R&S®NRP-Zxx Power Sensors Getting Started

1176882202
Version 04

ROHDE&SCHWARZ
Make ideas real

This manual gives an introduction to the Rohde & Schwarz NRP-Z sensors.

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Throughout this manual, products from Rohde & Schwarz are indicated without the ® symbol, for example R&S®NRP2 is abbreviated as R&S NRP2.

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1 Safety Information

The product documentation helps you use the R&S NRP-Z power sensor 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 NRP-Z power sensor is intended for the development, production and verification of electronic components and devices in industrial, administrative, and laboratory environments. Use the R&S NRP-Z power sensor 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 NRP-Z power sensor.
- Throughout the documentation, safety instructions are provided when you need to take care during setup or operation.

2 Documentation Overview

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

www.rohde-schwarz.com/product/nrpz

2.1 Getting Started Manual

Introduces the R&S NRP-Z power sensor and describes how to set up and start working with the product. Includes basic operations and general information, e.g. safety instructions, etc. A printed version is delivered with the power sensor.

2.2 User Manuals

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 and interfaces. Includes the contents of the getting started manual.

2.3 Tutorials

Tutorials offer guided examples and demonstrations on operating the R&S NRP-Z power sensor. They are provided on the product page of the internet.

2.4 Instrument Security Procedures

Deals with security issues when working with the R&S NRP-Z power sensor in secure areas. It is available for download on the Internet.

2.5 Basic Safety Instructions

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

2.6 Data Sheets and Brochures

The data sheet contains the technical specifications of the R&S NRP-Z power sensor. 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/nrpz

2.7 Release Notes and Open Source Acknowledgment (OSA)

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

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

See www.rohde-schwarz.com/firmware/nrpz

2.8 Application Notes, Application Cards, White Papers, etc.

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

See www.rohde-schwarz.com/application/nrpz

3 Key Features

Power measurements performed with the R&S NRP-Z power sensors can be evaluated in various ways. This manual gives a short introduction to the solutions offered by Rohde & Schwarz for viewing your power measurement results. Also, you find a description of how to set up and measure power with your power sensor.

You can view the results of your measurement on the following devices:

- PC/laptop
- Android 4.x device
- R&S NRP2 base unit
- Supported Rohde & Schwarz instrument

Using the R&S NRP-Z power sensors with a PC/laptop

Install the R&S NRP Toolkit on the PC/laptop. The R&S NRP Toolkit is a free software kit that provides drivers and tools. For details, see Chapter 6.1, "R&S NRP Toolkit", on page 24:

For optional use, different software solutions are offered:

- R&S Power Viewer
  Free software that supports all measurement modes and can perform mathematical calculations during measurements. It can be used with one power sensor at a time.
  For details, see Chapter 6.3, "R&S Power Viewer", on page 31.
- R&S NRPV virtual power meter
  Cost-effective measurement solution that can be used as a replacement for the R&S NRP2 base unit. It supports all measurement modes and can perform different mathematical calculations during measurements. It can be used with up to four power sensors simultaneously.
  For details, see Chapter 6.2, "R&S NRPV", on page 29.

Using the R&S NRP-Z power sensors with an Android device

Also, you can connect the power sensors to an Android device and view the results with the free of charge R&S Power Viewer Mobile.

For details, see Chapter 6.4, "R&S Power Viewer Mobile", on page 32.

Using the R&S NRP-Z power sensors with an R&S NRP2 or a compatible Rohde & Schwarz instrument

A short overview of the usage of the power sensors with the R&S NRP2 base unit or a compatible Rohde & Schwarz instrument is given in this manual:

- Chapter 6.5, "R&S NRP2", on page 32
- Chapter 6.6, "Compatible Instrument", on page 34

For more information on this usage, refer to the operating manual of the corresponding Rohde & Schwarz instrument.

Overview of the R&S NRP-Z power sensor types

The R&S NRP-Z power sensors are highly accurate standalone measuring instruments that offer all the functionality of conventional power meters, and more, within the small housing of a power sensor. With a high dynamic range, the different types of R&S NRP-Z power sensors are suitable for nearly every measurement task:

- Three-path power sensors
  With patented three-path technology. Suitable for many applications, thanks to their wide dynamic and frequency range. The sensors feature high measurement accuracy independent of the modulation type and speed and offer a wide range of functions.
- Two-path power sensors
  With slightly modified dynamic range and performance. A cost-effective solution ideal for production applications.
- Wideband power sensors
  With high video bandwidth that permits accurate time-domain analysis of the envelope power. Analysis is fast and easy thanks to also integrated measurement functions such as automatic pulse analysis.
- Thermal power sensors
  With outstanding measurement accuracy. They are the first choice for power measurements in the frequency range from DC to 110 GHz as performed in calibration labs, where measurement accuracy is the key requirement.
- Average power sensors
  Specially developed for EMC applications and cover the required frequency range from 9 kHz to 6 GHz.
- Level control sensors

With an integrated splitter that can split the signal into two parts of equal power. This feature allows you to feed power to a device under test (DUT) and monitor the power at the same time.

- Power sensor modules
  Developed for level calibration using the R&S FSMR measuring receiver.

You can find an overview of the available sensors and filter according to your requirements at:

www.rohde-schwarz.com/product/nrpz

4 Preparing for Use

This section describes the basic steps to be taken when setting up the R&S NRP-Z power sensors for the first time.

⚠ WARNING

Risk of injury due to disregarding safety information

Observe the information on appropriate operating conditions provided in the data sheet to prevent personal injury or damage to the power sensor. Read and observe the basic safety instructions provided with the power sensor, in addition to the safety instructions in the following sections. In particular, do not open the casing of the power sensor.

NOTICE

Risk of electrostatic discharge

Protect the work area against electrostatic discharge to avoid damage to electronic components in the modules. For details, refer to the general safety instructions.

NOTICE

Risk of instrument damage due to inappropriate operating conditions

An unsuitable operating site or test setup can damage the power sensor and to connected devices. Before switching on the power sensor, observe the information on appropriate operating conditions provided in the data sheet. In particular, ensure the following:

- The power sensor is dry and shows no sign of condensation.
- The power sensor is connected as described in the following sections.
- 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 correctly connected and are not overloaded.

4.1 EMI Suppression

Electromagnetic interference (EMI) can affect the measurement results.

To suppress generated electromagnetic interference:

- Use suitable shielded cables of high quality. For example, use double-shielded RF cables.
- Always terminate open cable ends.
- Note the EMC classification in the data sheet.

4.2 Unpacking and Checking the Power Sensor

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

Packing material and transportation

Always make sure that sufficient mechanical and electrostatic protection is provided when transporting the power sensors.

4.3 Connectors of the R&S NRP-Z Power Sensors

An R&S NRP-Z power sensor has two connectors, as shown in Figure 4-1.

Figure 4-1: Connectors of an R&S NRP-Z power sensor

1 = Host connector
2 = RF connector

Host connector

See (1) in Figure 4-1.

Lemo type host connector. You can plug it:

- Directly to a compatible Rohde & Schwarz instrument
- To a R&S NRP2 power meter base unit
- Using an R&S NRP-Z3 or R&S NRP-Z4 USB adapter to a controlling device (PC or other)
- Using an R&S NRP-Z5 USB hub to a controlling device (PC or other)

RF connector

See (2) in Figure 4-1.

Used to connect the power sensor to a device under test (DUT) or a signal generator.

Caused by their different frequency ranges, the R&S NRP-Z power sensors have different RF connectors. Also, for maximal measurement accuracy, the RF connector must be tightened using a torque wrench with a specific nominal torque.

Refer to the operating manual of your R&S NRP-Z power sensor for information on your connector and the allowed nominal torque.

4.4 Connecting the R&S NRP-Z Power Sensors

When connecting the R&S NRP-Z27/-Z28/-Z37/-Z98 sensors, there are additional requirements to fulfill. Refer to the operating manual of the corresponding sensor for a description on how to connect it.

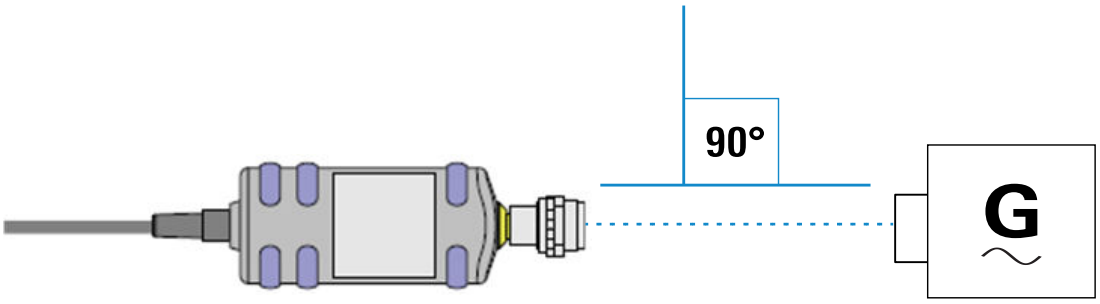
4.4.1 Connecting the RF Connector of the R&S NRP-Z Power Sensors

NOTICE

Risk of damage to the center pin of the RF connector

When connecting the power sensor, always rotate only the union nut of the RF connector. Do not rotate the sensor itself to avoid damage the center pin of the connector.

1. Refer to the operating manual of your R&S NRP-Z power sensor to find out what kind of RF connector your sensor has and the recommended nominal torque.
2. Insert the RF connector of the attenuator straight into the RF output of your DUT. Do not tilt it.



3. To ensure a maximal measurement accuracy, tighten the RF connector using a torque wrench with the recommended nominal torque (see the operating manual of your power sensor).

4.4.2 Connecting the Host Connector of the R&S NRP-Z Power Sensors

To connect to an adapter

You can use an R&S NRP-Z3 or R&S NRP-Z4 adapter.

1. Rotate both cables, so that the red markings on the sleeves of both of them are at the same position.
2. Insert the host connector of your sensor into the connector of your USB adapter.

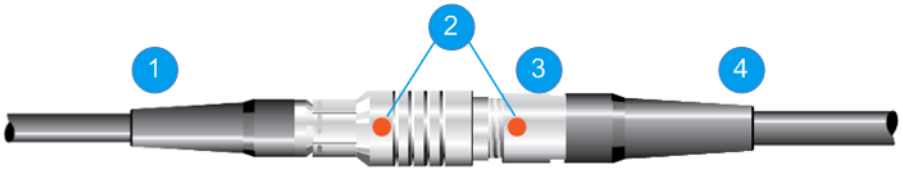


Figure 4-2: Connecting the host connector

1 = R&S NRP-Z4 in this example
2 = Red marking
3 = Host connector
4 = R&S NRP-Z power sensor

To connect to an R&S NRP-Z5 sensor hub

► Insert the host connector, red marking upwards, into the SENSOR connector of your sensor hub.

To connect to an Rohde & Schwarz instrument

► Insert the host connector, red marking upwards, into the SENSOR connector of your instrument.

4.5 Disconnecting the R&S NRP-Z Power Sensors

Additional requirements must be fulfilled when disconnecting the R&S NRP-Z27/-Z28/-Z37/-Z98 sensors. Refer to the operating manual of the corresponding sensor for a description on how to disconnect it.

4.5.1 Disconnecting the RF Connector of the R&S NRP-Z Power Sensors

NOTICE

Risk of damage to the center pin of the RF connector

When disconnecting the power sensor, always rotate only the union nut of the RF connector. Do not rotate the sensor itself to avoid damage the center pin of the connector.

► Carefully loosen the screw at the front of the sensor's RF connector and remove the sensor.

4.5.2 Disconnecting the Host Connector of the R&S NRP-Z Power Sensors

To disconnect from an R&S NRP-Z3 or R&S NRP-Z4 adapter

► Pull at the host connector (Figure 4-2 (3)) until it disconnects from the connector of the USB adapter.

To disconnect from an Rohde & Schwarz instrument or an R&S NRP-Z5 sensor hub

► At the same time, press down the ring of the built-in plug (1) and pull off the cable sleeve (2).

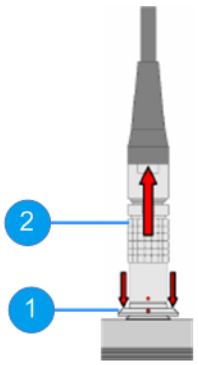


Figure 4-3: Disconnecting from a SENSOR connector

1 = Ring of the built-in plug
2 = Cable sleeve

4.6 Powering the R&S NRP-Z Power Sensors

The R&S NRP-Z power sensors can be powered in two ways:

- Self-powered from a separate power supply using the R&S NRP-Z3 active USB adapter or the R&S NRP-Z5 sensor hub.
- Bus-powered from the PC or a USB hub with its own power supply (self-powered hub) using the R&S NRP-Z3 active USB adapter or the R&S NRP-Z4 passive USB adapter.

Requirements for the usage in the bus-powered mode:

- Laptop/PC with a self-powered USB hub
- Total available current per USB port of 500 mA

5 Connecting to a PC

There are different possibilities for connecting a power sensor to a PC, which can differ depending on the type of power sensor and available accessories.

The following chapter gives an overview of the possible setups and what equipment is needed for each of them.

For details on powering the R&S NRP-Z power sensor, see Chapter 4.6, "Powering the R&S NRP-Z Power Sensors", on page 17.

5.1 Using a Passive USB Adapter

The R&S NRP-Z power sensors can be used with the R&S NRP-Z4 for power measurements where no external triggering is required.

Required equipment

- R&S NRP-Z power sensor
- R&S NRP-Z4 passive USB adapter
- PC with installed R&S NRP Toolkit, see Chapter 6.1, "R&S NRP Toolkit", on page 24

Setup

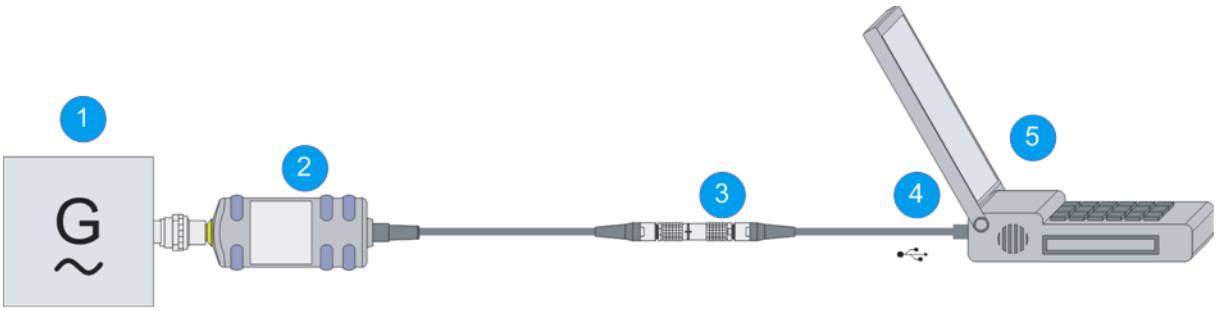


Figure 5-1: Setup with a passive USB adapter

1 = Signal source
2 = R&S NRP-Z power sensor
3 = R&S NRP-Z4
4 = USB connector
5 = PC with a USB interface

Incorrectly connecting/disconnecting the R&S NRP-Z power sensors may damage the power sensors or lead to erroneous results.

Ensure that you connect/disconnect your power sensors as described in Chapter 4.4, "Connecting the R&S NRP-Z Power Sensors", on page 14 and Chapter 4.5, "Disconnecting the R&S NRP-Z Power Sensors", on page 16.

1. Connect the cables as shown in Figure 5-1:
   a) Connect the R&S NRP-Z4 passive USB adapter to the power sensor.
   b) Connect the power sensor passive USB adapter to the computer.
   c) Connect the power sensor to the signal source.
2. On the PC, start a software application to view the measurement results. See Chapter 6, "Operating Concepts", on page 24.

5.2 Using an Active USB Adapter

The R&S NRP-Z power sensors can be used with the R&S NRP-Z3 for power measurements where an external power supply and/or external triggering is required.

Required equipment

- R&S NRP-Z power sensor
- R&S NRP-Z3
- PC with installed R&S NRP Toolkit, see Chapter 6.1, "R&S NRP Toolkit", on page 24

Setup

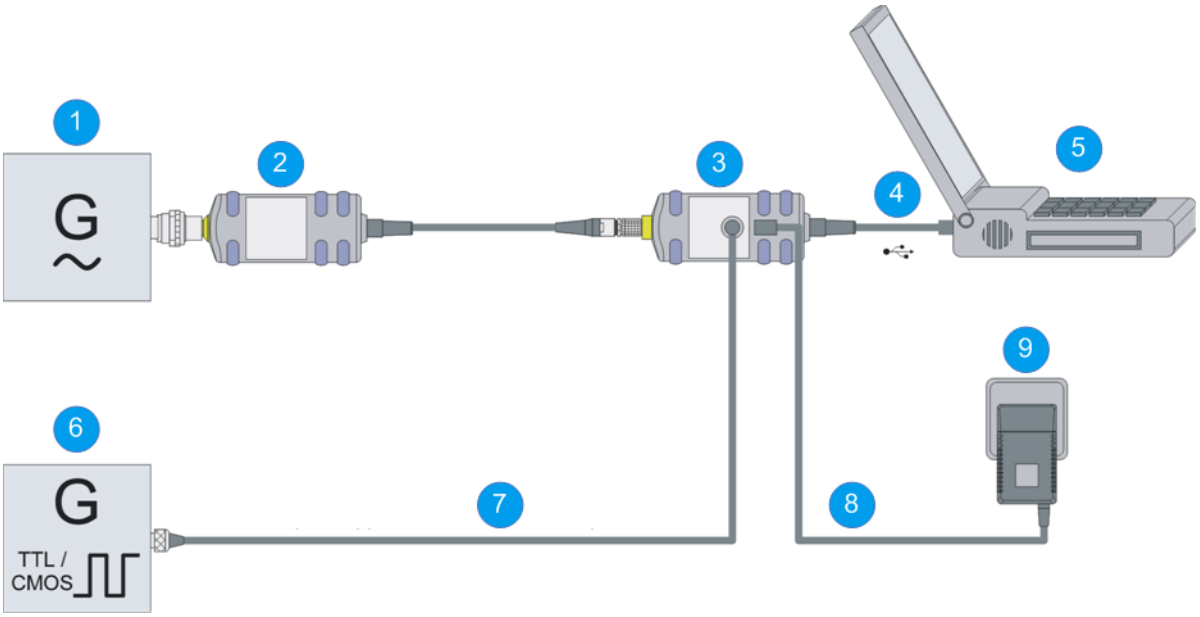


Figure 5-2: Setup with an active USB adapter

1 = Signal source
2 = R&S NRP-Z power sensor
3 = R&S NRP-Z3
4 = USB connector
5 = PC with a USB interface
6 = Trigger source (optional)
7 = BNC cable (optional, not supplied)
8 = Plug-in power supply (optional, supplied)
9 = AC supply connector (optional)

Incorrectly connecting/disconnecting the R&S NRP-Z power sensors may damage the power sensors or lead to erroneous results.

Ensure that you connect/disconnect your power sensors as described in Chapter 4.4, "Connecting the R&S NRP-Z Power Sensors", on page 14 and Chapter 4.5, "Disconnecting the R&S NRP-Z Power Sensors", on page 16.

1. Connect the cables as shown in Figure 5-2:
   a) Connect the R&S NRP-Z3 active USB adapter to the power sensor.
   b) Connect the power sensor passive USB adapter to the computer.
   c) Connect the power sensor to the signal source.
   d) Connect the R&S NRP-Z3 with a BNC cable to the trigger source (optional).

e) Connect the delivered plug-in power supply to the R&S NRP-Z3 and to an AC supply connector (optional).

2. On the PC, start a software application to view the measurement results. See Chapter 6, "Operating Concepts", on page 24.

5.3 Using an R&S NRP-Z5 Sensor Hub

The R&S NRP-Z5 sensor hub (high-speed USB 2.0) can host up to four R&S NRP-Z power sensors and provides simultaneous internal and external triggering of all connected sensors.

Required equipment

- R&S NRP-Z power sensor
- R&S NRP-Z5 sensor hub that provides:
  - Power supply
  - Through-wired trigger bus
  - Trigger input and trigger output via BNC sockets
- PC with installed R&S NRP Toolkit, see Chapter 6.1, "R&S NRP Toolkit", on page 24

Setup

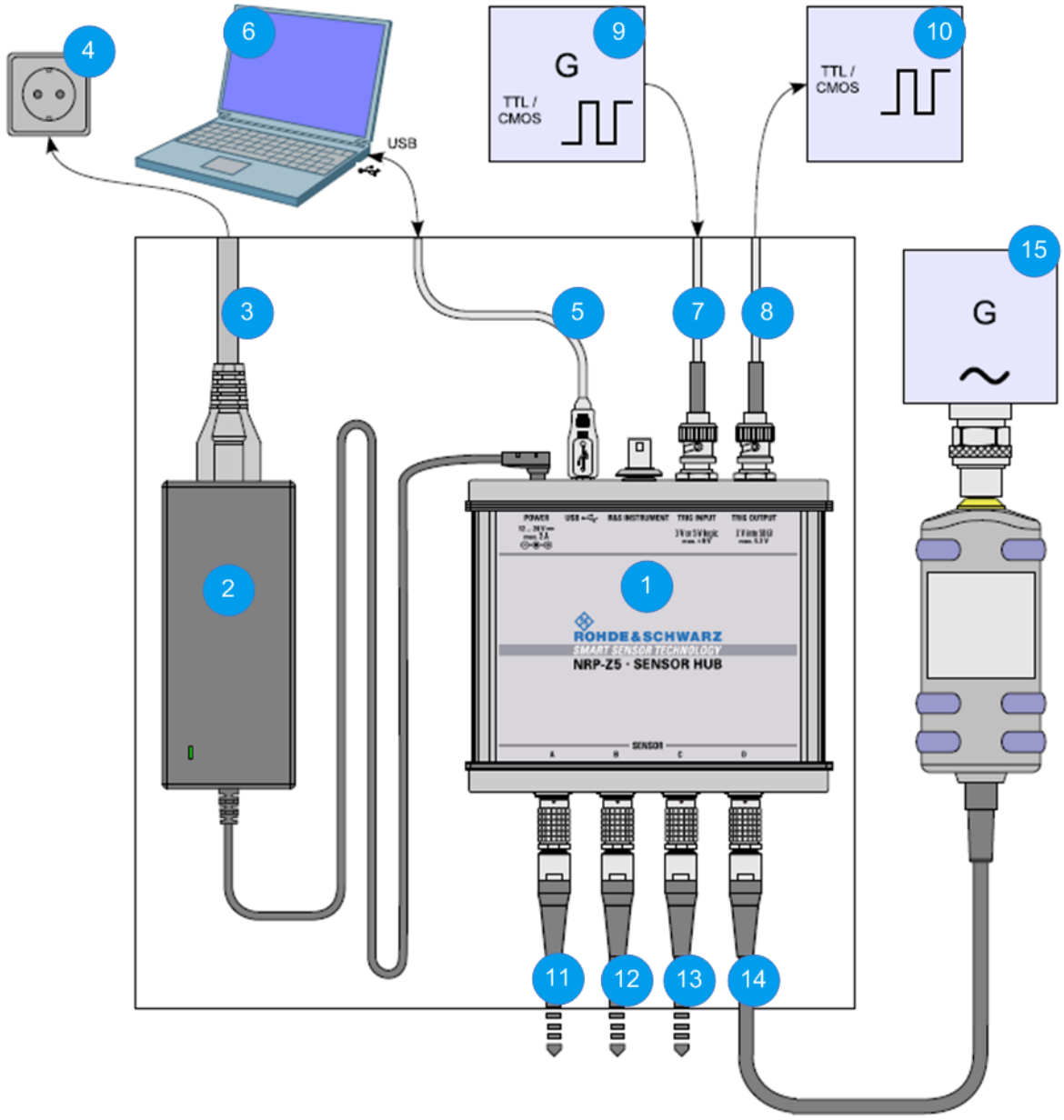


Figure 5-3: Setup with an R&S NRP-Z5 sensor hub

1 = R&S NRP-Z5 sensor hub
2 = External power supply unit (supplied)
3 = Power cable (supplied)
4 = AC power supply
5 = USB cable (supplied)
6 = PC with USB host interface
7, 8 = BNC cable (optional, not supplied)
9 = Trigger source (optional)

10 = Triggered device (optional)
11-14 = R&S NRP-Z power sensor
15 = Signal source

Incorrectly connecting/disconnecting the R&S NRP-Z power sensors may damage the power sensors or lead to erroneous results.

Ensure that you connect/disconnect your power sensors as described in Chapter 4.4, "Connecting the R&S NRP-Z Power Sensors", on page 14 and Chapter 4.5, "Disconnecting the R&S NRP-Z Power Sensors", on page 16.

1. Connect the cables as shown in Figure 5-3:
   a) Connect the power sensors to the R&S NRP-Z5 sensor hub. You can connect up to four sensors.
   b) Connect the R&S NRP-Z5 to the computer.
   c) Connect the power sensors to the signal source.
   d) Connect the delivered external power supply unit to the R&S NRP-Z5 and to an AC supply connector.
   e) Connect the R&S NRP-Z5 with a BNC cable to the trigger source (optional).
   f) Connect the R&S NRP-Z5 with a BNC cable to the trigger device (optional).
2. On the PC, start a software application to view the measurement results. See Chapter 6, "Operating Concepts", on page 24.

6 Operating Concepts

For operating the power sensor, you can choose from various possibilities.

Alternative to the methods of access described in this chapter, you can use remote control. For details, see:

- Chapter 7, "Remote Control", on page 37
- Operating manual of the R&S NRP-Z power sensor

- R&S NRP Toolkit 24
- R&S NRPV 29
- R&S Power Viewer 31
- R&S Power Viewer Mobile 32
- R&S NRP2 32
- Compatible Instrument 34

6.1 R&S NRP Toolkit

Before you start using the power sensors with a software solution, you have to install the R&S NRP Toolkit.

The R&S NRP Toolkit is the basic software package that supplies low-level drivers and tools for all power sensors. It is provided on your documentation CD-ROM and on the Rohde & Schwarz website. The content of the toolkit depends on your operating system.

To ensure that your power sensor is recognized properly by your system, first install the R&S NRP Toolkit on your laptop/PC and then connect your power sensor for the first time.

6.1.1 System Requirements

Hardware requirements:

- Desktop PC or laptop, or an Intel-based Apple Mac
- USB interface

- R&S NRP-Z3 or R&S NRP-Z4 USB adapter or R&S NRP-Z5 sensor hub

Supported operating systems:

- Microsoft Windows Vista 32/64-bit
- Microsoft Windows 7 32/64-bit
- Microsoft Windows 8 32/64-bit
- Microsoft Windows 10 32/64-bit
- Microsoft Windows XP 32-bit is available on request only.

R&S NRP Toolkit versions for Linux distributions and MacOSX are also available on request. To obtain an R&S NRP Toolkit for an operating system other than Microsoft Windows, contact the Rohde & Schwarz customer support:

customersupport@rohde-schwarz.com

6.1.2 Windows Operating System

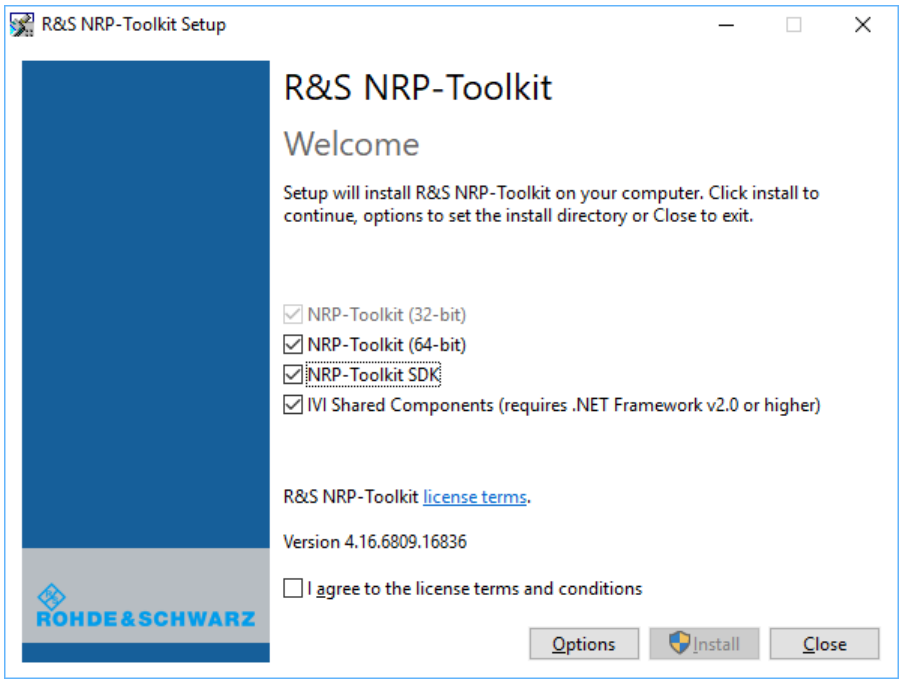
The R&S NRP Toolkit installer version for Windows-based systems contains the following components. Obligatory components are indicated.

- USB driver (obligatory)
- High level dynamic link library (NrpControl2) (obligatory)
- R&S NRP Toolkit SDK
- S-Parameter tool
  Program modules for loading an S-parameter table into the power sensor
- R&S NRP-Z uncertainty calculator and its PDF manual
- VxI plug&play with programming examples
  For installation, enable "NRP-Toolkit-SDK" during the installation of the R&S NRP Toolkit.
- Terminal (NrpTerm): low-level communication program for sending commands to the power sensor
- Firmware update (PureFW)
- Nrp Version Collector
  Tool for displaying version information of all installed, power measurement-relevant software packages.

To install the R&S NRP Toolkit

1. Start the R&S NRP Toolkit installer.

2. In the "Choose Components" dialog, select the components you want to install and accept the license terms to continue with the installation



3. Click "Next" and complete the installation process.

6.1.3 Linux-Based Systems

The R&S NRP Toolkit for a certain Linux distribution comes as a series of Debian (`*.deb`) or RPM (`*.rpm`) files. These files become installed through the standard installation process of the individual Linux distribution. See the `ReadMe` file that accompanies the R&S NRP Toolkit for further instructions.

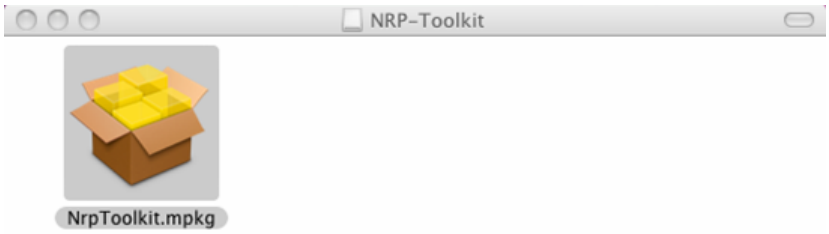
6.1.4 Mac OS X

The R&S NRP Toolkit installer version for Mac OS X contains the following components:

- Low-level driver: `RsNrpLib.framework`
- VXI PnP driver: `RsNrpz.framework`
- HTML help files for the VXI PnP driver
- Power Viewer Plus and its PDF manual
- Example programs for use with VXI PnP driver

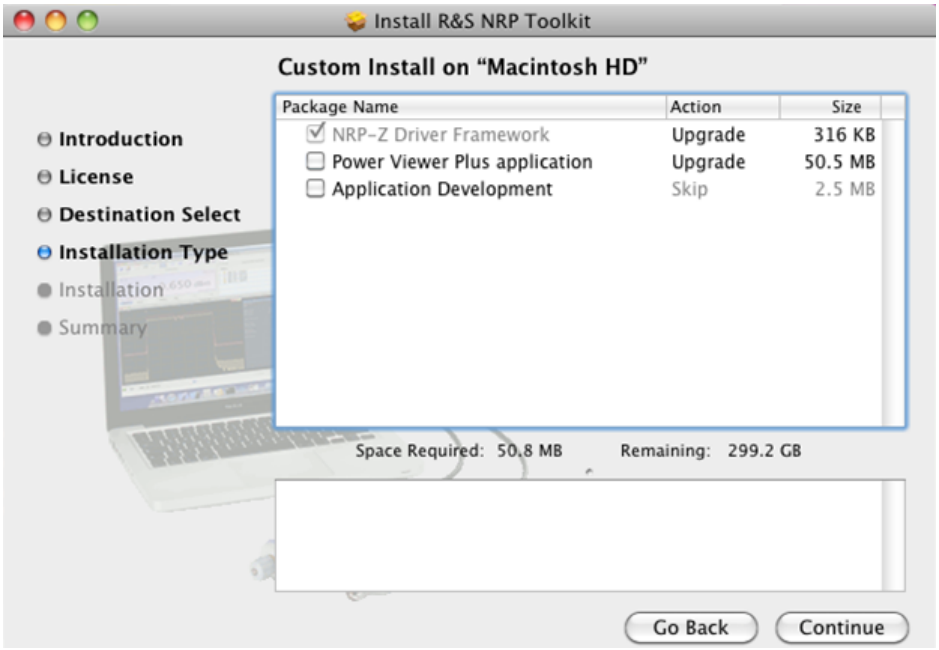
To install the R&S NRP Toolkit

1. In the Mac OS X Finder, double-click the provided .dmg disk image to mount it.
2. Double-click the `NrpToolkit.mpkg` installer to start the installation.



The R&S NRP Toolkit installer opens. The welcome message gives an overview of the packages that are part of the installer and indicates their default installation location.

3. Accept the license terms to continue with the installation.
4. Select the components you want to install and click "Continue" to complete the installation process.



a) R&S NRP-Z Driver Framework (obligatory).
b) Enable the "Power Viewer Plus application" (optional).
c) Enable "Application Development" (optional). You can use these examples as starting points for your own implementations.

5. Click "Continue" and complete the installation process.

   After a successful installation, you can start the applications provided with the R&S NRP Toolkit from the `Rohde-Schwarz` folder that was created in the Mac OS X application directory.

6.1.5 Performing a Firmware Update

Use the firmware update program (PureFW) to load new firmware for the power sensors. It is part of the R&S NRP Toolkit that is supplied on a CD-ROM together with the power sensors. For further details, refer to the operating manual.

6.2 R&S NRPV

The R&S NRPV enables you to measure power in all available measurement modes. Also, you can use up to four power sensors simultaneously.

The R&S NRPV software can be installed on any Windows PC. It is provided on your documentation CD-ROM and on the Rohde & Schwarz website as a separate standalone installation package. To make full use of its functionalities, you must activate your R&S NRP-Z power sensor with a license key.

Required equipment

- R&S NRP-Z power sensor
- R&S NRP-Z3, R&S NRP-Z4 or R&S NRP-Z5
- Windows PC with installed:
  - R&S NRP Toolkit
  - R&S NRPV (refer to the operating manual of the R&S NRPV for a description of the installation process)
- License key (R&S NRPZ-K1 option) for activating the power measurements for your R&S NRP-Z power sensor

Setup

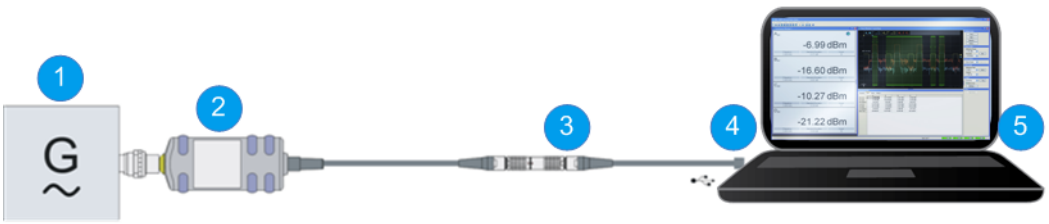


Figure 6-1: Setup with an R&S NRP-Z4 and an R&S NRPV

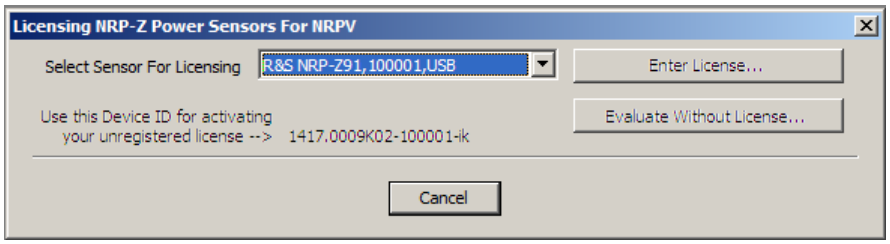
1 = Signal source
2 = R&S NRP-Z power sensor
3 = R&S NRP-Z4
4 = USB connector
5 = PC with installed R&S NRPV

Incorrectly connecting/disconnecting the R&S NRP-Z power sensors may damage the power sensors or lead to erroneous results.

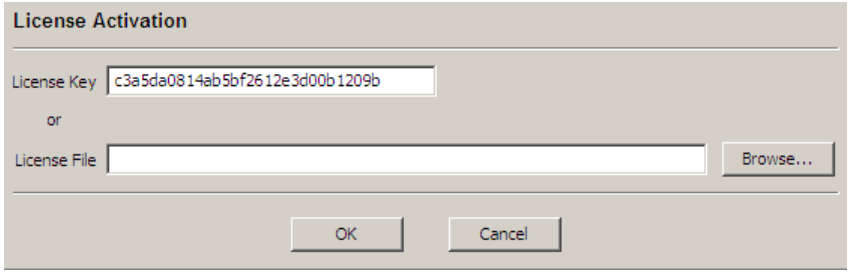
Ensure that you connect/disconnect your power sensors as described in Chapter 4.4, "Connecting the R&S NRP-Z Power Sensors", on page 14 and Chapter 4.5, "Disconnecting the R&S NRP-Z Power Sensors", on page 16.

Starting a measurement

1. Connect the power sensor to the PC as shown in Figure 6-1.
2. On the PC, start the R&S NRPV software.
3. Connect the power sensor to the PC. For a detailed description, see Chapter 5, "Connecting to a PC", on page 18.
4. If you use the power sensor for the first time with the R&S NRPV software, activate the sensor using a license key:
   a) In the "File" menu, select "File" > "Licensing".
   The "Licensing NRP-Z Power Sensors for NRPV" dialog opens.



   b) Select your power sensor.
   c) Select "Enter License".
   The "License Activation" dialog opens.



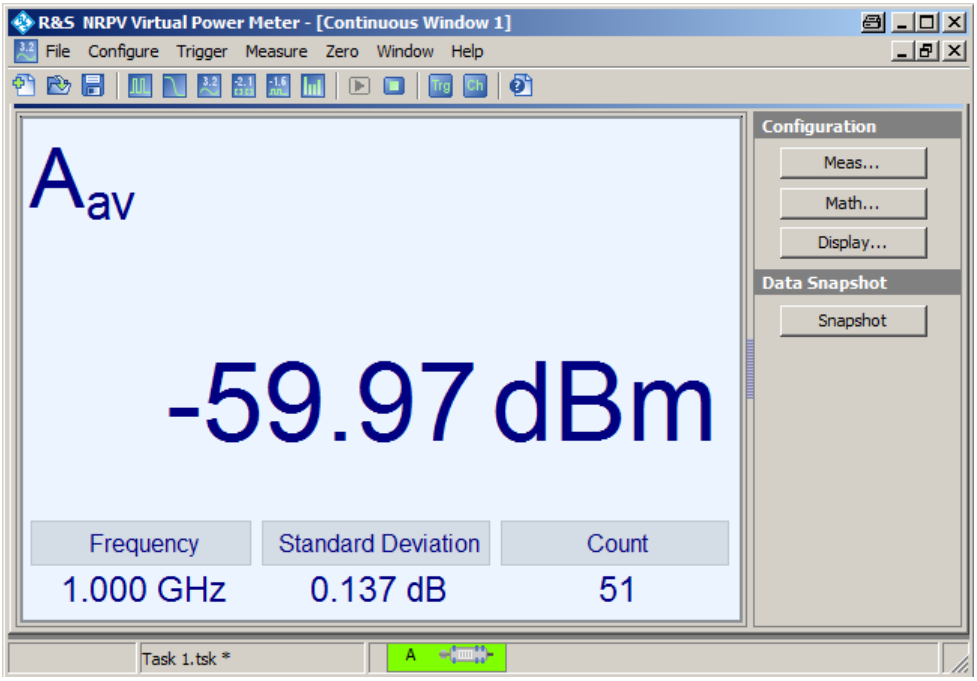
   d) Enter the license key either manually or with the key code file.

e) Confirm with "OK" to return to the "Licensing NRP-Z Power Sensors for NRPV" dialog. The dialog indicates all currently connected sensors.

Note: If you want to evaluate the R&S NRPV before buying a license for your power sensor, you can activate a sensor for temporary use. To do so, select "Evaluate Without License" in the "Licensing NRP-Z Power Sensors for NRPV" dialog. For a detailed description, refer to the operating manual of the R&S NRPV.

5. Switch on the test signal of the signal source.
6. To start a continuous measurement, select "Measure" > "Continuous".

   The "Continuous" measurement window appears. It shows the measurement results numerically, and the control panel for accessing further dialogs with parameters for measurement, evaluation and display.



For a detailed description of how to measure in this setup, refer to the operating manual of the R&S NRPV.

6.3 R&S Power Viewer

The R&S Power Viewer is software that simplifies many measurement tasks. It is provided on your documentation CD-ROM and on the Rohde & Schwarz website as a separate standalone installation package.

For details on installing and operating the R&S Power Viewer, refer to its operating manual. The manual is provided on the documentation CD-ROM and is installed automatically during the installation of the R&S Power Viewer.

If you want to use an android device like a tablet or a smartphone, use the R&S Power Viewer Mobile. For details, see Chapter 6.4, "R&S Power Viewer Mobile", on page 32.

6.4 R&S Power Viewer Mobile

The R&S Power Viewer Mobile extends the functionality of the R&S Power Viewer to Android-based devices, such as a smartphone and tablets.

You can download the R&S Power Viewer Mobile free of charge from the Google Play Store.

The 1MA215 "Using R&S®NRP Series Power Sensors with Android™ Handheld Devices" application note gives a detailed description on installation and features of the R&S Power Viewer Mobile. The application note is provided on the documentation CD-ROM.

6.5 R&S NRP2

With the R&S NRP-Z power sensors and an R&S NRP2, you can measure power with up to four power sensors simultaneously, depending on the base unit configuration. All sensor-dependent measurement functions can be used and the results can be displayed in parallel.

Required equipment

- R&S NRP-Z power sensor
- R&S NRP2 base unit

Setup

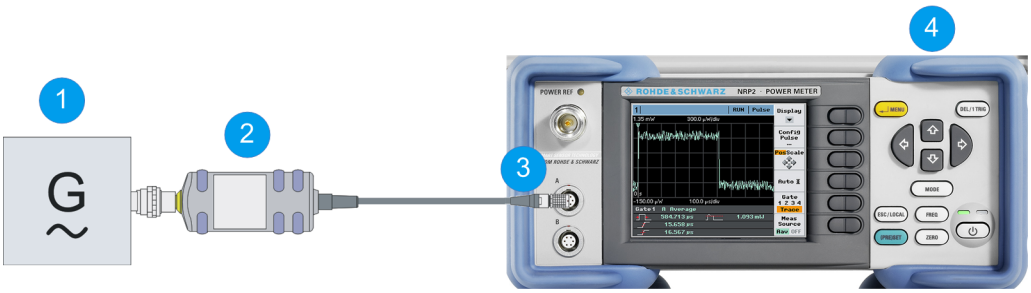


Figure 6-2: Setup with an R&S NRP2 base unit

1 = Signal source
2 = R&S NRP-Z power sensor
3 = SENSOR connector of the R&S NRP2
4 = R&S NRP2 base unit

Incorrectly connecting/disconnecting the R&S NRP-Z power sensors may damage the power sensors or lead to erroneous results.

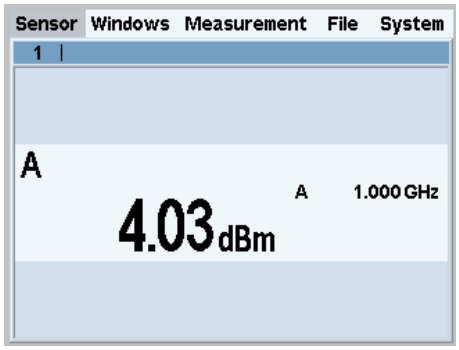
Ensure that you connect/disconnect your power sensors as described in Chapter 4.4, "Connecting the R&S NRP-Z Power Sensors", on page 14 and Chapter 4.5, "Disconnecting the R&S NRP-Z Power Sensors", on page 16.

Starting a measurement

1. Connect the power sensor to the [SENSOR] connector of the R&S NRP2 as shown in Figure 6-2.
2. Preset the R&S NRP2.
3. Execute zeroing.

   Note: Turn off all test signals before zeroing. An active test signal during zeroing causes an error.
4. Connect the power sensor to the signal source.

   The result window indicates the result (in dBm) obtained with sensor A.



5. If necessary, perform further settings.

For a detailed description of how to measure in this setup, refer to the operating manual of your R&S NRP2.

6.6 Compatible Instrument

Many Rohde & Schwarz instruments allow power measurements using the R&S NRP-Z power sensors. For example, the power sensors can be used with a signal generator to achieve stable and accurate RF power, which can be further supplied to your DUT.

You can connect the power sensors to the following instrument connectors:

- Directly to the SENSOR connector
- To the USB port of the instrument, using an R&S NRP-Z3 or R&S NRP-Z4 USB adapter
- To the USB port of the instrument, using an R&S NRP-Z5 USB hub

Refer to the operating manual of your Rohde & Schwarz instrument to find out if it supports power measurements with the R&S NRP-Z power sensors.

Required equipment

- R&S NRP-Z power sensor
- Compatible Rohde & Schwarz instrument
- R&S NRP-Z3 or R&S NRP-Z4 USB adapter or an R&S NRP-Z5 sensor hub (optional)

Setup

Figure 6-3: Setup with an R&S SMF

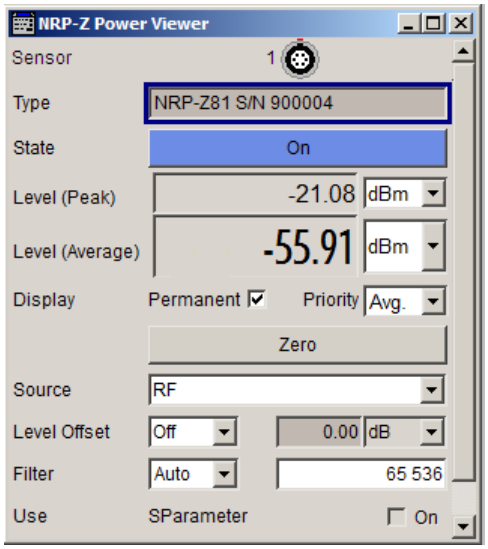
1 = R&S SMF
2 = Device under test (DUT)
3 = R&S NRP-Z icon
4 = [SENSOR] connector
5 = R&S NRP-Z Power Sensors
6 = RF output of the DUT
7 = [RF OUT] connector of the R&S SMF
8 = RF input of the DUT

Incorrectly connecting/disconnecting the R&S NRP-Z power sensors may damage the power sensors or lead to erroneous results.

Ensure that you connect/disconnect your power sensors as described in Chapter 4.4, "Connecting the R&S NRP-Z Power Sensors", on page 14 and Chapter 4.5, "Disconnecting the R&S NRP-Z Power Sensors", on page 16.

Starting a measurement

1. Connect the cables as shown in Figure 6-3:
   a) Connect the DUT to the [RF OUT] connector of the R&S SMF.
   b) Connect the DUT to the [RF] connector of the power sensor.
   c) Connect the power sensor to the [SENSOR] connector of the R&S SMF.
2. On the R&S SMF, open the "NRP-Z Power Viewer" dialog.



The dialog shows the result (in dBm) and some additional parameters.

3. If necessary, perform further settings.

For a detailed description of how to measure in this setup, refer to the operating manual your compatible Rohde & Schwarz instrument.

7 Remote Control

Use remote control to integrate the R&S NRP-Z power sensors into custom automatic test equipment (ATE) systems. The latest version of the available instrument drivers is part of the R&S NRP Toolkit SDK under Windows.

For a detailed description on how to perform different remote measurements, refer to various sample programs installed with the R&S NRP Toolkit SDK, or the application note "1GP69: R&S®NRP-Z Power Sensor Programming Guide".

8 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, or follow this QR code:

Figure 8-1: QR code to the Rohde & Schwarz support page

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