R&S® NRP-Toolkit

Release Notes
Version 4.24.1

Test and Measurement

Release Notes

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1 General information

This package contains the R&S® NRP-Toolkit software. This software is designed to work with all R&S®NRP® USB power sensors as well as the frequency selective power sensor NRQ6.

The R&S®NRP-Toolkit contains the following components:

- Windows USB kernel-mode driver (WHQL certified) for NRP Power Sensors
- Windows USB "userland" interface driver (NrpControl2.dll)
- Tool for assigning network parameters of Network Sensors via a (temporary) USB connection (NrpNetSet). This tool also displays Zeroconf TCP/IP address assignments
- Firmware Update Tool (NrpFirmwareUpdate)
- Tool to determine the extended measurement uncertainty of NRP Power Sensors (NrpUncertaintyCalc.exe)
- Terminal Tool for NRP USB Sensors (NrpTerm2)
- S-Parameter Update Tool (to load/save S2P files to/from sensor)
- Tool to display version information of installed NRP products related software (NrpVersionCollector)

The supplied drivers fully support both 32-bit and 64-bit PC architectures.

Additionally there are separate packages available for users/programmers who are to be integrating the R&S®NRP® USB power sensors in their own applications. For this group of persons, the so called VXI Plug&Play driver package is available. For the sake of simplicity, the NRP-Toolkit installer V4.4 (and higher) comes with this driver by default and installs it right after the installation of the lower driver layers.

Optionally the NRP-Toolkit installer offers the installation of a so called SDK (Software Development Kit) which puts source code and link libraries for a couple of demo programs to a common directory (`C:\ProgramData\Rohde-Schwarz\NRP-Toolkit-SDK`)

- 32-bit & 64-bit link libraries (rsnrpz_32.lib, rsnrpz_64.lib)
- Header files for development of own applications
- Demo applications
  (source code in various languages [C, C#, C++, Python, …])

An interactive application supporting multiple simultaneously used sensors can also be downloaded from the R&S® website
- Virtual Power Meter (NRPV [supporting multiple sensors/channels])

Note: *Starting with NRP Toolkit 4.23, we no longer guarantee support for Windows Versions older than Windows 10.*

WIN7 as well as WINXP is EoL from Microsoft side and no longer supported by them. Our kernel driver signatures are provided for Windows 10 and above only. Hence both

WIN versions are not supported anymore for any application although they might work in practice.

Note: This brochure describes the usage of the power sensors under Windows desktop operating systems. There are separate driver packages available for 32-bit and 64-bit Linux operating systems. These packages come as installable *:deb or *.rpm packages for popular Linux distributions. Besides this a MacOSX package is available. Furthermore, most R&S® USB power sensors are useable with selected Android devices (Smartphones, Tablets, Phablets).

Please contact our support if you are interested in application areas other than Microsoft Windows®.

Note: The operation of the frequency selective power sensor NRQ6 requires an installed VISA on the controlling host. This is not part of the present NRP-Toolkit. If a VISA is not yet installed on your PC, please refer to

https://www.rohde-schwarz.com/de/applikationen/r-s-visa-application-note_56280-148812.html

for downloading the R&S VISA installer free of charge.

2 Information on the Current Version and History

Hint: If you are searching the free user application **Power Viewer** (formerly known as **Power Viewer Plus**) you can download it separately from the Rohde & Schwarz website. Power Viewer is not part of the NRP-Toolkit and is not required for operating the tools and applications, which come with the NRP-Toolkit.

2.1 Version 4.24.1

Released: July 2024

Functional improvements:

- adding support for NRP8E, NRP18E
- Introducing **NrpFirmwareUpdate** tool instead of PureFW
  - can update base devices
  - can update NRP sensor family
  - can update NRT-Z43 and NRT-Z44 family sensors
  - will open FW update file selector in preselected path

Issues eliminated:

- Fixed Version Display which was not showing S2P Wizard

2.2 Version 4.23.8851.17818

Released: March 2024

Functional improvements:

- adding support for NRP170TWG, NRP140TWG

Issues eliminated:

- Fixed Uncertainty Calculator which did not select/activate the corresponding sensor-type when data was loaded from newer network sensor models
- Improving S2P Wizard
- Fixed Version Display which was not showing S2P Wizard

2.3 Version 4.23

Released: June 2023

Functional improvements:

- New release of USB driver, including support for NRP90S[N] three-path diode sensor, and support for NRP18P, NRP40P and NRP50P wideband sensors (= NRP-Z8x successors).
- Updated PureFW (= firmware update program) for supporting the new power sensors and the new NRT-Zxx series directional power sensors (via COMnn serial interface)
- Added NRP67S[N] and NRP90S[N] to Uncertainty Calculator
- Added new utility 'S2P_Wizard' for easily storing/removing S-parameter data to/from NRPxxX power sensors
- Updated VISA shared components to v7.2

Issues eliminated:

- The program for configuring network sensors now re-reads the current network setting whenever the selected sensor changes to avoid showing old/outdated information
- Fixed Uncertainty Calculator which did not select/activate the corresponding sensor-type when data was loaded from a network sensor

2.4 Version 4.20

Released: August 2020

Functional improvements:

- New release of USB driver, including support for new 90 GHz thermal power sensors (NRP90T, NRP90TN) and NRP67SN-V TVAC (thermal vacuum) Three-path Diode Power Sensor

2.5 Version 4.17

Released: February 2020

Functional improvements:

- New release of WHQL Certified USB driver, including new waveguide power sensors
- Extended various tools to support new base unit NRX
- Extended the number of supported sensors from 32 to 63

Issues eliminated:

- NRQ sample programs from NRP-Toolkit-SDK now use the full SENS:BAND:RES command for resolution bandwidth setting. In previous NRQ firmware versions the :RES part was optional

2.6 Version 4.16

Released: September 2018

Functional improvements:

- Added Multicast-DNS Service Discovery (mDNS-SD) functionality to Network Sensor Configuration tool
- Display for Zeroconf network parameters
- Added an extensive guide for setup and troubleshooting of the Ethernet interface of Network Sensors

Issues eliminated:

Fixed possible deadlock under sustaining error condition of sensor (for example, by permanent 'permissible input power exceeded')

2.7 Version 4.15

Released: April 2018

Functional improvements:

- Added support for frequency selective power sensor NRQ6
- Added Python and C/C++ samples to NRP-Toolkit-SDK for demonstrating various NRQ6 measurement modes (located in `C:\ProgramData\Rohde-Schwarz\NRP-Toolkit-SDK\examples\NRQ\` after installation)

Issues eliminated:

- Fixed redundant warning in S-Parameter tool when using R&S VISA v5.8.4

2.8 Version 4.14

Released: February 2018

Functional improvements:

- Fixed installer to register OCX modules which are required by S-Parameter Multi application
- Fixed problem with auto-detection of CAL:USER:DATA after a sensor firmware change

2.9   Version 4.13

Released: November 2017

Functional improvements:

- Added a tool to set (TCP/IP) network-parameters of NRPxxX**N** sensors via USB port of the corresponding sensor
- Enhanced resource string evaluation; a trailing '`::INSTR`' is now silently ignored
- Fixing sign propagation in 64-bit compilations for function which translates error-numbers into error-messages (= `rsnrpz_error_message()` in VXI Plug&Play driver)

2.10   Version 4.12

Released: September 2017

Functional improvements:

- Fixed NRP Uncertainty calculator (swapped temperature range of NRP110T)

2.11   Version 4.11

Released: June 2017

Functional improvements:

- Improved version of Firmware Update program 'PureFW'. The program now supports firmware update of new base devices

2.12   Version 4.10

Released: September 2016

Functional improvements:

- Improved MacOSX implementation
- Improved multi-thread capability of contained VXI Plug&Play driver 'rsnrpz' (all OSes)
- Fixed handling/re-usage of open sessions under LabView environment.

2.13 Version 4.9

Released: Juli 2016

Functional improvements:

- R&S internal release; added libraries again for 32-bit Windows XP from older NRP-Toolkit to support existing XP device installations. This is **not** included in the package which is released to the public.

2.14 Version 4.8

Released: June 2016

Functional improvements:

- Updated WHQL certification for actual USB driver and sensor models.
- Added support for NRPC18, NRPC33, NRPC40, NRPC50, NRPC67, NRPC18-B1, NRPC33-B1, NRPC40-B1, NRPC50-B1, NRPC67-B1, NRPM3, NRPM3N
- Added handling of binary data (read & write) to NrpTerm2
- All tools and user-land driver are compiled with Visual Studio 2015; including appropriate runtime libraries (vc14.0) in installer

2.15 Version 4.7

Released: December 2015

Functional improvements:

- Maintenance release. Improved handling of plug-/unplug events under Windows CE
- Added missing USB IDs of some special sensor models
- Windows 10 (32-/64-bit) now officially supported
- Dropped Windows XP support
- Fixed spurious race-condition in (separately available) R&S NRP Visa Passport driver
- Added function to retrieve overview of sensors attached to different applications in multi-application szenarios (usage map)
- Mentioned the existence of the Uncertainty Calculator also in the release notes

2.16 Version 4.6

Released: September 2015

Functional improvements:

- Maintenance release. Implementation of multi-application functionality in other high-level drivers and various sample programs

2.17 Version 4.5

Released: August 2015

Functional improvements:

- Made low-level driver capable of being used in multiple applications simultaneously. Introduced a new status information (NRP_ERROR_SENSOR_IN_USE) for synchronizing multiple instances
- Enhanced upper driver layers in order to take 'sensor-is-in-use' status into account
- Improved various applications and sample programs to take 'sensor-is-in-use' status into account
- Fixed NRP VISA Passport driver (available as a separately downloadable package)
- Separated Power Viewer Plus from NRP-Toolkit. Power Viewer Plus V7.1 and higher comes in a separately installable package now
- Added more sample programs to the NRP-Toolkit-SDK (including samples for using power sensors with VISA and NRP VISA Passport under C/C++ and C#)

2.18 Version 4.4

Released: June 2015

Functional improvements:

- Added latest kernel-mode device drivers for new R&S® NRP USB devices (WHQL certified)
- VXI Plug&Play driver no longer is an optional component; it is installed always now
- Improved NrpVersionCollector application which displays versions of installed software packages
- Fixed uninstaller issues

2.19 Version 4.3

Released: May 2015

Functional improvements:

- New installer structure. Single installer for 32-bit & 64-bit drivers and optional SDK (Software Development Kit) with programming examples
- Installer option for deploying IVI Shared Component containing USBTMC driver (necessary for NRPxxS/NRPxxSN series power sensors)
- Improved firmware-update tool (PureFW) supporting Zero-Conf sensor connections
- Fixed rendering issues of WebGUI
- Added tool to display version information of all relevant currently installed drivers
- New version of Power Viewer Plus, Version 7.0

2.20 Version 4.2.0

Released: November 2014

Functional improvements:

- Synchronized device change events for NRPxxS[N] series sensors with the end of the boot procedure of the firmware
- Added new, re-written S-Parameter tool
- Added optional VXI Plug&Play driver installation and demo programs

Known issues:

- Firmware update program PureFW sometimes ends prematurely when updating NRPxxS[N] series sensors via network (but firmware update succeeds anyway)

- Firmware update program PureFW sometimes has access violation on Windows XP

- WebGUI of NRPxxSN network sensor may exhibit rendering errors when used with Internet Explorer. If possible, a different browser should be used

- Uninstallation of NRP-Toolkit on a system with activated UAC sometimes leaves an empty NRP-Toolkit folder in the Start Menu until next reboot

2.21 Version 4.1.0

Released: September 2014

Functional improvements:

- Added support for additional power sensors (NRPxxS[N] series)

- New tools for Firmware Update, S-Parameter management and basic interactive I/O
- Included new Terminal Tool NrpTerm2 replacing ancient USB Term

2.22 Version 4.0.0

Released: August 2014

Functional improvements:

- Updated WHQL certified kernel-mode drivers for Microsoft Windows® 7 (32-bit/64-bit) and Windows® 8 (32-bit/64-bit)
- Added useful Uncertainty Calculator tool and documentation
- Fixed NRP-Z5 support where the runtime environment could have been initialized twice under certain conditions
- New version of Power Viewer Plus, Version 6.4

2.23 Version 3.1.0

Released: May 2013

Functional improvements:

- Introduced new WHQL certified kernel-mode drivers, adding support for Microsoft Windows® 8 (32-bit/64-bit)
- Locale independent floating point data entry in vintage Power Viewer
- New version of Power Viewer Plus, Version 6.1

2.24 Version 2.3.1

Released: January 2013

Functional improvements:

- Added support for R&S® USB Hub R&S® NRP-Z5
- New version of Power Viewer Plus, Version 5.9

2.25 Version 2.2.0

Released: July 2012

Functional improvements:

- New version of Power Viewer Plus, Version 5.6

2.26   Version 2.1.19

Released: May 2012

Functional improvements:

- Power Viewer Plus, Version 5.5
- MacOS and Linux: Updated VXI PnP driver
  - Zeroing function has timed out with NRP-Z8x sensors
  - Fixed potential dead-lock situation in rsnrpz_isMeasurementComplete()
- MacOS: Updated list of supported NRP-Z sensors in NrpLib driver

2.27   Version 2.1.18

Released: April 2012

Functional improvements:

- Power Viewer Plus, Version 5.4

2.28   Version 2.1.17

Released: March 2012

Intermediate release

- Intermediate. Not publically released

2.29   Version 2.1.16

Released: January 2012

Functional improvements:

- Power Viewer Plus, Version 5.3

2.30   Version 2.1.15

Released: October 2011

Functional improvements:

- Power Viewer Plus, Version 5.0

2.31 Version 2.1.14

Released: July 2011

Functional improvements:

- Bugfix in Silent Installation

2.32 Version 2.1.12

Released: February 2011

Functional improvements:

- Added new NRP Sensors to USB Driver (NRP-Z211, NRP-Z221)
- Power Viewer Plus, Version 4.1

Issues eliminated:

- -

2.33 Version 2.1.10

Released: February 2011

Functional improvements:

- Firmware Update: changed messages during the progress to prevent sensor unplugging
- Power Viewer Plus, Version 4.0

Issues eliminated:

- -

2.34 Version 2.1.6

Released: August 2010

Functional improvements:

- New S-Parameter Update Tool to load more S2P files into an NRP-Z81

- No Wizards or other Dialogs occur after plugging a new sensor to the PC
- Power Viewer Plus, Version 3.3

Issues eliminated:

- -

3 Installation

3.1 Prerequisites

The R&S NRP-Toolkit software is designed to run on a Microsoft Windows based operating system (Windows 10, 11). The R&S NRP-Toolkit installation requires about 70 Megabytes of free space on the hard disk.

The traditional R&S NRP-Z series of power sensors as well as the newer R&S NRPxxS/SN, NRPxxA/AN and NRPxxT/TN series are self-contained measurement device which can directly be connected to a PC's USB port. For the R&S NRP-Z series either the R&S NRP Z3 or Z4 adapter cable is necessary. The NRPxxS/SN, NRPxxA/AN, NRPxxT/TN series power sensors come with a detachable USB adapter cable for connection to a PC (when orders with NRP-ZKU option). If the passive NRP Z4 or the NRP-ZKU cable is used the USB port must be capable of driving high power USB devices up to 500 mA.

Note: Starting with NRP Toolkit 4.23, we no longer guarantee support for Windows Versions older than Windows 10.

WIN7 as well as WINXP is EoL from Microsoft side and no longer supported by them. Our kernel driver signatures are provided for Windows 10 and above only. Hence both WIN versions are not supported anymore for any application although they might work in practice.

Note: If you are up to use the frequency selective power sensor NRQ6, an installed VISA is required on the controlling host. If you do not yet have a VISA on your PC, please navigate to

https://www.rohde-schwarz.com/de/applikationen/r-s-visa-application-note_56280-148812.html

From there you can download the R&S VISA installer free of charge.

3.2 Execution of the Installer program

After downloading the R&S® NRP-Toolkit Installer executable simply start the `*.exe` file. The main dialog provides the selection of including optional packages.
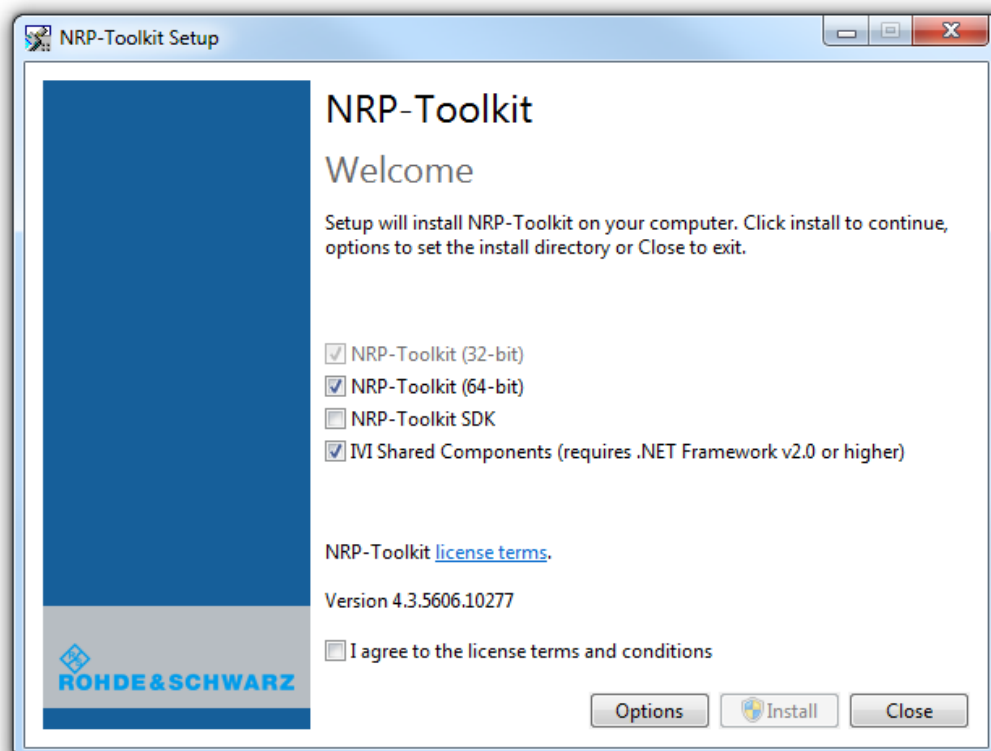
The basic package(s) with the low-level drivers (Kernel modules) need to be installed always. If you plan to develop individual programs, the SDK option (Software Development Kit) should also be selected. This provides header-files, link libraries and example source code for programmers -- these parts will be installed in `C:\ProgramData\Rohde-Schwarz\NRP-Toolkit-SDK`.

The NRPxxS/SN, NRPxxA/AN and NRPxxT/TN series power sensors constitute composite USB devices. This means, the devices provide a USBTMC interface and the traditional (so called NRP Legacy) interface in parallel. Therefore the NRP-Toolkit Installer has an option to add the driver for the USBTMC interface by means of the corresponding IVI Shared Component.

There are some command-line switches for the NRP-Toolkit installer which allow system integrators to call the installer from their own installation procedure. In this case it is often desirable to run the sub-installer silently. There could also be situations where you don't want to install the IVI Share Components (for example, because you already have them on the system)

Command-line switch	Description
/install | /repair | /uninstall | /layout	Installs, repairs, uninstalls the NRP-Toolkit or creates a complete local copy of the bundle. '/install' is the default
/passive | /quiet	Displays minimal user interface with no prompts or displays no user interface at all
/norestart	Suppress any attempts to restart. By default the user interface will prompt before restart
/log <filename.txt>	Logs to a specific file. By default a log file is created in the system's temp directory (%TEMP%)
InstallUsbTmc=1|0	Select or deselect IVI Shared Components for Installation

Examples (the version numbers are only placeholders):

```
NrpToolkit-4.3.5606.10277  /install  /quiet  InstallUsbTmc=0

NrpToolkit-4.3.5606.10277  /uninstall  /passive

NrpToolkit-4.3.5606.10277  /install  /log NrpToolkit_DevServer.txt
```

3.3 Update Procedure

The R&S® NRP-Toolkit Installer is capable of updating a previously installed (older) USB device driver on your system. This procedure removes any existing NRP driver from the Windows installation and clears corresponding registry entries. Subsequently the new device drivers become installed. This process may take several minutes.

Whenever USB drivers are updated it is required that the sensors are unplugged and reconnected again. Windows automatically installs the appropriate driver as soon as each sensor is connected initially to the PC.

Note: If you did not install the R&S® NRP-Toolkit software, Windows will not be able to access the power sensor(s). Instead, the Windows device manager shows an unknown USB device that is marked with a yellow exclamation mark. In this case, please proceed as follows:

- *Abort the dialog for driver installation.*
- *Install the R&S®NRP-Toolkit from the CD-ROM or from your downloaded package. Then manually assign the USB driver from the NRP-Toolkit to the R&S® NRP device.*
- *Go to Control Panel – Add/Remove Hardware and start the hardware assistant to search for new components.*
- *Select the R&S® NRP power sensor in the list of hardware components and complete the driver installation.*
- *Unplug the power sensor and reconnect it.*

4 Customer Support

Technical support – where and when you need it

For quick, expert help with any Rohde & Schwarz equipment, contact one of our Customer Support Centers. A team of highly qualified engineers provides telephone support and will work with you to find a solution to your query on any aspect of the operation, programming or applications of Rohde & Schwarz equipment.

Up-to-date information and upgrades

To keep your instrument up-to-date and to be informed about new application notes related to your instrument, please send an e-mail to the Customer Support Center stating your instrument and your wish. We will take care that you will get the right information.

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