power sensor.

### 16.2.1.3 Sensor Check Source (R&S NRX-B1) Notifications

Number range: 3000 to 3999. Described notifications:

3002 - setting not supported.....	494
3003 - missing calibration data.....	494
3004 - version <no.> available for sensor check source (R&S NRX-B1).....	495

#### 3002 - setting not supported

The sensor check source (R&S NRX-B1) does not support the set frequency or power level.

Solution: Change the frequency or power level setting. See "[Sensor Check Source tab](#)" on page 145.

#### 3003 - missing calibration data

The calibration data of the sensor check source (R&S NRX-B1) are missing for the set power level.

Solution:

- Change the frequency or power level setting. See "[Sensor Check Source tab](#)" on page 145.
- If you cannot work with another power level, servicing is required. Contact customer support. See [Chapter 16.5, "Contacting Customer Support"](#), on page 496.

**3004 - version <no.> available for sensor check source (R&S NRX-B1)**

A newer version of the sensor check source (R&S NRX-B1) is available.

Solution: Update the sensor check source (R&S NRX-B1) as described in "[Sensor Check Source Info](#)" on page 146.

**16.2.1.4 License Key Notifications**

Number range: 4000 to 4999.

For all notifications not described here, collect information for technical support. See [Chapter 16.4, "Collecting Information for Technical Support"](#), on page 496. Described notifications:

<a href="#">4001 - license key management warning</a> .....	495
<a href="#">4002 - remote language not allowed, NRX-K301 option missing</a> .....	495

**4001 - license key management warning**

Usually caused by:

- Problems with the system time. See "[Date and Time Settings](#)" on page 155.
- Wrong license key for a software option.  
See "[SW Options tab](#)" on page 161.

**4002 - remote language not allowed, NRX-K301 option missing**

For the feature you want to use, the NRX KS emulation mode (R&S NRX-K301) option is required. The option is not installed on your R&S NRX.

Solution: Purchase the NRX KS emulation mode (R&S NRX-K301) option and install it. See also [Chapter 12, "Option Management"](#), on page 169.

**16.2.1.5 Queue Handling Notifications**

Number range starts from 9000.

**9001 - static error queue overflow**

The queue of events has reached its maximum number of 1000 notices, warnings and errors. No more entries are created.

Solution: Solve the errors before continuing.

**16.3 Performing Tests**

Using the graphical user interface, you can test the following:

- User interface of the R&S NRX, see [Chapter 11.4, "Test"](#), on page 166.
- Connected power sensors, see "[Sensor Test](#)" on page 152.

In remote control, use the commands described in [Chapter 14.12, "Running Selftests"](#), on page 384.

## 16.4 Collecting Information for Technical Support

If you encounter problems that you cannot solve yourself, contact your Rohde & Schwarz support center, see [Chapter 16.5, "Contacting Customer Support"](#), on page 496. Our support center staff is optimally trained to assist you in solving problems.

The support center finds solutions more quickly and efficiently if you provide them with information on the instrument and an error description.

### Obtaining information from the R&S NRX firmware

1. Select [System] > "Test".
2. Create and save the information for troubleshooting. See ["Creating information for troubleshooting"](#) on page 167.

Attach the archive file to an email in which you describe the problem.

## 16.5 Contacting Customer Support

### Technical support – where and when you need it

For quick, expert help with any Rohde & Schwarz product, contact our customer support center. A team of highly qualified engineers provides support and works with you to find a solution to your query on any aspect of the operation, programming or applications of Rohde & Schwarz products.

### Contact information

Contact our customer support center at [www.rohde-schwarz.com/support](http://www.rohde-schwarz.com/support), or follow this QR code:



*Figure 16-1: QR code to the Rohde & Schwarz support page*



## 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

[SENSe<Sensor>:][POWer:][AVG:]APERTure[:VALue].....	437
[SENSe<Sensor>:][POWer:][AVG:]BUFFer:CLEar.....	274
[SENSe<Sensor>:][POWer:][AVG:]BUFFer:COUNT?.....	274
[SENSe<Sensor>:][POWer:][AVG:]BUFFer:INFO?.....	274
[SENSe<Sensor>:][POWer:][AVG:]BUFFer:SIZE.....	275
[SENSe<Sensor>:][POWer:][AVG:]BUFFer:STATE.....	275
[SENSe<Sensor>:][POWer:][AVG:]SMOothing:STATE.....	437
[SENSe<Sensor>:][POWer:]BURSt:DTOLerance.....	438
[SENSe<Sensor>:][POWer:]NCORrection[:STATE].....	438
[SENSe<Sensor>:][POWer:]TGATe:SELect.....	438
[SENSe<Sensor>:][POWer:]TGATe[:EXCLude]:MID[:STATE].....	440
[SENSe<Sensor>:][POWer:]TGATe<Gate>:OFFSet:TIME.....	439
[SENSe<Sensor>:][POWer:]TGATe<Gate>:TIME.....	439
[SENSe<Sensor>:][POWer:]TGATe<Gate>[:EXCLude]:MID:OFFSet[:TIME].....	439
[SENSe<Sensor>:][POWer:]TGATe<Gate>[:EXCLude]:MID:TIME.....	440
[SENSe<Sensor>:][POWer:]TSLot[:AVG]:COUNT.....	440
[SENSe<Sensor>:][POWer:]TSLot[:AVG]:WIDTh.....	441
[SENSe<Sensor>:][POWer:]TSLot[:AVG][:EXCLude]:MID:OFFSet[:TIME].....	441
[SENSe<Sensor>:][POWer:]TSLot[:AVG][:EXCLude]:MID:TIME.....	441
[SENSe<Sensor>:][POWer:]TSLot[:AVG][:EXCLude]:MID[:STATE].....	441
[SENSe<Sensor>:]ADD.....	403
[SENSe<Sensor>:]AUXiliary.....	270
[SENSe<Sensor>:]AVERAge:COUNT:AUTO:MTIME.....	428
[SENSe<Sensor>:]AVERAge:COUNT:AUTO:NSRatio.....	428
[SENSe<Sensor>:]AVERAge:COUNT:AUTO:RESolution.....	336
[SENSe<Sensor>:]AVERAge:COUNT:AUTO:SLOT.....	429
[SENSe<Sensor>:]AVERAge:COUNT:AUTO:TYPE.....	429
[SENSe<Sensor>:]AVERAge:COUNT:AUTO[:STATE].....	429
[SENSe<Sensor>:]AVERAge:COUNT:ENUM.....	430
[SENSe<Sensor>:]AVERAge:COUNT[:VALue].....	430
[SENSe<Sensor>:]AVERAge:RESet.....	336
[SENSe<Sensor>:]AVERAge:TCONtrol.....	430
[SENSe<Sensor>:]AVERAge:TYPE.....	431
[SENSe<Sensor>:]AVERAge[:STATE].....	431
[SENSe<Sensor>:]BANDwidth:VIDeo.....	431
[SENSe<Sensor>:]BANDwidth:VIDeo:FNUMber.....	371
[SENSe<Sensor>:]BANDwidth:VIDeo:LIST?.....	276
[SENSe<Sensor>:]BANDwidth[:RESolution]:TYPE:AUTO[:STATE].....	360
[SENSe<Sensor>:]BANDwidth[:RESolution]:TYPE[:VALue].....	360
[SENSe<Sensor>:]BANDwidth[:RESolution][:VALue].....	361
[SENSe<Sensor>:]BURSt:MODE.....	432
[SENSe<Sensor>:]BURSt:PERiod.....	432
[SENSe<Sensor>:]BURSt:WIDTh.....	432
[SENSe<Sensor>:]BWIDth:VIDeo.....	432
[SENSe<Sensor>:]BWIDth:VIDeo:FNUMber.....	371
[SENSe<Sensor>:]BWIDth:VIDeo:LIST?.....	276
[SENSe<Sensor>:]CATalog?.....	270

[SENSe<Sensor>:]CORRection:DCYClE:STATe.....	433
[SENSe<Sensor>:]CORRection:DCYClE[:INPut][:MAGNitude].....	433
[SENSe<Sensor>:]CORRection:DCYClE:VALue.....	433
[SENSe<Sensor>:]CORRection:FDOFFset[:INPut][:MAGNitude]?.....	434
[SENSe<Sensor>:]CORRection:FDOTable:STATe.....	434
[SENSe<Sensor>:]CORRection:FDOTable[:SElect].....	434
[SENSe<Sensor>:]CORRection:OFFSet:STATe.....	434
[SENSe<Sensor>:]CORRection:OFFSet[:VALue].....	435
[SENSe<Sensor>:]CORRection:SPDevice:LIST?.....	331
[SENSe<Sensor>:]CORRection:SPDevice:SElect.....	331
[SENSe<Sensor>:]CORRection:SPDevice:STATe.....	331
[SENSe<Sensor>:]DATA?.....	435
[SENSe<Sensor>:]DM:STANdard.....	366
[SENSe<Sensor>:]DM:STATe.....	365
[SENSe<Sensor>:]DM:WCDMa:CRATe.....	435
[SENSe<Sensor>:]FREQuency:FIXed.....	325
[SENSe<Sensor>:]FREQuency:TRACk.....	325
[SENSe<Sensor>:]FREQuency[:CW].....	325
[SENSe<Sensor>:]FUNCTion:CONCurrenT.....	318
[SENSe<Sensor>:]FUNCTion:OFF:ALL<Channel>.....	318
[SENSe<Sensor>:]FUNCTion:OFF[:FUNC].....	318
[SENSe<Sensor>:]FUNCTion:STATe?.....	319
[SENSe<Sensor>:]FUNCTion[:ON].....	436
[SENSe<Sensor>:]INFormAtion?.....	436
[SENSe<Sensor>:]INPut:ATTenuATion:AUTO.....	436
[SENSe<Sensor>:]INPut:ATTenuATion[:VALue].....	437
[SENSe<Sensor>:]INTerMAl:TRIGger:JITTer:METHod.....	437
[SENSe<Sensor>:]POWer:CCDFunctioN:REFerence.....	442
[SENSe<Sensor>:]POWer:PEP:HOLD.....	442
[SENSe<Sensor>:]POWer:REFerence.....	273
[SENSe<Sensor>:]POWer:REFlectioN:RANGe:AUTO.....	319
[SENSe<Sensor>:]POWer:REFlectioN:RANGe:LIMit:DETECT.....	319
[SENSe<Sensor>:]POWer:REFlectioN:RANGe:LIMit[:STATe].....	320
[SENSe<Sensor>:]POWer:REFlectioN:RANGe:LOWer.....	320
[SENSe<Sensor>:]POWer:REFlectioN:RANGe[:UPPer].....	320
[SENSe<Sensor>:]POWer[:POWer]:RANGe:AUTO.....	319
[SENSe<Sensor>:]POWer[:POWer]:RANGe:LIMit:DETECT.....	319
[SENSe<Sensor>:]POWer[:POWer]:RANGe:LIMit[:STATe].....	320
[SENSe<Sensor>:]POWer[:POWer]:RANGe:LOWer.....	320
[SENSe<Sensor>:]POWer[:POWer]:RANGe[:UPPer].....	320
[SENSe<Sensor>:]RANGe:AUTO.....	442
[SENSe<Sensor>:]RANGe:CLEVel.....	443
[SENSe<Sensor>:]RANGe[:VALue].....	443
[SENSe<Sensor>:]RGAMma:PHASe.....	332
[SENSe<Sensor>:]RGAMma[:MAGNitude].....	332
[SENSe<Sensor>:]ROSCillator:REFio:FREQuency.....	443
[SENSe<Sensor>:]ROSCillator:REFio:OUTPut[:STATe].....	444
[SENSe<Sensor>:]ROSCillator:SOURce.....	444
[SENSe<Sensor>:]RRRESolutioN.....	321
[SENSe<Sensor>:]SAMPLing.....	444

[SENSe<Sensor>:]SGAMma:CORRection:STATe.....	445
[SENSe<Sensor>:]SGAMma:PHASe.....	445
[SENSe<Sensor>:]SGAMma[MAGNitude].....	445
[SENSe<Sensor>:]STATistics:AVERage?.....	305
[SENSe<Sensor>:]STATistics:OFFSet[:TIME].....	306
[SENSe<Sensor>:]STATistics:PEAK?.....	306
[SENSe<Sensor>:]STATistics:SAMPles[:MINimum].....	445
[SENSe<Sensor>:]STATistics:SCALe:X:MPWidth?.....	308
[SENSe<Sensor>:]STATistics:SCALe:X:POINts.....	446
[SENSe<Sensor>:]STATistics:SCALe:X:RANGe.....	446
[SENSe<Sensor>:]STATistics:SCALe:X:RLEVel.....	446
[SENSe<Sensor>:]STATistics:TIME.....	447
[SENSe<Sensor>:]STATistics[:EXCLude]:MID:OFFSet[:TIME].....	447
[SENSe<Sensor>:]STATistics[:EXCLude]:MID:TIME.....	447
[SENSe<Sensor>:]TIMing:EXCLude:START.....	448
[SENSe<Sensor>:]TIMing:EXCLude:STOP.....	448
[SENSe<Sensor>:]TRACe:AVERage:COUNT.....	448
[SENSe<Sensor>:]TRACe:AVERage:TCONtrol.....	449
[SENSe<Sensor>:]TRACe:AVERage[:STATe].....	449
[SENSe<Sensor>:]TRACe:ESAMpling:AUTO.....	449
[SENSe<Sensor>:]TRACe:MEASurement:ALGorithm.....	449
[SENSe<Sensor>:]TRACe:MEASurement:AUTO[:STATe].....	285
[SENSe<Sensor>:]TRACe:MEASurement:DEFine:DURation:REFerence.....	450
[SENSe<Sensor>:]TRACe:MEASurement:DEFine:TRANSition:HREFerence.....	450
[SENSe<Sensor>:]TRACe:MEASurement:DEFine:TRANSition:LREFerence.....	450
[SENSe<Sensor>:]TRACe:MEASurement:OFFSet:TIME.....	286
[SENSe<Sensor>:]TRACe:MEASurement:POWer:AVG?.....	451
[SENSe<Sensor>:]TRACe:MEASurement:POWer:HREFerence?.....	451
[SENSe<Sensor>:]TRACe:MEASurement:POWer:LREFerence?.....	451
[SENSe<Sensor>:]TRACe:MEASurement:POWer:MAX?.....	452
[SENSe<Sensor>:]TRACe:MEASurement:POWer:MIN?.....	452
[SENSe<Sensor>:]TRACe:MEASurement:POWer:PULSe:BASE?.....	452
[SENSe<Sensor>:]TRACe:MEASurement:POWer:PULSe:TOP?.....	453
[SENSe<Sensor>:]TRACe:MEASurement:POWer:REFerence?.....	453
[SENSe<Sensor>:]TRACe:MEASurement:PULSe:DCYCLE?.....	453
[SENSe<Sensor>:]TRACe:MEASurement:PULSe:DURation?.....	453
[SENSe<Sensor>:]TRACe:MEASurement:PULSe:PERiod?.....	454
[SENSe<Sensor>:]TRACe:MEASurement:PULSe:SEPAration?.....	454
[SENSe<Sensor>:]TRACe:MEASurement:TRANSition:ESAMpling:AUTO[:STATe].....	454
[SENSe<Sensor>:]TRACe:MEASurement:TRANSition:NEGative:DURation?.....	454
[SENSe<Sensor>:]TRACe:MEASurement:TRANSition:NEGative:OCCurrence?.....	455
[SENSe<Sensor>:]TRACe:MEASurement:TRANSition:NEGative:OVERshoot?.....	455
[SENSe<Sensor>:]TRACe:MEASurement:TRANSition:POSitive:DURation?.....	455
[SENSe<Sensor>:]TRACe:MEASurement:TRANSition:POSitive:OCCurrence?.....	455
[SENSe<Sensor>:]TRACe:MEASurement:TRANSition:POSitive:OVERshoot?.....	456
[SENSe<Sensor>:]TRACe:MEASurement:TRANSition:SPERiod?.....	456
[SENSe<Sensor>:]TRACe:MEASurement[:STATe].....	285
[SENSe<Sensor>:]TRACe:MID:OFFSet:TIME.....	286
[SENSe<Sensor>:]TRACe:MID:TIME.....	286
[SENSe<Sensor>:]TRACe:OFFSet:TIME.....	244

[SENSe<Sensor>:]TRACe:POINts.....	456
[SENSe<Sensor>:]TRACe:REALtime.....	276
[SENSe<Sensor>:]TRACe:TIME.....	245
[SENSe<Sensor>:]UNIT:POWer[:VALue].....	245
*CLS.....	179
*DEV.....	180
*DMC.....	180
*EMC.....	180
*ESE.....	180
*ESR?.....	180
*GCLS.....	181
*GMC?.....	181
*GOPC?.....	181
*GWAI.....	181
*IDN?.....	181
*IST?.....	181
*LMC?.....	182
*OPC.....	182
*OPT?.....	182
*PMC.....	182
*PRE.....	182
*PSC.....	183
*RCL.....	183
*RMC.....	183
*RST.....	183
*SAV.....	183
*SRE.....	184
*SRQ?.....	184
*STB?.....	184
*TRG.....	184
*TST?.....	184
*WAI.....	185
*XESE.....	185
*XESR?.....	185
*XPRES.....	185
*XSRE.....	185
*XSTB?.....	186
&ABO.....	178
&DFC.....	178
&GET.....	179
&GTL.....	179
&GTM.....	179
&GTR.....	179
&HFC.....	179
&LLO.....	179
&NREN.....	179
ABORt<Measurement>.....	222
ABORt<undef>:ALL.....	222
CALCulate<Measurement>:AVALue.....	226
CALCulate<Measurement>:COUNT:DATA?.....	321

CALCulate<Measurement>:DATA?	322
CALCulate<Measurement>:DMODE	226
CALCulate<Measurement>:EXTRemes:RESet	227
CALCulate<Measurement>:HOLD:FUNCTion	227
CALCulate<Measurement>:HOLD[:STATe]	228
CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer:STATe	253
CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer[:DATA]	249
CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer[:DATA]:CCDF	250
CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer[:DATA]:POWER	252
CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer[:DATA]:RATio:RCOefficient	250
CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer[:DATA]:RATio:RFRatio	251
CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer[:DATA]:RATio:RLOSs	251
CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer[:DATA]:RATio:SWR	251
CALCulate<Measurement>:LIMit<DirectionalChannel>:LOWer[:DATA]:RATio[:VALue]	252
CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer:STATe	256
CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer[:DATA]	253
CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer[:DATA]:CCDF	253
CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer[:DATA]:POWER	256
CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer[:DATA]:RATio:RCOefficient	254
CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer[:DATA]:RATio:RFRatio	254
CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer[:DATA]:RATio:RLOSs	254
CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer[:DATA]:RATio:SWR	255
CALCulate<Measurement>:LIMit<DirectionalChannel>:UPPer[:DATA]:RATio[:VALue]	255
CALCulate<Measurement>:LIMit<undef>:BEEP[:STATe]	417
CALCulate<Measurement>:LIMit<undef>:CLEar:AUTO	248
CALCulate<Measurement>:LIMit<undef>:CLEar[:IMMEDIATE]	248
CALCulate<Measurement>:LIMit<undef>:FAIL?	249
CALCulate<Measurement>:LIMit<undef>:FCOunt?	249
CALCulate<Measurement>:LIMit<undef>:TYPE	228
CALCulate<Measurement>:LIMit<undef>[:STATe]	228
CALCulate<Measurement>:MATH[:EXPReSSion]	323
CALCulate<Measurement>:MATH[:EXPReSSion]:CATalog?	324
CALCulate<Measurement>:MAXimum:DATA?	322
CALCulate<Measurement>:MEAN:DATA?	322
CALCulate<Measurement>:METer<DirectionalChannel>:LOWer[:DATA]:CCDF	233
CALCulate<Measurement>:METer<DirectionalChannel>:LOWer[:DATA]:RATio:RCOefficient	233
CALCulate<Measurement>:METer<DirectionalChannel>:LOWer[:DATA]:RATio:RFRatio	234
CALCulate<Measurement>:METer<DirectionalChannel>:LOWer[:DATA]:RATio:RLOSs	234
CALCulate<Measurement>:METer<DirectionalChannel>:LOWer[:DATA]:RATio:SWR	235
CALCulate<Measurement>:METer<DirectionalChannel>:LOWer[:DATA]:RATio[:VALue]	235
CALCulate<Measurement>:METer<DirectionalChannel>:LOWer[:DATA][:POWER]	235
CALCulate<Measurement>:METer<DirectionalChannel>:UPPer[:DATA]:CCDF	236
CALCulate<Measurement>:METer<DirectionalChannel>:UPPer[:DATA]:RATio:RCOefficient	236
CALCulate<Measurement>:METer<DirectionalChannel>:UPPer[:DATA]:RATio:RFRatio	237
CALCulate<Measurement>:METer<DirectionalChannel>:UPPer[:DATA]:RATio:RLOSs	237
CALCulate<Measurement>:METer<DirectionalChannel>:UPPer[:DATA]:RATio:SWR	238
CALCulate<Measurement>:METer<DirectionalChannel>:UPPer[:DATA]:RATio[:VALue]	238
CALCulate<Measurement>:METer<DirectionalChannel>:UPPer[:DATA][:POWER]	238
CALCulate<Measurement>:MINimum:DATA?	322
CALCulate<Measurement>:PTPeak:DATA?	322

CALCulate<Measurement>:RELative<DirectionalChannel>:CCDF.....	315
CALCulate<Measurement>:RELative<DirectionalChannel>:POWer[:MAGNitude].....	315
CALCulate<Measurement>:RELative<DirectionalChannel>:RATio:RCoefficient.....	316
CALCulate<Measurement>:RELative<DirectionalChannel>:RATio:RFRatio.....	316
CALCulate<Measurement>:RELative<DirectionalChannel>:RATio:RLOSSs.....	316
CALCulate<Measurement>:RELative<DirectionalChannel>:RATio:SWR.....	317
CALCulate<Measurement>:RELative<DirectionalChannel>:RATio[:MAGNitude].....	317
CALCulate<Measurement>:RELative<DirectionalChannel>:STATe.....	272
CALCulate<Measurement>:RELative<DirectionalChannel>[:MAGNitude].....	272
CALCulate<Measurement>:RELative<DirectionalChannel>[:MAGNitude]:AUTO.....	272
CALCulate<Measurement>:RESolution.....	229
CALCulate<Measurement>:SDEViation:DATA?.....	322
CALCulate<Measurement>:STATistics:APERture.....	307
CALCulate<Measurement>:STATistics:AWGN[:STATe].....	307
CALCulate<Measurement>:STATistics:MARKer:HORizontal:DATA?.....	312
CALCulate<Measurement>:STATistics:MARKer:HORizontal:POSition[:X][:POWer].....	418
CALCulate<Measurement>:STATistics:MARKer:VERTical:DATA[:POWer]?.....	313
CALCulate<Measurement>:STATistics:MARKer:VERTical:POSition[:Y].....	418
CALCulate<Measurement>:STATistics:MARKer:X:POSition:RELative.....	313
CALCulate<Measurement>:STATistics:MARKer:X:POSition[:ABSolute].....	313
CALCulate<Measurement>:STATistics:PDF:MARKer:Y:POSition.....	314
CALCulate<Measurement>:STATistics:PDF[:SCALE]:Y:PDIVision.....	308
CALCulate<Measurement>:STATistics:PDF[:SCALE]:Y:TOP.....	309
CALCulate<Measurement>:STATistics:POWer:AVG:DATA?.....	306
CALCulate<Measurement>:STATistics:SAMPles[:MINimum].....	307
CALCulate<Measurement>:STATistics:TGATe:SElection.....	307
CALCulate<Measurement>:STATistics[:CDF]:MARKer:Y:POSition.....	312
CALCulate<Measurement>:STATistics[:CDF][:SCALE]:Y[:LINear]:PDIVision.....	309
CALCulate<Measurement>:STATistics[:CDF][:SCALE]:Y[:LINear]:TOP.....	309
CALCulate<Measurement>:STATistics[:SCALE]:X:MODE.....	310
CALCulate<Measurement>:STATistics[:SCALE]:X:POINTS.....	310
CALCulate<Measurement>:STATistics[:SCALE]:X:RANGE.....	311
CALCulate<Measurement>:STATistics[:SCALE]:X:RLEVel:RELative.....	311
CALCulate<Measurement>:STATistics[:SCALE]:X:RLEVel[:ABSolute].....	311
CALCulate<Measurement>:STATistics[:SCALE]:Y:SPACing.....	312
CALCulate<Measurement>:TRACe:MARKer<Marker>:XDELta?.....	277
CALCulate<Measurement>:TRACe:MARKer<Marker>:XPOSition.....	418
CALCulate<Measurement>:TRACe:MARKer<Marker>:YDELta?.....	277
CALCulate<Measurement>:TRACe:MARKer<Marker>:YPOSition?.....	278
CALCulate<Measurement>:TRACe:MEASurement:ALGorithm.....	287
CALCulate<Measurement>:TRACe:MEASurement:DEFine:DURation:REFerence.....	287
CALCulate<Measurement>:TRACe:MEASurement:DEFine:TRANSition:HREFerence.....	287
CALCulate<Measurement>:TRACe:MEASurement:DEFine:TRANSition:LREFerence.....	288
CALCulate<Measurement>:TRACe:MEASurement:POWer:AVG?.....	288
CALCulate<Measurement>:TRACe:MEASurement:POWer:HREFerence?.....	288
CALCulate<Measurement>:TRACe:MEASurement:POWer:LREFerence?.....	289
CALCulate<Measurement>:TRACe:MEASurement:POWer:MAX?.....	289
CALCulate<Measurement>:TRACe:MEASurement:POWer:MIN?.....	289
CALCulate<Measurement>:TRACe:MEASurement:POWer:PULSe:BASE?.....	289
CALCulate<Measurement>:TRACe:MEASurement:POWer:PULSe:TOP?.....	290



CALCulate<Measurement>:TRACe:MEASurement:POWer:REFerence?	290
CALCulate<Measurement>:TRACe:MEASurement:PULSe:DCYClE?	290
CALCulate<Measurement>:TRACe:MEASurement:PULSe:DURation?	290
CALCulate<Measurement>:TRACe:MEASurement:PULSe:PERiod?	291
CALCulate<Measurement>:TRACe:MEASurement:PULSe:SEPAratIon?	291
CALCulate<Measurement>:TRACe:MEASurement:TRANsition:ESAMplIng:AUTO[:STATe]	330
CALCulate<Measurement>:TRACe:MEASurement:TRANsition:NEGAtive:DURation?	291
CALCulate<Measurement>:TRACe:MEASurement:TRANsition:NEGAtive:OCCurrence?	292
CALCulate<Measurement>:TRACe:MEASurement:TRANsition:NEGAtive:OVERshoot?	292
CALCulate<Measurement>:TRACe:MEASurement:TRANsition:POSitive:DURation?	292
CALCulate<Measurement>:TRACe:MEASurement:TRANsition:POSitive:OCCurrence?	293
CALCulate<Measurement>:TRACe:MEASurement:TRANsition:POSitive:OVERshoot?	293
CALCulate<Measurement>:TRACe:MEASurement:TRANsition:SPERiod?	293
CALCulate<Measurement>:TRACe:X:POINts	276
CALCulate<Measurement>:TRACe:X[:SCALe]:LEFT	239
CALCulate<Measurement>:TRACe:X[:SCALe]:LENGth	239
CALCulate<Measurement>:TRACe:Y[:SCALe]:SPAN:DB	239
CALCulate<Measurement>:TRACe:Y[:SCALe]:SPAN:DBM	240
CALCulate<Measurement>:TRACe:Y[:SCALe]:SPAN:DBUV	240
CALCulate<Measurement>:TRACe:Y[:SCALe]:SPAN:DPCT	240
CALCulate<Measurement>:TRACe:Y[:SCALe]:SPAN:ONE	241
CALCulate<Measurement>:TRACe:Y[:SCALe]:SPAN:WATT	241
CALCulate<Measurement>:TRACe:Y[:SCALe]:TOP:DB	241
CALCulate<Measurement>:TRACe:Y[:SCALe]:TOP:DBM	242
CALCulate<Measurement>:TRACe:Y[:SCALe]:TOP:DBUV	242
CALCulate<Measurement>:TRACe:Y[:SCALe]:TOP:DPCT	242
CALCulate<Measurement>:TRACe:Y[:SCALe]:TOP:ONE	243
CALCulate<Measurement>:TRACe:Y[:SCALe]:TOP:WATT	243
CALCulate<Measurement>:TSLot:TIMing:EXCLude:STARt	303
CALCulate<Measurement>:TSLot:TIMing:EXCLude:STOP	303
CALCulate<Measurement>:TYPE	269
CALCulate<Measurement>[:CHANnel<Channel>]:AVERAge:COUNT:AUTO:MTIME	337
CALCulate<Measurement>[:CHANnel<Channel>]:AVERAge:COUNT:AUTO:NSRatio	337
CALCulate<Measurement>[:CHANnel<Channel>]:AVERAge:COUNT:AUTO:SLOT	337
CALCulate<Measurement>[:CHANnel<Channel>]:AVERAge:COUNT:AUTO:TYPE	338
CALCulate<Measurement>[:CHANnel<Channel>]:AVERAge:COUNT:AUTO[:STATe]	368
CALCulate<Measurement>[:CHANnel<Channel>]:AVERAge:COUNT:ENUM	369
CALCulate<Measurement>[:CHANnel<Channel>]:AVERAge:COUNT[:VALue]	369
CALCulate<Measurement>[:CHANnel<Channel>]:AVERAge:TCONtrol:AUTO	338
CALCulate<Measurement>[:CHANnel<Channel>]:AVERAge:TCONtrol[:ENUM]	339
CALCulate<Measurement>[:CHANnel<Channel>]:AVERAge:TYPE	340
CALCulate<Measurement>[:CHANnel<Channel>]:AVERAge[:STATe]	340
CALCulate<Measurement>[:CHANnel<Channel>]:BURSt:TIMing:EXCLude:STARt	326
CALCulate<Measurement>[:CHANnel<Channel>]:BURSt:TIMing:EXCLude:STOP	327
CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:DCYClE:STATe	327
CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:DCYClE[:VALue]	327
CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:OFFSet:RPLane	366
CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:OFFSet:STATe	332
CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:OFFSet:TABLE:INDEX	333
CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:OFFSet:TABLE[:STATe]	333

CALCulate<Measurement>[:CHANnel<Channel>]:CORRection:OFFSet[:MAGNitude].....	334
CALCulate<Measurement>[:CHANnel<Channel>]:FEED<Channel>.....	267
CALCulate<Measurement>[:CHANnel<Channel>]:INPut:ATTenuation:AUTO.....	343
CALCulate<Measurement>[:CHANnel<Channel>]:INPut:ATTenuation[:VALue].....	344
CALCulate<Measurement>[:CHANnel<Channel>]:NRT:APERture:MODE.....	369
CALCulate<Measurement>[:CHANnel<Channel>]:NRT:APERture[:VALue].....	370
CALCulate<Measurement>[:CHANnel<Channel>]:NRT:BURSt:MODE.....	362
CALCulate<Measurement>[:CHANnel<Channel>]:NRT:BURSt:PERiod.....	362
CALCulate<Measurement>[:CHANnel<Channel>]:NRT:BURSt:WIDTh.....	363
CALCulate<Measurement>[:CHANnel<Channel>]:NRT:CCDF:THReshold.....	363
CALCulate<Measurement>[:CHANnel<Channel>]:NRT:DIRRection.....	363
CALCulate<Measurement>[:CHANnel<Channel>]:NRT:DMODulation:WCDMa:CRATe.....	367
CALCulate<Measurement>[:CHANnel<Channel>]:NRT:DMODulation[:VALue].....	366
CALCulate<Measurement>[:CHANnel<Channel>]:NRT:PEP:HOLD:TIME.....	364
CALCulate<Measurement>[:CHANnel<Channel>]:NRT:VBWidTh[:VALue].....	370
CALCulate<Measurement>[:CHANnel<Channel>]:ROSCillator:REFio:FREQUency.....	359
CALCulate<Measurement>[:CHANnel<Channel>]:ROSCillator:REFio:OUTPut[:STATe].....	359
CALCulate<Measurement>[:CHANnel<Channel>]:ROSCillator:SOURce.....	360
CALCulate<Measurement>[:CHANnel<Channel>]:SAMPLing.....	328
CALCulate<Measurement>[:CHANnel<Channel>]:SENSe:INDeX.....	271
CALCulate<Measurement>[:CHANnel<Channel>]:SGAMma:CORRection:STATe.....	334
CALCulate<Measurement>[:CHANnel<Channel>]:SGAMma:PHASe.....	334
CALCulate<Measurement>[:CHANnel<Channel>]:SGAMma[:MAGNitude].....	335
CALCulate<Measurement>[:CHANnel<Channel>]:TRACe:AVERage:COUNT[:VALue].....	340
CALCulate<Measurement>[:CHANnel<Channel>]:TRACe:AVERage:TCONtrol:AUTO.....	341
CALCulate<Measurement>[:CHANnel<Channel>]:TRACe:AVERage:TCONtrol[:ENUM].....	341
CALCulate<Measurement>[:CHANnel<Channel>]:TRACe:AVERage[:STATe].....	342
CALCulate<Measurement>[:CHANnel<Channel>]:TRACe:ESAMPLing.....	328
CALCulate<Measurement>[:CHANnel<Channel>][:POWER]:BURSt:DTOLerance.....	329
CALCulate<Measurement>[:CHANnel<Channel>][:POWER]:NCORRection[:STATe].....	342
CALCulate<Measurement>[:CHANnel<Channel>][:POWER]:VBWidTh:ENUM.....	343
CALCulate<Measurement>[:CHANnel<Channel>][:POWER][:AVG]:APERture[:VALue].....	329
CALCulate<Measurement>[:CHANnel<Channel>][:POWER][:AVG]:RANGe:AUTO.....	344
CALCulate<Measurement>[:CHANnel<Channel>][:POWER][:AVG]:RANGe:CLEVel:STATe.....	345
CALCulate<Measurement>[:CHANnel<Channel>][:POWER][:AVG]:RANGe:CLEVel[:VALue].....	345
CALCulate<Measurement>[:CHANnel<Channel>][:POWER][:AVG]:RANGe[:VALue].....	345
CALCulate<Measurement>[:CHANnel<Channel>][:POWER][:AVG]:SMOothing[:STATe].....	330
CALCulate<Measurement>[:POWER]:TGATe<Gate>[:AVG]:OFFSet[:TIME].....	300
CALCulate<Measurement>[:POWER]:TGATe<Gate>[:AVG]:TIME.....	301
CALCulate<Measurement>[:POWER]:TGATe<Gate>[:AVG][:EXCLude]:MID:OFFSet[:TIME].....	301
CALCulate<Measurement>[:POWER]:TGATe<Gate>[:AVG][:EXCLude]:MID:TIME.....	301
CALCulate<Measurement>[:POWER]:TGATe<Gate>[:AVG][:EXCLude]:MID[:STATe].....	302
CALCulate<Measurement>[:POWER]:TGATe<Undef>[:AVG]:SELection.....	302
CALCulate<Measurement>[:POWER]:TSLot[:AVG]:COUNT.....	303
CALCulate<Measurement>[:POWER]:TSLot[:AVG]:SELection.....	304
CALCulate<Measurement>[:POWER]:TSLot[:AVG]:WIDTh.....	304
CALCulate<Measurement>[:POWER]:TSLot[:AVG][:EXCLude]:MID:OFFSet[:TIME].....	304
CALCulate<Measurement>[:POWER]:TSLot[:AVG][:EXCLude]:MID:TIME.....	304
CALCulate<Measurement>[:POWER]:TSLot[:AVG][:EXCLude]:MID[:STATe].....	305
CALibration<Sensor>:TEST:DEVIation?.....	384

CALibration<Sensor>:TEST:REFerence?.....	385
CALibration<Sensor>:TEST?.....	384
CALibration<Sensor>:ZERO.....	382
CALibration<Sensor>:ZERO:AUTO.....	382
CALibration<Sensor>:ZERO:FAST:AUTO.....	383
CALibration<undef>:ALL:ZERO:AUTO.....	383
CALibration<undef>:ALL:ZERO:FAST:AUTO.....	383
CONFigure<Measurement>:ARRay[:POWer][:AVG]:DIFFerence:RELative?.....	196
CONFigure<Measurement>:ARRay[:POWer][:AVG]:DIFFerence?.....	195
CONFigure<Measurement>:ARRay[:POWer][:AVG]:RATio:RELative?.....	197
CONFigure<Measurement>:ARRay[:POWer][:AVG]:RATio?.....	196
CONFigure<Measurement>:ARRay[:POWer][:AVG]:REFLection?.....	197
CONFigure<Measurement>:ARRay[:POWer][:AVG]:RELative?.....	198
CONFigure<Measurement>:ARRay[:POWer][:AVG]:RLOSSs?.....	198
CONFigure<Measurement>:ARRay[:POWer][:AVG]:SUM:RELative?.....	200
CONFigure<Measurement>:ARRay[:POWer][:AVG]:SUM?.....	199
CONFigure<Measurement>:ARRay[:POWer][:AVG]:SWR?.....	200
CONFigure<Measurement>:ARRay[:POWer][:AVG]?.....	194
CONFigure<Measurement>:STATistics:CCDF?.....	221
CONFigure<Measurement>:STATistics:PDF?.....	221
CONFigure<Measurement>:XTIMe[:POWer]:NONE.....	202
CONFigure<Measurement>:XTIMe[:POWer]:RATio?.....	202
CONFigure<Measurement>:XTIMe[:POWer]?.....	201
CONFigure<Measurement>[:SCALar][:POWer]:BURSt:DIFFerence:RELative?.....	205
CONFigure<Measurement>[:SCALar][:POWer]:BURSt:DIFFerence?.....	205
CONFigure<Measurement>[:SCALar][:POWer]:BURSt:RATio:RELative?.....	208
CONFigure<Measurement>[:SCALar][:POWer]:BURSt:RATio?.....	207
CONFigure<Measurement>[:SCALar][:POWer]:BURSt:REFLection?.....	210
CONFigure<Measurement>[:SCALar][:POWer]:BURSt:RELative?.....	204
CONFigure<Measurement>[:SCALar][:POWer]:BURSt:RLOSSs?.....	210
CONFigure<Measurement>[:SCALar][:POWer]:BURSt:SUM:RELative?.....	207
CONFigure<Measurement>[:SCALar][:POWer]:BURSt:SUM?.....	206
CONFigure<Measurement>[:SCALar][:POWer]:BURSt:SWR?.....	209
CONFigure<Measurement>[:SCALar][:POWer]:BURSt?.....	203
CONFigure<Measurement>[:SCALar][:POWer]:TSLot:DIFFerence:RELative?.....	214
CONFigure<Measurement>[:SCALar][:POWer]:TSLot:DIFFerence?.....	213
CONFigure<Measurement>[:SCALar][:POWer]:TSLot:RATio:RELative?.....	217
CONFigure<Measurement>[:SCALar][:POWer]:TSLot:RATio?.....	216
CONFigure<Measurement>[:SCALar][:POWer]:TSLot:REFLection?.....	219
CONFigure<Measurement>[:SCALar][:POWer]:TSLot:RELative?.....	213
CONFigure<Measurement>[:SCALar][:POWer]:TSLot:RLOSSs?.....	219
CONFigure<Measurement>[:SCALar][:POWer]:TSLot:SUM:RELative?.....	216
CONFigure<Measurement>[:SCALar][:POWer]:TSLot:SUM?.....	215
CONFigure<Measurement>[:SCALar][:POWer]:TSLot:SWR?.....	218
CONFigure<Measurement>[:SCALar][:POWer]:TSLot?.....	212
CONFigure<Measurement>[:SCALar][:POWer][:AVG]:DIFFerence:RELative?.....	190
CONFigure<Measurement>[:SCALar][:POWer][:AVG]:DIFFerence?.....	189
CONFigure<Measurement>[:SCALar][:POWer][:AVG]:RATio:RELative?.....	192
CONFigure<Measurement>[:SCALar][:POWer][:AVG]:RATio?.....	191
CONFigure<Measurement>[:SCALar][:POWer][:AVG]:REFLection?.....	193

CONFigure<Measurement>[:SCALar][:POWer][:AVG]:RELative?.....	189
CONFigure<Measurement>[:SCALar][:POWer][:AVG]:RLOSs?.....	193
CONFigure<Measurement>[:SCALar][:POWer][:AVG]:SUM:RELative?.....	191
CONFigure<Measurement>[:SCALar][:POWer][:AVG]:SUM?.....	190
CONFigure<Measurement>[:SCALar][:POWer][:AVG]:SWR?.....	192
CONFigure<Measurement>[:SCALar][:POWer][:AVG]?.....	188
DIAGnostic:INFO:OTIME?.....	385
DISPlay:BRIGthness.....	229
DISPlay:ERRorlist.....	229
DISPlay:ILLumination.....	419
DISPlay:LAYout.....	230
DISPlay:MESSage:TEXT:CLEar.....	230
DISPlay:MESSage:TEXT[:DATA].....	230
DISPlay:MESSage:TYPE.....	230
DISPlay:MESSage[:STATe].....	230
DISPlay:OVERload[:STATe].....	231
DISPlay:PIXMap?.....	231
DISPlay:UPDate.....	231
DISPlay[:WINDow<Undef>]:SELect.....	419
DISPlay[:WINDow<Undef>]:SIZE.....	419
DISPlay[:WINDow<Window>]:ANALog:AUTO.....	243
DISPlay[:WINDow<Window>]:ANALog:LOWer.....	244
DISPlay[:WINDow<Window>]:ANALog:LOWer:POWer.....	420
DISPlay[:WINDow<Window>]:ANALog:LOWer:RATio.....	420
DISPlay[:WINDow<Window>]:ANALog:UPPer.....	244
DISPlay[:WINDow<Window>]:ANALog:UPPer:POWer.....	420
DISPlay[:WINDow<Window>]:ANALog:UPPer:RATio.....	420
DISPlay[:WINDow<Window>]:AVALue.....	421
DISPlay[:WINDow<Window>]:FORMat.....	421
DISPlay[:WINDow<Window>]:METer:AUTO.....	243
DISPlay[:WINDow<Window>]:METer:LOWer.....	244
DISPlay[:WINDow<Window>]:METer:LOWer:POWer.....	421
DISPlay[:WINDow<Window>]:METer:LOWer:RATio.....	422
DISPlay[:WINDow<Window>]:METer:UPPer.....	244
DISPlay[:WINDow<Window>]:METer:UPPer:POWer.....	422
DISPlay[:WINDow<Window>]:METer:UPPer:RATio.....	422
DISPlay[:WINDow<Window>]:POSition.....	232
DISPlay[:WINDow<Window>]:TRACe:LOWer.....	423
DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:FEED:INDex.....	278
DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:FUNCTion.....	278
DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:MODE.....	279
DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:MODE.....	279
DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:POWer:DBM.....	280
DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:POWer:DBUV.....	281
DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:POWer:RATio:DB.....	281
DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:POWer:RATio:DPCT.....	282
DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:POWer:RATio:O.....	282
DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:POWer:WATT.....	282
DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:RELative:POWer:DB.....	281
DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:RELative:POWer:DPCT.....	282

DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:RELative:POWer:O.....	282
DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:RELative:POWer:WATT.....	282
DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:RELative:TIME.....	283
DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:POSition:TIME.....	283
DISPlay[:WINDow<Window>]:TRACe:MARKer<Marker>:REFerence.....	283
DISPlay[:WINDow<Window>]:TRACe:MARKer<Undef>:SELectioN.....	284
DISPlay[:WINDow<Window>]:TRACe:MEASurement:POWer:AVG[:STATe].....	294
DISPlay[:WINDow<Window>]:TRACe:MEASurement:POWer:MAXimum[:STATe].....	294
DISPlay[:WINDow<Window>]:TRACe:MEASurement:POWer:MINimum[:STATe].....	294
DISPlay[:WINDow<Window>]:TRACe:MEASurement:POWer:PULSe:BASE[:STATe].....	295
DISPlay[:WINDow<Window>]:TRACe:MEASurement:POWer:PULSe:HREFerence[:STATe].....	295
DISPlay[:WINDow<Window>]:TRACe:MEASurement:POWer:PULSe:LREFerence[:STATe].....	295
DISPlay[:WINDow<Window>]:TRACe:MEASurement:POWer:PULSe:TOP[:STATe].....	296
DISPlay[:WINDow<Window>]:TRACe:MEASurement:PULSe:DCYClE[:STATe].....	296
DISPlay[:WINDow<Window>]:TRACe:MEASurement:PULSe:DURation[:STATe].....	296
DISPlay[:WINDow<Window>]:TRACe:MEASurement:PULSe:PERiod[:STATe].....	297
DISPlay[:WINDow<Window>]:TRACe:MEASurement:PULSe:RESolution[:STATe].....	297
DISPlay[:WINDow<Window>]:TRACe:MEASurement:PULSe:SEPARation[:STATe].....	297
DISPlay[:WINDow<Window>]:TRACe:MEASurement:RRELation.....	298
DISPlay[:WINDow<Window>]:TRACe:MEASurement:SELectioN.....	298
DISPlay[:WINDow<Window>]:TRACe:MEASurement:TRANSition:NEGative:DURation[:STATe].....	298
DISPlay[:WINDow<Window>]:TRACe:MEASurement:TRANSition:NEGative:OCCurrence[:STATe].....	298
DISPlay[:WINDow<Window>]:TRACe:MEASurement:TRANSition:NEGative:OVERshoot[:STATe].....	299
DISPlay[:WINDow<Window>]:TRACe:MEASurement:TRANSition:POSitive:DURation[:STATe].....	299
DISPlay[:WINDow<Window>]:TRACe:MEASurement:TRANSition:POSitive:OCCurrence[:STATe].....	299
DISPlay[:WINDow<Window>]:TRACe:MEASurement:TRANSition:POSitive:OVERshoot[:STATe].....	300
DISPlay[:WINDow<Window>]:TRACe:UPPER.....	423
DISPlay[:WINDow<Window>]:TSLot.....	424
DISPlay[:WINDow<Window>][:NUMeric<Numeric>]:RESolution.....	422
DISPlay[:WINDow<Window>][:STATe].....	231
FETCh<Measurement>:ARRay[:POWer][:AVG]:DIFFerence:RELative?.....	196
FETCh<Measurement>:ARRay[:POWer][:AVG]:DIFFerence?.....	195
FETCh<Measurement>:ARRay[:POWer][:AVG]:RATio:RELative?.....	197
FETCh<Measurement>:ARRay[:POWer][:AVG]:RATio?.....	196
FETCh<Measurement>:ARRay[:POWer][:AVG]:REFLectioN?.....	197
FETCh<Measurement>:ARRay[:POWer][:AVG]:RELative?.....	198
FETCh<Measurement>:ARRay[:POWer][:AVG]:RLOSs?.....	198
FETCh<Measurement>:ARRay[:POWer][:AVG]:SUM:RELative?.....	200
FETCh<Measurement>:ARRay[:POWer][:AVG]:SUM?.....	199
FETCh<Measurement>:ARRay[:POWer][:AVG]:SWR?.....	200
FETCh<Measurement>:ARRay[:POWer][:AVG]?.....	194
FETCh<Measurement>:STATistics:CCDF?.....	221
FETCh<Measurement>:STATistics:PDF?.....	221
FETCh<Measurement>:XTIME[:POWer]:RATio?.....	202
FETCh<Measurement>:XTIME[:POWer]?.....	201
FETCh<Measurement>[:SCALar][:POWer]:BURSt:DIFFerence:RELative?.....	205
FETCh<Measurement>[:SCALar][:POWer]:BURSt:DIFFerence?.....	205
FETCh<Measurement>[:SCALar][:POWer]:BURSt:RATio:RELative?.....	208
FETCh<Measurement>[:SCALar][:POWer]:BURSt:RATio?.....	207
FETCh<Measurement>[:SCALar][:POWer]:BURSt:REFLectioN?.....	210

FETCh<Measurement>[:SCALar][:POWer]:BURSt:RELAtive?	204
FETCh<Measurement>[:SCALar][:POWer]:BURSt:RLOSs?	210
FETCh<Measurement>[:SCALar][:POWer]:BURSt:SUM:RELAtive?	207
FETCh<Measurement>[:SCALar][:POWer]:BURSt:SUM?	206
FETCh<Measurement>[:SCALar][:POWer]:BURSt:SWR?	209
FETCh<Measurement>[:SCALar][:POWer]:BURSt?	203
FETCh<Measurement>[:SCALar][:POWer]:TSLot:DIFFerence:RELAtive?	214
FETCh<Measurement>[:SCALar][:POWer]:TSLot:DIFFerence?	213
FETCh<Measurement>[:SCALar][:POWer]:TSLot:RATio:RELAtive?	217
FETCh<Measurement>[:SCALar][:POWer]:TSLot:RATio?	216
FETCh<Measurement>[:SCALar][:POWer]:TSLot:REFLectioN?	219
FETCh<Measurement>[:SCALar][:POWer]:TSLot:RELAtive?	213
FETCh<Measurement>[:SCALar][:POWer]:TSLot:RLOSs?	219
FETCh<Measurement>[:SCALar][:POWer]:TSLot:SUM:RELAtive?	216
FETCh<Measurement>[:SCALar][:POWer]:TSLot:SUM?	215
FETCh<Measurement>[:SCALar][:POWer]:TSLot:SWR?	218
FETCh<Measurement>[:SCALar][:POWer]:TSLot?	212
FETCh<Measurement>[:SCALar][:POWer][:AVG]:DIFFerence:RELAtive?	190
FETCh<Measurement>[:SCALar][:POWer][:AVG]:DIFFerence?	189
FETCh<Measurement>[:SCALar][:POWer][:AVG]:RATio:RELAtive?	192
FETCh<Measurement>[:SCALar][:POWer][:AVG]:RATio?	191
FETCh<Measurement>[:SCALar][:POWer][:AVG]:REFLectioN?	193
FETCh<Measurement>[:SCALar][:POWer][:AVG]:RELAtive?	189
FETCh<Measurement>[:SCALar][:POWer][:AVG]:RLOSs?	193
FETCh<Measurement>[:SCALar][:POWer][:AVG]:SUM:RELAtive?	191
FETCh<Measurement>[:SCALar][:POWer][:AVG]:SUM?	190
FETCh<Measurement>[:SCALar][:POWer][:AVG]:SWR?	192
FETCh<Measurement>[:SCALar][:POWer][:AVG]?	188
FORMat:SREGister	257
FORMat[:READings]:BORDer	257
FORMat[:READings][:DATA]	257
INITiate<Measurement>:CONTinuous	223
INITiate<Measurement>:DISable	223
INITiate<Measurement>[:IMMediate]	224
INITiate<Undef>:ALL:CONTinuous	223
INITiate<Undef>:ALL:DISable	224
INITiate<Undef>:ALL[:IMMediate]	225
INPut<Sensor>:PORT:OFFSet	367
INPut<Sensor>:PORT:POSition	367
INPut<Sensor>:PORT:SOURce:AUTO	364
INPut<Sensor>:PORT:SOURce[:VALue]	365
INPut<undef>:TRIGger:IMPedance	373
MEASure<Measurement>:ARRay[:POWer][:AVG]:DIFFerence:RELAtive?	196
MEASure<Measurement>:ARRay[:POWer][:AVG]:DIFFerence?	195
MEASure<Measurement>:ARRay[:POWer][:AVG]:RATio:RELAtive?	197
MEASure<Measurement>:ARRay[:POWer][:AVG]:RATio?	196
MEASure<Measurement>:ARRay[:POWer][:AVG]:REFLectioN?	197
MEASure<Measurement>:ARRay[:POWer][:AVG]:RELAtive?	198
MEASure<Measurement>:ARRay[:POWer][:AVG]:RLOSs?	199
MEASure<Measurement>:ARRay[:POWer][:AVG]:SUM:RELAtive?	200

MEASure<Measurement>:ARRay[:POWer][:AVG]:SUM?	199
MEASure<Measurement>:ARRay[:POWer][:AVG]:SWR?	200
MEASure<Measurement>:ARRay[:POWer][:AVG]?	195
MEASure<Measurement>:STATistics:CCDF?	221
MEASure<Measurement>:STATistics:PDF?	221
MEASure<Measurement>:XTIME[:POWer]:RATio?	202
MEASure<Measurement>:XTIME[:POWer]?	201
MEASure<Measurement>[:SCALar][:POWer]:BURSt:DIFFerence:RELative?	205
MEASure<Measurement>[:SCALar][:POWer]:BURSt:DIFFerence?	205
MEASure<Measurement>[:SCALar][:POWer]:BURSt:RATio:RELative?	208
MEASure<Measurement>[:SCALar][:POWer]:BURSt:RATio?	208
MEASure<Measurement>[:SCALar][:POWer]:BURSt:REFLectioN?	210
MEASure<Measurement>[:SCALar][:POWer]:BURSt:RELative?	204
MEASure<Measurement>[:SCALar][:POWer]:BURSt:RLOSs?	210
MEASure<Measurement>[:SCALar][:POWer]:BURSt:SUM:RELative?	207
MEASure<Measurement>[:SCALar][:POWer]:BURSt:SUM?	206
MEASure<Measurement>[:SCALar][:POWer]:BURSt:SWR?	209
MEASure<Measurement>[:SCALar][:POWer]:BURSt?	203
MEASure<Measurement>[:SCALar][:POWer]:TSLot:DIFFerence:RELative?	214
MEASure<Measurement>[:SCALar][:POWer]:TSLot:DIFFerence?	213
MEASure<Measurement>[:SCALar][:POWer]:TSLot:RATio:RELative?	217
MEASure<Measurement>[:SCALar][:POWer]:TSLot:RATio?	216
MEASure<Measurement>[:SCALar][:POWer]:TSLot:REFLectioN?	219
MEASure<Measurement>[:SCALar][:POWer]:TSLot:RELative?	213
MEASure<Measurement>[:SCALar][:POWer]:TSLot:RLOSs?	219
MEASure<Measurement>[:SCALar][:POWer]:TSLot:SUM:RELative?	216
MEASure<Measurement>[:SCALar][:POWer]:TSLot:SUM?	215
MEASure<Measurement>[:SCALar][:POWer]:TSLot:SWR?	218
MEASure<Measurement>[:SCALar][:POWer]:TSLot?	212
MEASure<Measurement>[:SCALar][:POWer][:AVG]:DIFFerence:RELative?	190
MEASure<Measurement>[:SCALar][:POWer][:AVG]:DIFFerence?	189
MEASure<Measurement>[:SCALar][:POWer][:AVG]:RATio:RELative?	192
MEASure<Measurement>[:SCALar][:POWer][:AVG]:RATio?	191
MEASure<Measurement>[:SCALar][:POWer][:AVG]:REFLectioN?	193
MEASure<Measurement>[:SCALar][:POWer][:AVG]:RELative?	189
MEASure<Measurement>[:SCALar][:POWer][:AVG]:RLOSs?	193
MEASure<Measurement>[:SCALar][:POWer][:AVG]:SUM:RELative?	191
MEASure<Measurement>[:SCALar][:POWer][:AVG]:SUM?	190
MEASure<Measurement>[:SCALar][:POWer][:AVG]:SWR?	192
MEASure<Measurement>[:SCALar][:POWer][:AVG]?	188
MEMory:CATalog:STATe?	387
MEMory:CATalog:TABLE?	387
MEMory:CATalog[:ALL]?	388
MEMory:CLEar:TABLE	388
MEMory:CLEar[:NAME]	388
MEMory:FREE:STATe?	389
MEMory:FREE:TABLE?	389
MEMory:FREE[:ALL]?	389
MEMory:NSTATes?	389
MEMory:STATe:CATalog?	389

MEMory:STATe:DEFine.....	390
MEMory:STATe:MAP.....	390
MEMory:STATe:RESet.....	390
MEMory:TABLE:DATA:POINts?.....	391
MEMory:TABLE:DATA?.....	390
MEMory:TABLE:FREQuency.....	391
MEMory:TABLE:FREQuency:POINts?.....	391
MEMory:TABLE:GAIN:POINts?.....	391
MEMory:TABLE:GAIN[:MAGNitude].....	392
MEMory:TABLE:MAP.....	392
MEMory:TABLE:MOVE.....	392
MEMory:TABLE:RESet.....	393
MEMory:TABLE:SElect.....	393
OUTPut:LIMit:FAIL.....	374
OUTPut:LIMit:FEED:INDex.....	374
OUTPut:MODE<output>.....	374
OUTPut:REcorder<output>:FEED:INDex.....	375
OUTPut:REcorder<output>:FEED[:VALue].....	425
OUTPut:REcorder<output>:LIMit:LOWer:CCDF.....	375
OUTPut:REcorder<output>:LIMit:LOWer:POWer.....	376
OUTPut:REcorder<output>:LIMit:LOWer:RATio:RCoefficient.....	376
OUTPut:REcorder<output>:LIMit:LOWer:RATio:RFRatio.....	377
OUTPut:REcorder<output>:LIMit:LOWer:RATio:RLOSSs.....	377
OUTPut:REcorder<output>:LIMit:LOWer:RATio:SWR.....	377
OUTPut:REcorder<output>:LIMit:LOWer:RATio[:VALue].....	378
OUTPut:REcorder<output>:LIMit:LOWer[:VALue].....	376
OUTPut:REcorder<output>:LIMit:UPPer:CCDF.....	378
OUTPut:REcorder<output>:LIMit:UPPer:POWer.....	379
OUTPut:REcorder<output>:LIMit:UPPer:RATio:RCoefficient.....	379
OUTPut:REcorder<output>:LIMit:UPPer:RATio:RFRatio.....	380
OUTPut:REcorder<output>:LIMit:UPPer:RATio:RLOSSs.....	380
OUTPut:REcorder<output>:LIMit:UPPer:RATio:SWR.....	381
OUTPut:REcorder<output>:LIMit:UPPer:RATio[:VALue].....	381
OUTPut:REcorder<output>:LIMit:UPPer[:VALue].....	379
OUTPut:REcorder<output>[:STATe].....	424
OUTPut:ROSCillator[:STATe].....	425
OUTPut:SOURce:STATe.....	371
OUTPut:TRIGger:SOURce.....	381
OUTPut:TRIGger[:STATe].....	425
OUTPut:TTL<output>:ACTive.....	425
OUTPut:TTL<output>:FAIL.....	425
OUTPut:TTL<output>:FEED.....	426
OUTPut:TTL<output>[:STATe].....	426
READ<Measurement>:ARRay[:POWer][:AVG]:DIFFerence:RELAtive?.....	196
READ<Measurement>:ARRay[:POWer][:AVG]:DIFFerence?.....	195
READ<Measurement>:ARRay[:POWer][:AVG]:RATio:RELAtive?.....	197
READ<Measurement>:ARRay[:POWer][:AVG]:RATio?.....	196
READ<Measurement>:ARRay[:POWer][:AVG]:REFLectiOn?.....	197
READ<Measurement>:ARRay[:POWer][:AVG]:RELAtive?.....	198
READ<Measurement>:ARRay[:POWer][:AVG]:RLOSSs?.....	199



READ<Measurement>:ARRay[:POWer][:AVG]:SUM:RELative?	200
READ<Measurement>:ARRay[:POWer][:AVG]:SUM?	199
READ<Measurement>:ARRay[:POWer][:AVG]:SWR?	200
READ<Measurement>:ARRay[:POWer][:AVG]?	195
READ<Measurement>:STATistics:CCDF?	221
READ<Measurement>:STATistics:PDF?	221
READ<Measurement>:XTIME[:POWer]:RATio?	202
READ<Measurement>:XTIME[:POWer]?	201
READ<Measurement>[:SCALar][:POWer]:BURSt:DIFFerence:RELative?	205
READ<Measurement>[:SCALar][:POWer]:BURSt:DIFFerence?	205
READ<Measurement>[:SCALar][:POWer]:BURSt:RATio:RELative?	208
READ<Measurement>[:SCALar][:POWer]:BURSt:RATio?	208
READ<Measurement>[:SCALar][:POWer]:BURSt:REFLection?	210
READ<Measurement>[:SCALar][:POWer]:BURSt:RELative?	204
READ<Measurement>[:SCALar][:POWer]:BURSt:RLOSs?	210
READ<Measurement>[:SCALar][:POWer]:BURSt:SUM:RELative?	207
READ<Measurement>[:SCALar][:POWer]:BURSt:SUM?	206
READ<Measurement>[:SCALar][:POWer]:BURSt:SWR?	209
READ<Measurement>[:SCALar][:POWer]:BURSt?	203
READ<Measurement>[:SCALar][:POWer]:TSLot:DIFFerence:RELative?	214
READ<Measurement>[:SCALar][:POWer]:TSLot:DIFFerence?	213
READ<Measurement>[:SCALar][:POWer]:TSLot:RATio:RELative?	217
READ<Measurement>[:SCALar][:POWer]:TSLot:RATio?	216
READ<Measurement>[:SCALar][:POWer]:TSLot:REFLection?	219
READ<Measurement>[:SCALar][:POWer]:TSLot:RELative?	213
READ<Measurement>[:SCALar][:POWer]:TSLot:RLOSs?	219
READ<Measurement>[:SCALar][:POWer]:TSLot:SUM:RELative?	216
READ<Measurement>[:SCALar][:POWer]:TSLot:SUM?	215
READ<Measurement>[:SCALar][:POWer]:TSLot:SWR?	218
READ<Measurement>[:SCALar][:POWer]:TSLot?	212
READ<Measurement>[:SCALar][:POWer][:AVG]:DIFFerence:RELative?	190
READ<Measurement>[:SCALar][:POWer][:AVG]:DIFFerence?	189
READ<Measurement>[:SCALar][:POWer][:AVG]:RATio:RELative?	192
READ<Measurement>[:SCALar][:POWer][:AVG]:RATio?	191
READ<Measurement>[:SCALar][:POWer][:AVG]:REFLection?	193
READ<Measurement>[:SCALar][:POWer][:AVG]:RELative?	189
READ<Measurement>[:SCALar][:POWer][:AVG]:RLOSs?	193
READ<Measurement>[:SCALar][:POWer][:AVG]:SUM:RELative?	191
READ<Measurement>[:SCALar][:POWer][:AVG]:SUM?	190
READ<Measurement>[:SCALar][:POWer][:AVG]:SWR?	192
READ<Measurement>[:SCALar][:POWer][:AVG]?	188
SOURce:OUTPut:STATe	371
SOURce:POWer[:VALue]	372
SOURce:PULM:STATe	372
SOURce:UNIT:POWer	246
SOURce[:RF]:FREQUency[:VALue]	372
STATus:DEVIce:CONDition?	414
STATus:DEVIce:ENABle	415
STATus:DEVIce:NTRansition	415
STATus:DEVIce:PTRansition	416

STATus:DEVIce[:EVENT]?.....	414
STATus:OPERation:BIT<bitno>:CONDition?.....	414
STATus:OPERation:BIT<bitno>:ENABle.....	415
STATus:OPERation:BIT<bitno>:NTRansition.....	415
STATus:OPERation:BIT<bitno>:PTRansition.....	416
STATus:OPERation:BIT<bitno>[:EVENT]?.....	414
STATus:OPERation:CALibrating[:SUMMary]:CONDition?.....	414
STATus:OPERation:CALibrating[:SUMMary]:ENABle.....	415
STATus:OPERation:CALibrating[:SUMMary]:NTRansition.....	415
STATus:OPERation:CALibrating[:SUMMary]:PTRansition.....	416
STATus:OPERation:CALibrating[:SUMMary][:EVENT]?.....	414
STATus:OPERation:CONDition?.....	414
STATus:OPERation:ENABle.....	415
STATus:OPERation:LLFail<RegisterIndex>[:SUMMary]:CONDition?.....	414
STATus:OPERation:LLFail<RegisterIndex>[:SUMMary]:ENABle.....	415
STATus:OPERation:LLFail<RegisterIndex>[:SUMMary]:NTRansition.....	415
STATus:OPERation:LLFail<RegisterIndex>[:SUMMary]:PTRansition.....	416
STATus:OPERation:LLFail<RegisterIndex>[:SUMMary][:EVENT]?.....	414
STATus:OPERation:MEASuring:EXTension<RegisterIndex>:CONDition?.....	414
STATus:OPERation:MEASuring:EXTension<RegisterIndex>:ENABle.....	415
STATus:OPERation:MEASuring:EXTension<RegisterIndex>:NTRansition.....	415
STATus:OPERation:MEASuring:EXTension<RegisterIndex>:PTRansition.....	416
STATus:OPERation:MEASuring:EXTension<RegisterIndex>[:SUMMary][:EVENT]?.....	414
STATus:OPERation:MEASuring[:SUMMary]:CONDition?.....	414
STATus:OPERation:MEASuring[:SUMMary]:ENABle.....	415
STATus:OPERation:MEASuring[:SUMMary]:NTRansition.....	415
STATus:OPERation:MEASuring[:SUMMary]:PTRansition.....	416
STATus:OPERation:MEASuring[:SUMMary][:EVENT]?.....	414
STATus:OPERation:NTRansition.....	416
STATus:OPERation:PTRansition.....	416
STATus:OPERation:SENSe[:SUMMary]:CONDition?.....	414
STATus:OPERation:SENSe[:SUMMary]:ENABle.....	415
STATus:OPERation:SENSe[:SUMMary]:NTRansition.....	416
STATus:OPERation:SENSe[:SUMMary]:PTRansition.....	416
STATus:OPERation:SENSe[:SUMMary][:EVENT]?.....	414
STATus:OPERation:TRIGger:EXTension<RegisterIndex>:CONDition?.....	414
STATus:OPERation:TRIGger:EXTension<RegisterIndex>:ENABle.....	415
STATus:OPERation:TRIGger:EXTension<RegisterIndex>:NTRansition.....	416
STATus:OPERation:TRIGger:EXTension<RegisterIndex>:PTRansition.....	416
STATus:OPERation:TRIGger:EXTension<RegisterIndex>[:SUMMary][:EVENT]?.....	414
STATus:OPERation:TRIGger[:SUMMary]:CONDition?.....	414
STATus:OPERation:TRIGger[:SUMMary]:ENABle.....	415
STATus:OPERation:TRIGger[:SUMMary]:NTRansition.....	416
STATus:OPERation:TRIGger[:SUMMary]:PTRansition.....	416
STATus:OPERation:TRIGger[:SUMMary][:EVENT]?.....	414
STATus:OPERation:ULFail<RegisterIndex>[:SUMMary]:CONDition?.....	414
STATus:OPERation:ULFail<RegisterIndex>[:SUMMary]:ENABle.....	415
STATus:OPERation:ULFail<RegisterIndex>[:SUMMary]:NTRansition.....	416
STATus:OPERation:ULFail<RegisterIndex>[:SUMMary]:PTRansition.....	416
STATus:OPERation:ULFail<RegisterIndex>[:SUMMary][:EVENT]?.....	414

STATus:OPERation[:EVENT]?	414
STATus:PRESet	413
STATus:QUEStionable:BIT<bitno>:CONDition?	414
STATus:QUEStionable:BIT<bitno>:ENABle	415
STATus:QUEStionable:BIT<bitno>:NTRansition	416
STATus:QUEStionable:BIT<bitno>:PTRansition	416
STATus:QUEStionable:BIT<bitno>[:EVENT]?	414
STATus:QUEStionable:CALibration[:SUMMARY]:CONDition?	414
STATus:QUEStionable:CALibration[:SUMMARY]:ENABle	415
STATus:QUEStionable:CALibration[:SUMMARY]:NTRansition	416
STATus:QUEStionable:CALibration[:SUMMARY]:PTRansition	416
STATus:QUEStionable:CALibration[:SUMMARY][:EVENT]?	414
STATus:QUEStionable:CONDition?	414
STATus:QUEStionable:ENABle	415
STATus:QUEStionable:MEASure<RegisterIndex>:CONDition?	414
STATus:QUEStionable:MEASure<RegisterIndex>:ENABle	415
STATus:QUEStionable:MEASure<RegisterIndex>:NTRansition	416
STATus:QUEStionable:MEASure<RegisterIndex>:PTRansition	416
STATus:QUEStionable:MEASure<RegisterIndex>[:SUMMARY][:EVENT]?	414
STATus:QUEStionable:NTRansition	416
STATus:QUEStionable:POWer[:SUMMARY]:CONDition?	414
STATus:QUEStionable:POWer[:SUMMARY]:ENABle	415
STATus:QUEStionable:POWer[:SUMMARY]:NTRansition	416
STATus:QUEStionable:POWer[:SUMMARY]:PTRansition	416
STATus:QUEStionable:POWer[:SUMMARY][:EVENT]?	415
STATus:QUEStionable:PTRansition	416
STATus:QUEStionable:WINDow<RegisterIndex>:CONDition?	414
STATus:QUEStionable:WINDow<RegisterIndex>:ENABle	415
STATus:QUEStionable:WINDow<RegisterIndex>:NTRansition	416
STATus:QUEStionable:WINDow<RegisterIndex>:PTRansition	416
STATus:QUEStionable:WINDow<RegisterIndex>[:SUMMARY][:EVENT]?	415
STATus:QUEStionable[:EVENT]?	414
STATus:QUEue[:NEXT]?	413
SYSTem:COMMunicate:GPIB[:SELF]:ADDRess	399
SYSTem:COMMunicate:INET[:SELF]:ADDRess	397
SYSTem:COMMunicate:INET[:SELF]:DNS:ADDRess	397
SYSTem:COMMunicate:INET[:SELF]:DNS:SUFFix	397
SYSTem:COMMunicate:INET[:SELF]:GATeway:ADDRess	398
SYSTem:COMMunicate:INET[:SELF]:MODE	398
SYSTem:COMMunicate:INET[:SELF]:SUBNetmask:ADDRess	398
SYSTem:COMMunicate:NETWork:MACaddress?	399
SYSTem:COMMunicate:NETWork:REStart	399
SYSTem:COMMunicate:NETWork:STATus?	399
SYSTem:COMMunicate:NETWork[:COMMON]:DOMain	397
SYSTem:COMMunicate:NETWork[:COMMON]:HOSTname	398
SYSTem:COMMunicate:NETWork[:COMMON]:WORKgroup	399
SYSTem:COMMunicate:NETWork[:IPAddress]:DNS	397
SYSTem:COMMunicate:NETWork[:IPAddress]:GATeway	398
SYSTem:COMMunicate:NETWork[:IPAddress]:MODE	398
SYSTem:COMMunicate:NETWork[:IPAddress]:SUBNet:MASK	398

SYSTem:COMMunicate:NETWork[:IPADdress][:ADDRess].....	397
SYSTem:DATE.....	406
SYSTem:DATE:LOCal.....	406
SYSTem:DATE:UTC.....	406
SYSTem:DEVIce:ID?.....	404
SYSTem:DFPRint.....	405
SYSTem:DFPRint:HISTory:COUNT?.....	405
SYSTem:DFPRint:HISTory:ENTRy?.....	405
SYSTem:DID?.....	404
SYSTem:ERRor:ALL?.....	410
SYSTem:ERRor:CODE:ALL?.....	411
SYSTem:ERRor:CODE[:NEXT]?.....	411
SYSTem:ERRor:COUNT?.....	411
SYSTem:ERRor:EXTended[:STATe].....	412
SYSTem:ERRor[:NEXT]?.....	412
SYSTem:FWUPdate.....	396
SYSTem:FWUPdate:STATus?.....	396
SYSTem:HCOPY.....	258
SYSTem:HELP:HEADers?.....	400
SYSTem:HELP:SYNTax:ALL?.....	400
SYSTem:HELP:SYNTax?.....	400
SYSTem:IDN:ANSWer.....	400
SYSTem:IDN:AUTO.....	401
SYSTem:IDN:MODE.....	401
SYSTem:INFO:TERMchar.....	405
SYSTem:INFO[:INFO]?.....	405
SYSTem:KLOCK.....	412
SYSTem:LANGUage.....	401
SYSTem:LOCK:SHARed:STRing?.....	412
SYSTem:LOCK:TIMEout.....	412
SYSTem:OPT:ANSWer.....	402
SYSTem:OPT:AUTO.....	402
SYSTem:OPT:MODE.....	402
SYSTem:PRESet.....	394
SYSTem:REBoot.....	394
SYSTem:SENSor<Sensor>:INFO?.....	403
SYSTem:SENSor<Sensor>:REBoot.....	395
SYSTem:SENSor<Sensor>:RESet.....	394
SYSTem:SENSor<Sensor>:TEST?.....	386
SYSTem:SERRor:LIST:ALL?.....	410
SYSTem:SERRor:LIST:NEXT?.....	410
SYSTem:SERRor:REMOve.....	409
SYSTem:SERRor[:ALL]?.....	409
SYSTem:SHUTdown.....	395
SYSTem:SPEEd.....	232
SYSTem:STANdard:CATalog?.....	346
SYSTem:STANdard:PRESet.....	346
SYSTem:STANdard:PWSettings.....	347
SYSTem:STANdard:TRIGger:SOURce.....	347
SYSTem:TIME.....	407

SYSTem:TIME:DSTime:MODE.....	407
SYSTem:TIME:DSTime:RULE.....	407
SYSTem:TIME:DSTime:RULE:CATalog?.....	408
SYSTem:TIME:HRTimer:ABSolute:SET.....	408
SYSTem:TIME:LOCAl.....	407
SYSTem:TIME:UTC.....	407
SYSTem:TZONE.....	408
SYSTem:VERSIon?.....	402
TEST:DEVIce:RESult?.....	385
TEST:DEVIce[:ALL].....	385
TEST:SENSor<Sensor>?.....	386
TEST:USB:STORage?.....	386
TRIGger<Measurement>:MODE.....	264
TRIGger<Measurement>[:CHANnel<Channel>]:ATRigger[:STATe].....	259
TRIGger<Measurement>[:CHANnel<Channel>]:COUNT.....	259
TRIGger<Measurement>[:CHANnel<Channel>]:DELay:AUTO.....	260
TRIGger<Measurement>[:CHANnel<Channel>]:DELay[:VALue].....	260
TRIGger<Measurement>[:CHANnel<Channel>]:DTIME.....	261
TRIGger<Measurement>[:CHANnel<Channel>]:EXTernal<Port>:IMPedance.....	261
TRIGger<Measurement>[:CHANnel<Channel>]:HOLDoff.....	262
TRIGger<Measurement>[:CHANnel<Channel>]:HYSTeresis.....	262
TRIGger<Measurement>[:CHANnel<Channel>]:JITTer:METHOD.....	263
TRIGger<Measurement>[:CHANnel<Channel>]:LEVel.....	263
TRIGger<Measurement>[:CHANnel<Channel>]:MASTer:PORT.....	264
TRIGger<Measurement>[:CHANnel<Channel>]:MASTer[:STATe].....	265
TRIGger<Measurement>[:CHANnel<Channel>]:SLOPe.....	265
TRIGger<Measurement>[:CHANnel<Channel>]:SOURce.....	266
TRIGger<Measurement>[:CHANnel<Channel>]:SYNChronize:PORT.....	266
TRIGger<Measurement>[:CHANnel<Channel>]:SYNChronize[:STATe].....	266
TRIGger<Measurement>[:IMMediate].....	267
TRIGger<undef>:ALL:ATRigger[:STATe].....	259
TRIGger<undef>:ALL:COUNT.....	259
TRIGger<undef>:ALL:DELay:AUTO.....	260
TRIGger<undef>:ALL:DELay[:VALue].....	260
TRIGger<undef>:ALL:DTIME.....	261
TRIGger<undef>:ALL:HOLDoff.....	262
TRIGger<undef>:ALL:HYSTeresis.....	262
TRIGger<undef>:ALL:LEVel.....	263
TRIGger<undef>:ALL:MODE.....	264
TRIGger<undef>:ALL:SLOPe.....	265
TRIGger<undef>:ALL:SOURce.....	266
TRIGger<undef>:ALL:SYNChronize[:STATe].....	266
TRIGger<undef>:ALL[:IMMediate].....	267
UNIT<Measurement>:POWer:RATio.....	246
UNIT<Measurement>:POWer:REFlection.....	246
UNIT<Measurement>:POWer:RELative:STATe.....	247
UNIT<Measurement>:POWer[:VALue].....	247

# Index

## Symbols

*OPC .....	468
*OPC? .....	468
*WAI .....	468
1 Trig key .....	26
3rd and 4th measurement channel (R&S NRX-K4) .....	44

## A

AC power supply .....	29
Connecting to .....	19
Accessory list .....	17
Add Sensor dialog .....	151

## B

Bench top operation .....	18
Boolean parameters .....	465
Brochures .....	15
Burst average .....	73
Result display .....	74
Settings .....	74

## C

Case-sensitivity	
SCPI .....	462
Channel	
Correction .....	129
Filter .....	131
Mode .....	128
Channel Filter Configuration dialog .....	131
Checking .....	17
Command line .....	466
Command structure .....	461
Command syntax	
Common .....	462
Device-specific .....	462
Common command	
Syntax .....	462
Common commands .....	177
CONDition .....	470
Connecting	
External devices .....	23
Power supply .....	19
Sensor .....	21
Connections tab .....	137
Connector	
AC power supply .....	29
Out 1 / Trig Out .....	28
Sensor .....	24, 30
Trig In / Out 2 .....	28
Continuous average .....	71
Result display .....	71
Settings .....	72
Control	
Measurement .....	59
Cursor keys .....	27
Customer support .....	496
Collecting information .....	496

## D

Data sheets .....	15
Date and Time dialog .....	155
Default settings .....	134
Delete key .....	26
Details tab .....	163
Device status register .....	473
Diagnostics	
Tests .....	495
Dialog	
Measurement Main Configuration .....	112
Display layout .....	36
Changing .....	36
Examples .....	38
Display settings .....	50
Documentation overview .....	14
Dropout time	
Trigger .....	62

## E

Electromagnetic interference (EMI) .....	18
Electrostatic discharge (ESD) .....	18
Emulation .....	417
Emulations tab .....	143
ENABLE .....	471
Enable register .....	479
Enter key .....	26
Error message	
Number .....	492
Errors	
Displaying .....	35
Esc key .....	25
ESE .....	479
ESR .....	479
Ethernet interface .....	28
Remote control .....	458
Evaluate dialog .....	107
EVENT .....	471
External devices .....	23

## F

Favorites key .....	26
Firmware	
update .....	170
Freq key .....	26
Front panel keys .....	25

## G

Gate Configuration dialog .....	93
General tab .....	156
Getting started .....	14
Global Settings tab .....	167
Going back to the previous level .....	31
GPIO interface .....	461

## H

Hardware Config tab .....	165
Hardware option .....	24
Help .....	14

- Hierarchy level
  - Changing ..... 31
- HiSLIP
  - Protocol ..... 460
  - Resource string ..... 459
- Hold-off time
  - Trigger ..... 62
- HW Options tab ..... 161
- I**
- I/O dialog ..... 144
- IEC 625/IEEE 488 interface ..... 29
- IEC/IEEE bus interface ..... 461
- Initial state
  - Preset ..... 134
- Installing
  - Option ..... 162
  - Options ..... 169
- Instrument identification string ..... 143
- Instrument info tab ..... 153
- Instrument Password tab ..... 159
- Instrument security procedures ..... 14
- Instrument settings ..... 133
- Instrument test ..... 166
- Interface
  - Ethernet ..... 28, 458
  - IEC 625/IEEE 488 ..... 29
  - Module bay ..... 24
  - USB device ..... 29
  - USB host ..... 29
- K**
- Key ..... 25
  - 1 Trig ..... 26
  - Delete ..... 26
  - Enter ..... 26
  - Esc ..... 25
  - Favorites ..... 26
  - Freq ..... 26
  - Local ..... 25
  - On/standby ..... 27
  - Preset ..... 26
  - Screenshot ..... 26
  - System ..... 27
  - Zero ..... 26
- L**
- LAN
  - VXI-11 protocol ..... 460
- LAN Settings tab ..... 158
- License Key ..... 169
- Limit violation ..... 47
- Local key ..... 25
- Logon ..... 159
- M**
- Main measurement dialog ..... 32
  - Access ..... 32
  - Layout ..... 33
- Manage License Keys tab ..... 162
- Manage Sensors dialog ..... 150
- Manual operation ..... 31
  - Returning to ..... 43
- Measured value
  - Limit violation ..... 47
- Measurement
  - Basics ..... 44
  - Control ..... 59
  - Parallel ..... 44
  - Setup ..... 46
  - Starting ..... 46
- Measurement Main Configuration dialog ..... 112
- Measurement panes
  - Swapping ..... 38
- Measurement results ..... 71
  - Controlling ..... 60
- Measurement settings ..... 50, 71
- Measurement Settings dialog ..... 67
  - Statistics ..... 103
- Measurement types ..... 71
  - Burst average ..... 73
  - Continuous average ..... 71
  - NRT ..... 107
  - Pulse analysis ..... 80
  - Statistics ..... 100
  - Time gate ..... 89
  - Timeslot ..... 94
  - Trace ..... 75
- Messages
  - Deleting ..... 36
  - Displaying ..... 35
- Mnemonics ..... 461
- Module bay ..... 24
- N**
- Network
  - Overview ..... 139
- Network dialog ..... 138
- Notification ..... 491
  - Number ..... 492
- Notification center ..... 35
  - Symbols ..... 35
- NRT ..... 107
  - Result display ..... 107
  - Settings ..... 108
- NTRansition ..... 471
- O**
- On/standby key ..... 27
- Open source acknowledgment (OSA) ..... 15
- Open source license ..... 164
- Open Source Licenses dialog ..... 164
- Operating concepts
  - Manual operation ..... 31
  - Remote control ..... 42
  - Remote operation ..... 41
- Operating conditions ..... 17
- Operation calibrating status register ..... 481
- Operation lower limit fail status register ..... 487
- Operation measuring extended status register ..... 483
- Operation measuring status register ..... 482
- Operation sense status register ..... 486
- Operation status register ..... 480
- Operation trigger extended status register ..... 485
- Operation trigger status register ..... 484
- Operation upper limit fail status register ..... 489

- Option
  - 3rd and 4th measurement channel (R&S NRX-K4) .... 44
  - Details ..... 163
  - Hardware ..... 161
  - Installing ..... 162, 169
  - Manage license keys ..... 162
  - Management ..... 169
  - second measurement channel (R&S NRX-K2) ..... 44
  - Software ..... 161
- Option identification string ..... 144
- Options dialog ..... 161
- Out 1 / Trig Out connector ..... 28
- Overlapping commands
  - Preventing ..... 468
- Overview tab ..... 139
- P**
- Parallel poll enable register ..... 473
- Parameter
  - SCPI ..... 463
- Parameters
  - Block data ..... 466
  - Editing ..... 39
  - Special numeric values ..... 464
  - String ..... 466
  - Text ..... 465
- Password
  - Instrument ..... 159
  - Security ..... 160
- Placing ..... 18
- Power supply
  - Connecting to ..... 19
- PPE ..... 473
- Preparing for use ..... 17
- Preset ..... 133, 134
- Preset key ..... 26
- Primary sensor ..... 114
- Protocol
  - HiSLIP ..... 460
  - VXI-11 ..... 460
- Ptransition ..... 471
- Pulse analysis
  - Result display ..... 81
  - Settings ..... 81, 82
- Pulse Analysis dialog ..... 82
- Q**
- Query ..... 467
- Questionable calibration status register ..... 478
- Questionable measurement status register ..... 477
- Questionable power status register ..... 476
- Questionable status register ..... 475
- R**
- Recall
  - Settings ..... 133
- Release notes ..... 15
- Remote control ..... 42
  - Basics ..... 457
  - Changing to ..... 42
  - Command syntax ..... 462
  - Common commands ..... 177
  - Emulation ..... 417
  - Ethernet interface ..... 458
  - HiSLIP protocol ..... 460
  - Interfaces ..... 457
  - Leaving ..... 43
  - Protocols ..... 457
  - Query ..... 467
  - Response ..... 467
  - SCPI command structure ..... 461
  - SCPI parameter ..... 463
  - Socket communication ..... 461
  - Structure ..... 466
  - Synchronization ..... 468
  - Syntax elements ..... 466
  - USB interface ..... 457
  - VISA resource strings ..... 459
  - VXI-11 protocol ..... 460
- Remote dialog ..... 141
- Remote operation ..... 41
- Remote settings
  - Emulations ..... 143
  - Settings ..... 142
  - VISA Resource ..... 142
- Resource string
  - HiSLIP ..... 459
  - Socket ..... 459
  - VISA ..... 459
  - VXI-11 ..... 459
- Response ..... 467
- S**
- Safety information ..... 17
- Safety instructions ..... 15
- Sanitization ..... 157
- Save
  - Settings ..... 133
- Save and recall ..... 133
- Scale Configuration dialog ..... 104
- SCPI parameter ..... 463
- SCPI status register
  - Structure ..... 470
- Screenshot key ..... 26
- Screenshots
  - Creating ..... 40
  - Saving ..... 40
- second measurement channel (R&S NRX-K2) ..... 44
- Secondary sensor ..... 114
- Security
  - General settings ..... 156
  - Instrument password ..... 159
  - LAN settings ..... 158
  - Security password ..... 160
- Security dialog ..... 156
- Security Password tab ..... 160
- Security procedures ..... 14
- Selftest ..... 495
- Sensor
  - Assignment ..... 44
  - Connecting ..... 21
  - Connector ..... 24, 30
  - Memory ..... 44
  - Zeroing ..... 135
- Sensor Info dialog ..... 151
- Sensor Manager ..... 150
- Sensor range
  - Attenuation ..... 127
  - Attenuator mode ..... 127
  - Offset ..... 127



- Range ..... 126
- Range state ..... 126
- User defined transition ..... 126
- Sensor settings ..... 133
- Sensor Test dialog ..... 152
- Service request enable register ..... 472
- Settings
  - Burst average ..... 74
  - Display ..... 50
  - Input/Output ..... 144
  - Network ..... 138
  - NRT ..... 108
  - Open source licenses ..... 164
  - Options ..... 161
  - Pulse analysis ..... 81, 82
  - Remote ..... 141
  - Scale configuration ..... 104
  - Security ..... 156
  - Sensor manager ..... 150
  - Statistics ..... 102
  - Statistics Timing ..... 106
  - System ..... 137
  - System info ..... 153
  - Time gate ..... 91, 93
  - Timeslot ..... 97, 98
  - Trace ..... 76, 77
  - Trigger ..... 63
- Settings conflict ..... 48
- Settings tab ..... 142
- Socket
  - Communication ..... 461
  - Resource string ..... 459
- Software option
  - Installing ..... 169
- Software update
  - see firmware ..... 170
- Sources
  - Trigger ..... 61
- SRE ..... 472
- Standard event status register ..... 479
- Start dialog ..... 31
- Statistics ..... 100
  - Result display ..... 100
  - Scale configuration ..... 104
  - Settings ..... 102
  - Timing ..... 106
- Statistics Timing dialog ..... 106
- Status
  - Information ..... 491
- Status byte register ..... 472
- Status information ..... 34
- Status register ..... 470
  - CONDition ..... 470
  - Device status register ..... 473
  - ENABle ..... 471
  - Enable register ..... 479
  - EVENT ..... 471
  - Hierarchy ..... 469
  - IST flag ..... 473
  - NTRansition ..... 471
  - Operation calibrating status register ..... 481
  - Operation lower limit fail status register ..... 487
  - Operation measuring extended status register ..... 483
  - Operation measuring status register ..... 482
  - Operation sense status register ..... 486
  - Operation status register ..... 480
  - Operation trigger extended status register ..... 485
  - Operation trigger status register ..... 484
  - Operation upper limit fail status register ..... 489
  - Parallel poll enable register ..... 473
  - PTRansition ..... 471
  - Questionable calibration status register ..... 478
  - Questionable measurement status register ..... 477
  - Questionable power status register ..... 476
  - Questionable status register ..... 475
  - Remote control ..... 413
  - Service request enable register ..... 472
  - Standard event status register ..... 479
  - Status byte register ..... 472
    - Sum bit ..... 471
  - Status reporting system ..... 468
  - STB ..... 472
  - Suffixes ..... 463
  - Sum bit ..... 471
  - Support information ..... 167
  - SW Options tab ..... 161
  - Switching on ..... 20
  - Symbols
    - Notification center ..... 35
    - Status information ..... 34
  - Syntax elements ..... 466
  - System Info dialog ..... 153
  - System key ..... 27
  - System Overview dialog ..... 137
    - Connections ..... 137
    - Global settings ..... 167
    - Hardware configuration ..... 165
    - Instrument info ..... 153
    - Test ..... 166
  - System settings ..... 137

## T

  - Tab
    - Instrument info ..... 153
  - Termination control ..... 60
  - Test tab ..... 166
  - Tests ..... 495
  - Time gate ..... 89
    - Result display ..... 90
    - Settings ..... 91, 93
  - Timeslot ..... 94
    - Result display ..... 95
    - Settings ..... 97, 98
  - Timeslot Configuration dialog ..... 98
  - Touchscreen ..... 25
  - Trace ..... 75
    - Result display ..... 75
    - Settings ..... 76, 77
  - Trace Marker dialog ..... 77
  - Trig In / Out 2 connector ..... 28
  - Trigger
    - Dropout time ..... 62
    - Hold-off time ..... 62
    - Sources ..... 61
    - States ..... 60
  - Trigger settings ..... 63
  - Troubleshooting ..... 491
    - Information ..... 167
    - Notification ..... 491
    - Status information ..... 491
    - Tests ..... 495
  - Tutorials ..... 14

**U**

Units .....	464
Unpacking .....	17
USB	
Device interface .....	29
Host interface .....	27, 29
USB interface	
Remote control .....	457
USB resource string .....	458
User Interaction Needed dialog .....	45
User interface .....	31
Display layout .....	36
Going back .....	31
Main measurement dialog .....	32
Measurement panes .....	38
Notification center .....	35
Parameters .....	39
Restricting access .....	40
Screenshots .....	40
Settings conflict .....	48
Start dialog .....	31
Status information .....	34
User interface test .....	166
User manual .....	14

**V**

VISA	
Resource string .....	459
VISA Resource tab .....	142
VXI-11	
Protocol .....	460
Resource string .....	459

**W**

Warning message	
Number .....	492

**Z**

Zero key .....	26
Zeroing sensor .....	135
Zeroing Sensors dialog .....	135