R&S®ZNXSIM
Vector Network Analyzer
PC Simulation
Getting Started

ROHDE&SCHWARZ

Make ideas real

This document gets you started with the Rohde & Schwarz vector network analyzer PC simulation. It covers the following products and options:

- R&S®ZNPC, license dongle for local licenses (1325.6601.02)

- R&S®ZNPC-FL, license dongle for floating licenses (1325.6601.03)

- R&S®ZNXSIM-K1, simulation of R&S®ZNB/ZNBT/ZND
  local license (1334.4066.02) or floating license (1334.4066.51)

- R&S®ZNXSIM-K2, simulation of R&S®ZNA
  local license (1338.1626.02) or floating license (1338.1626.51)

- R&S®ZNXSIM-K22, time domain analysis for R&S®ZNXSIM-K1 or R&S®ZNXSIM-K2
  local license (1338.1632.02) or floating license (1338.1632.51)

1 Introduction

With the R&S ZNXSIM Vector Network Analyzer PC Simulation you can have all the functions of a R&S ZNA, R&S ZNB, R&S ZNB or R&S ZND on your desktop – always accessible, even when you do not have access to the hardware.

The same software that runs on the instrument (firmware) is used to run the simulation.

- The R&S ZNA firmware simulates all available R&S ZNA models. It can be installed in parallel with a R&S ZNB or R&S ZND firmware, but only one of them can be run at a time.
- The R&S ZNB firmware can be run as R&S ZNB, R&S ZNBT, or R&S ZND (see Figure 4-1). It also comprises the documentation for all these instruments.
- The R&S ZND firmware can also simulate a R&S ZNB or R&S ZNBT, but only comprises the R&S ZND docs. Because R&S ZNB and R&S ZND firmware cannot be installed in parallel, only install the R&S ZND firmware if you are not interested in simulating a R&S ZNB or R&S ZNBT.

2 Installation

This section explains how to install a R&S ZNA, R&S ZNB/BT or R&S ZND simulation on your PC.

System requirements

The firmware requires 64-bit Windows (Windows 10 or Windows 7) with administrative privileges during installation.

1. Download the latest instrument firmware installer from the R&S ZNXSIM firmware website (https://www.rohde-schwarz.com/firmware/znxsim).

2. Run the firmware installer and follow its instructions.
   Provide your admin credentials, if requested by the Windows user account control ("Do you want to allow this app to make changes to your device" under Windows 10). Also please accept the installation of Rohde & Schwarz device software.
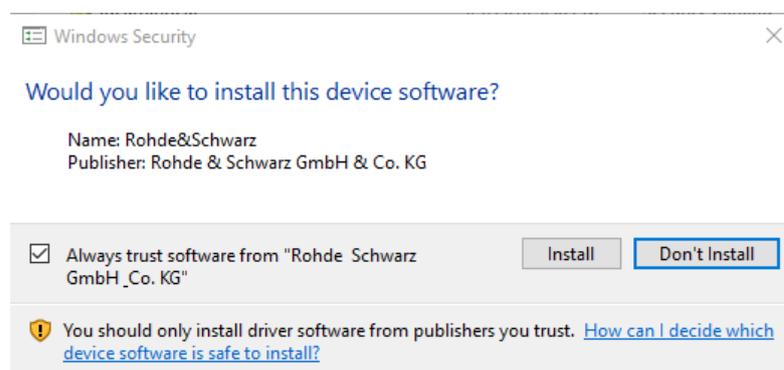
3 Licensing

Running a firmware simulation requires a dedicated software license:

- Option R&S ZNXSIM-K1 for R&S ZNB, R&S ZNBT or R&S ZND
- Option R&S ZNXSIM-K2 for R&S ZNA

Licenses are available as local and floating variants. While **local** licenses must be available on the PC running the simulation, **floating** licenses can also reside on remote license servers. These remote license servers must be reachable by the PC's license server via LAN.

R&S ZNPC license dongle

R&S ZNXSIM licenses "live" on dedicated R&S ZNPC IC chips that are delivered as a smart card and a USB dongle. You can either use the smart card with a smart card reader, or remove the license chip and insert it into the USB dongle.
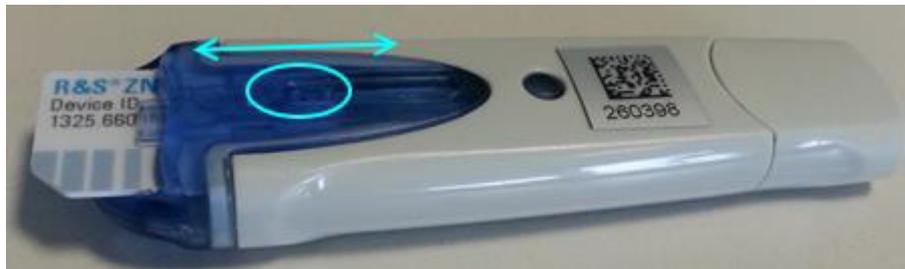
Figure 3-1: R&S ZNPC license dongle

In any case, the license chip must be properly detected by the license server instance on the PC it is physically connected to. Make sure the RSSmartCardService driver is installed, when the smart card or dongle is connected to this PC for the first time.

R&S License Server

The R&S License Server is used for option management on a PC, device or server. It supports:

- parallel usage of local dongles by multiple applications ("shared access")
- license verification via LAN, using https connections to central license servers with floating licenses

The R&S License Server is installed with the VNA simulation.

If the VNA simulation complains about missing licenses, run the R&S License Server Manager browser app from the Windows start menu of the simulation PC ("Start" > "R&S License Server" > "R&S License Server Manager"). Make sure the required R&S ZNPC licenses are visible in the "Licenses" tab.

If you want to use local licenses but no local licenses are visible, verify that the smart card or license dongle is properly inserted into the smart card reader or USB port of the simulation PC, respectively. If a license dongle is used, make sure that the IC chip is fully inserted into the dongle (see "R&S ZNPC license dongle" on page 4).

If you want to use floating licenses, make sure to define one or more remote floating license servers in the license server manager of the simulation PC and check their connection state.

- Local licenses are only allowed on a license dongle R&S ZNPC, floating licenses only on a license dongle R&S ZNPC-FL.
- A floating license server must be equipped with the license dongle R&S ZNPC-FL.
- The floating license server version must be 1.26.3.1500 or higher

For more information, see the R&S License Server "Managing Floating Licenses" help, which can be opened from the "Help" icon in the top right corner of the local R&S License Server Manager web interface. A PDF user manual with identical content can be accessed via the R&S License Server folder in the Windows start menu ("Open License Server Manual").

Both help and manual cover the following topics:

- how to manage local licenses
- how to set up a floating license server
- how to connect to and obtain licenses from a floating license server

4 First Steps

Once the installation has completed, after a possible restart the newly installed application can be opened from the Windows start menu or desktop icon ("R&S ZN<A|B|D> Vector Network Analyzer").

The firmware installation creates a "R&S ZN<A|B|D> Vector Network Analyzer" program group in the Windows start menu. The following steps explain how to configure and launch the simulation.

1. From the program group, select "Configure Simulation" to open the "Simulation Config" tool.
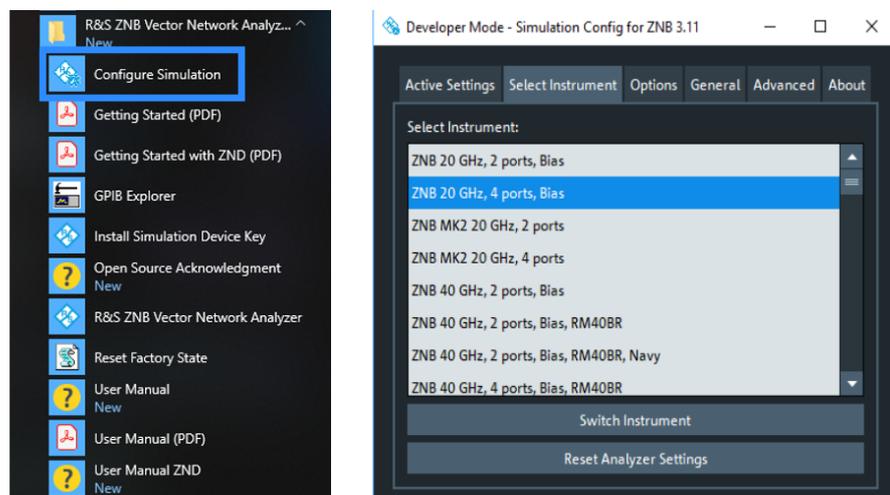
Figure 4-1: Instrument selection

2. In the "Select Instrument" tab of the "Simulation Config" tool, choose your desired instrument model (and simulated hardware). Click "Switch Instrument" to activate your selection.

3. If the selected instrument has changed and the VNA application was already running, close it.

4. Now run the VNA application.
   For example, select "R&S ZNB Vector Network Analyzer" for firmware R&S ZNB.

R&S ZNB/ZNBT or R&S ZND simulation

When the R&S ZNB/ZNBT or R&S ZND simulation is run for the first time, its graphical user interface starts up in full-screen mode with the (virtual) hardkey panel enabled. Select "Display" > "View Bar" > "Title and Task Bar On" from the menu bar to switch to window mode.
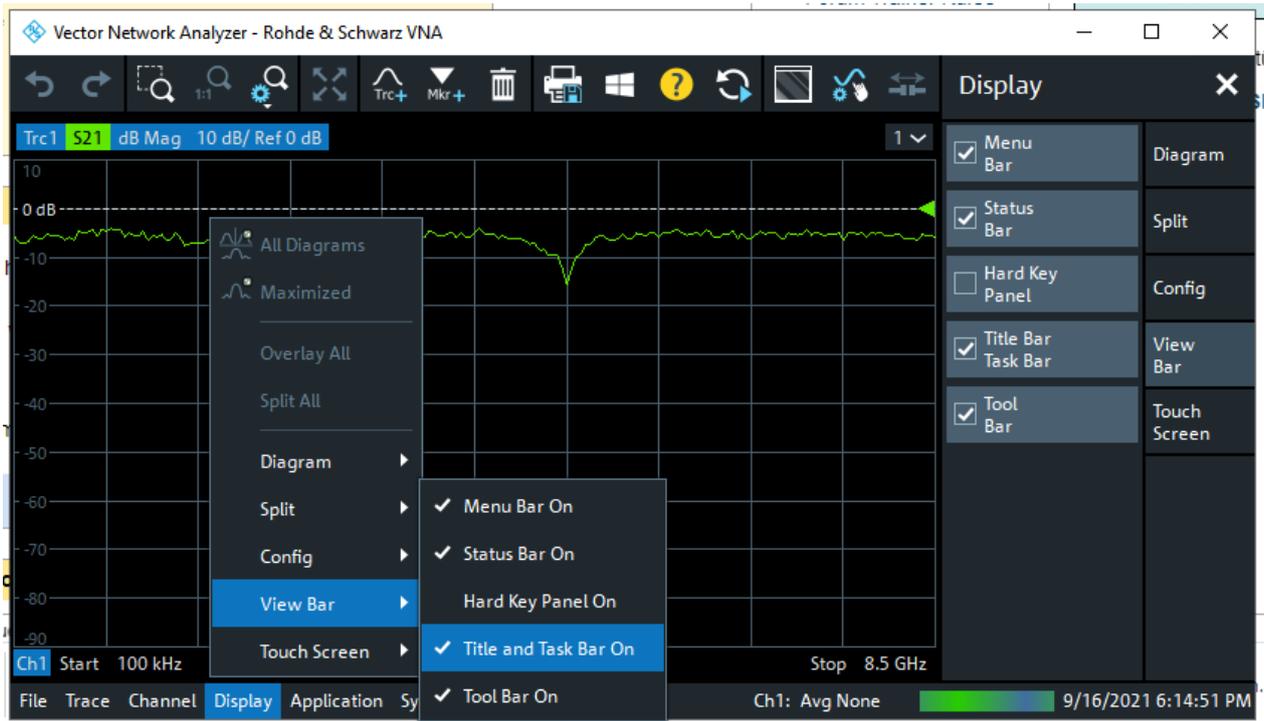
Figure 4-2: R&S ZNB/ZNBT/ZND in window mode

R&S ZNA simulation

When running the R&S ZNA simulation for the first time, it possibly starts up in "Single Window Mode" with the function keys of the integrated into the main application window. To display the control window, unselect "Display" > "Config" > "Single Window Mode" from the main menu.
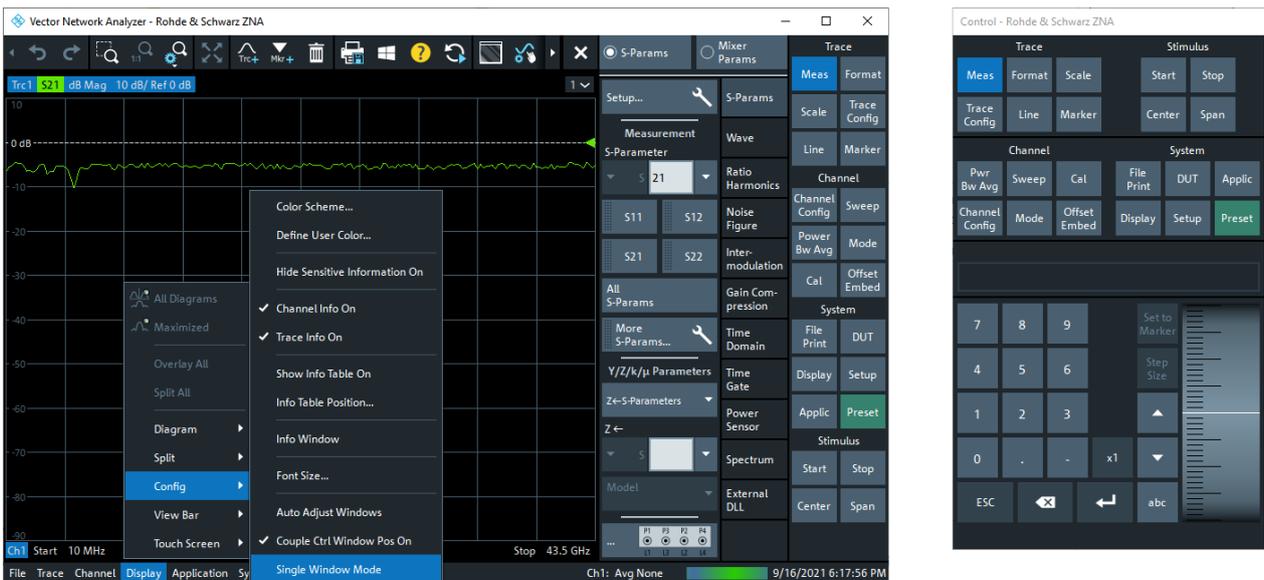
Figure 4-3: R&S ZNA with control window

Trace data

The firmware simulation comes with default trace data. However, you can also display and analyze your own trace data. Use the "File" menu to load them into the simulation.

K-options of the instrument

Option R&S ZNXSIM-K22 enables time domain analysis on the simulation (instrument options R&S ZNx-K2/K3/K20).

The following instrument options are not available on the R&S -ZNx simulation.

- METAS calibration option R&S ZNx-K50
- De-/embedding options R&S ZNx-K220 and R&S ZNx-K230
- Delta-L option R&S ZNx-K231

5 Using remote commands with the simulation

The Rohde & Schwarz VNA simulation is the ideal environment to develop software control elements using the SCPI remote control commands. You can access the simulation directly by using the TCPIP protocol and using the LAN local host address 127.0.0.1.

VISA library

To establish a remote control connection to the VNA firmware, a VISA library must be installed on the simulation PC. A VISA installation is also required, if you want to use certain external devices with the VNA simulation, such as power meters or calibration units. With R&S VISA, Rohde & Schwarz offers a VISA library free for download.

The firmware installation includes a utility for basic remote control and command execution: the "GPIB Explorer" (a.k.a.IECWIN32) can be found in the Windows start menu.
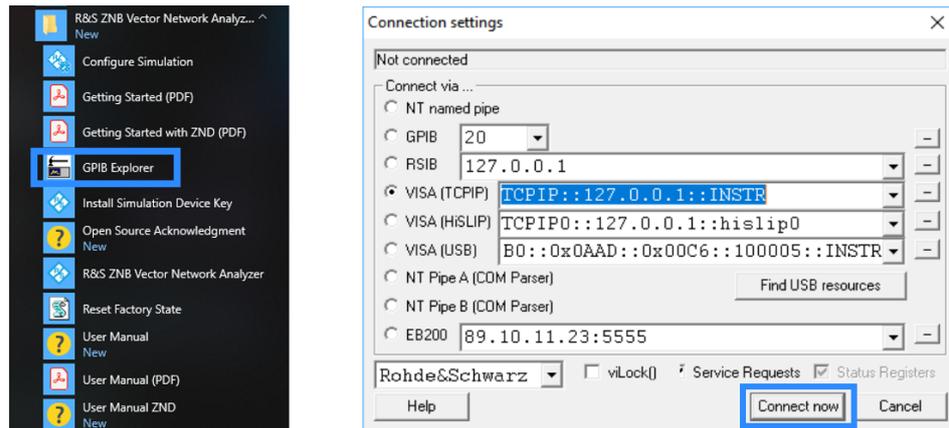
After specifying the VISA connection string (as displayed above), select "Connect Now" to establish the remote control connection. You can then send commands directly or execute a remote command script. The available command set is displayed in the tree at the bottom left hand side: