VERIFY YOUR O-RAN RADIO UNITS

The evolution of O-RAN is making radio access networks more open, disaggregated and flexible. The evolving O-RAN radio units (O-RU) need to conform with both 3GPP and O-RAN standards.

Your task

Opening the network architecture can foster innovation, accommodate individual needs and enhance network efficiency. However, it also brings new challenges in terms of interoperability between the network equipment of different vendors. Testing this equipment is crucial to ensure interoperability between components from different vendors and to deliver the same customer experience as with traditional RAN.
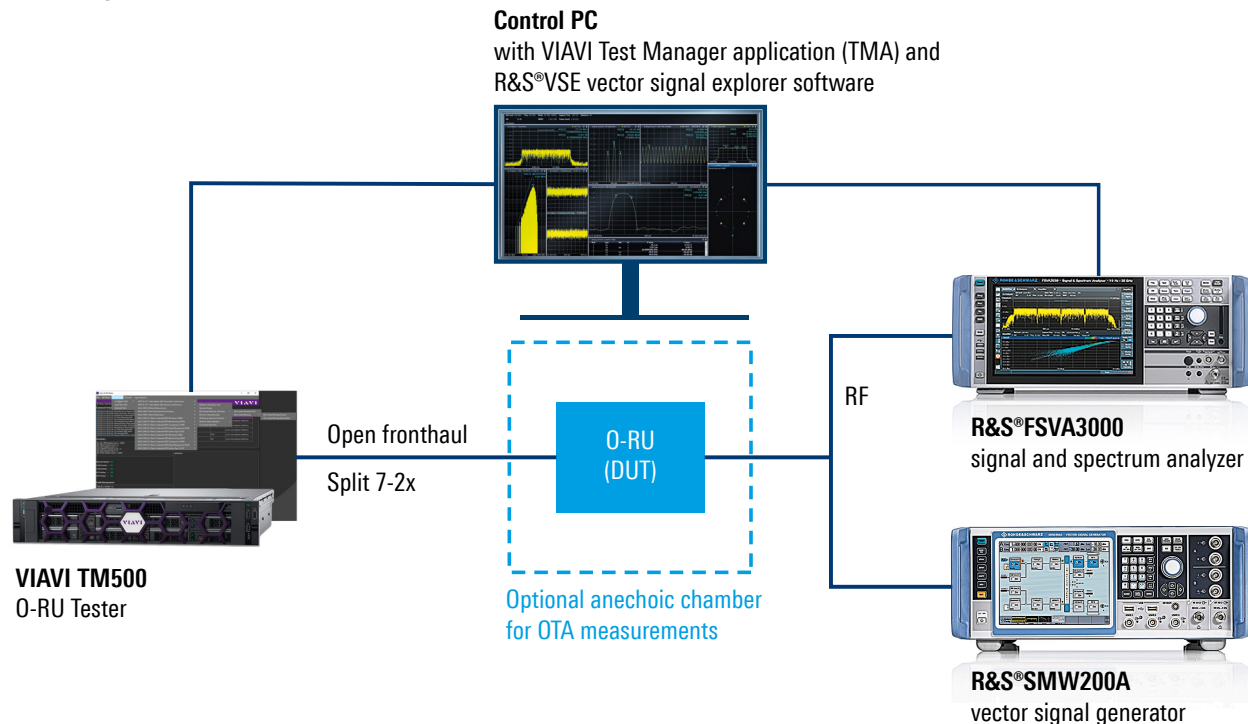
Rohde & Schwarz solution

Together with VIAVI Solutions, Rohde & Schwarz – a leading expert in RF and mobile communications testing – offers a proven, powerful test solution to verify the conformance of your O-RU.

In the test setup, VIAVI's distributed unit (DU) emulator synchronizes and configures the O-RU. Rohde & Schwarz signal generators and signal and spectrum analyzers provide RF signals and waveforms, capture signals and analyze the I/Q data both in uplink and downlink.

The full test setup is controlled from the central O-RU Test Manager, which simplifies O-RU performance testing. Select the test case you want to run and the test manager will automatically trigger the appropriate configurations on the O-RU under test and the measurement instruments.

Test setup

Control PC
with VIAVI Test Manager application (TMA) and
R&S®VSE vector signal explorer software

VIAVI TM500
O-RU Tester

Open fronthaul

Split 7-2x

O-RU
(DUT)

Optional anechoic chamber
for OTA measurements

RF

R&S®FSVA3000
signal and spectrum analyzer

R&S®SMW200A
vector signal generator

ROHDE & SCHWARZ

Make ideas real
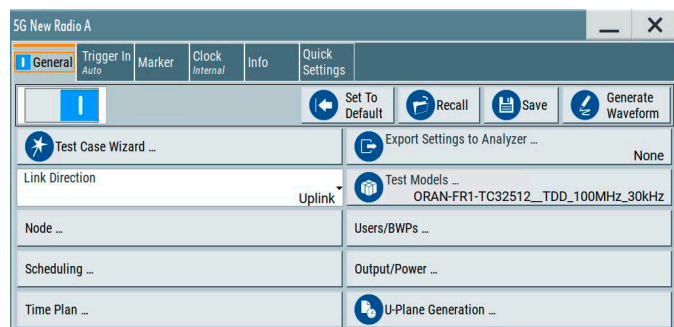
How to measure O-RU performance

For transmitter tests, the user can choose from predefined O-RAN or 3GPP test cases or create a user-specific waveform on the generator for FDD or TDD. The waveform file is then loaded to the DU emulator in the U-plane format.

After the initial configuration of the O-RU, the DU emulator sends the U-plane and C-plane information to the O-RU. The O-RU processes the data and sends out the appropriate RF signal. The signal is captured and demodulated by the Rohde & Schwarz signal and spectrum analyzer. Then the user can verify all the parameters or make use of the extensive range of tools that come with the Rohde & Schwarz analysis software.
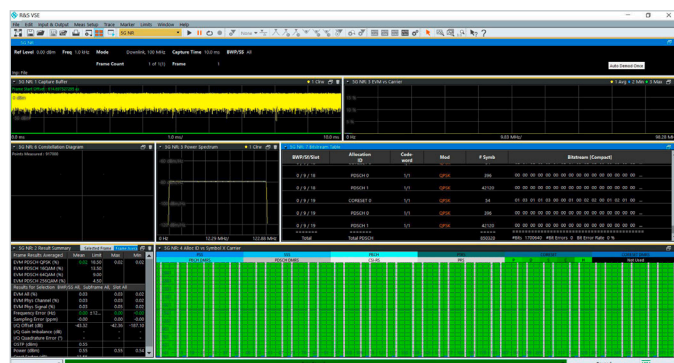
For receiver tests, users can select the RF signal to be sent from the generator to the O-RU in a conducted or radiated manner. The O-RU captures the signal, processes it and sends split 7-2x open fronthaul traffic via an Ethernet link to the DU emulator. The emulator extracts the I/Q data, which is then forwarded to R&S®VSE, where it can be analyzed in detail.

The VIAVI O-RU Test Manager provides a clear pass/fail overview for the main parameters. For in-depth debugging, customers can use R&S®VSE to access detailed measurement results.

In contrast to O-RAN conformance tests, full 3GPP conformance tests require a pairwise setup consisting of O-RU and O-DU. However, the O-RU test solution provides 3GPP preconformance test capabilities for the O-RU in isolation.

Beamforming can be measured with the setup by adding the R&S®OSP switch box for sequential beamforming measurements or by using an oscilloscope such as the R&S®RTP. The R&S®SMW200A signal generator with two RF paths is an ideal solution for UL beamforming tests.

O-RU test setup

▶ R&S®FSV3000, R&S®FSVA3000 or R&S®FSW signal and spectrum analyzer
▶ R&S®SMW200A, R&S®SMM100A or R&S®SMBV100B vector signal generator
▶ R&S®VSE vector signal explorer
▶ VIAVI TM500 O-RU Tester
▶ VIAVI Test Manager application

Summary

The market-leading signal generation and analysis solutions from Rohde & Schwarz provide test capabilities for 3GPP TS 38.141 conformance tests and have been extended to support WG4.CONF testing when paired with the VIAVI O-RU Tester. Users benefit from the future-proof Rohde & Schwarz solutions, e.g. when changing from FR1 to FR2 OTA measurements.

Signal generation using the R&S®SMW200A vector signal generator

Signal analysis using the R&S®VSE analysis software

VIAVI O-RU Test Manager
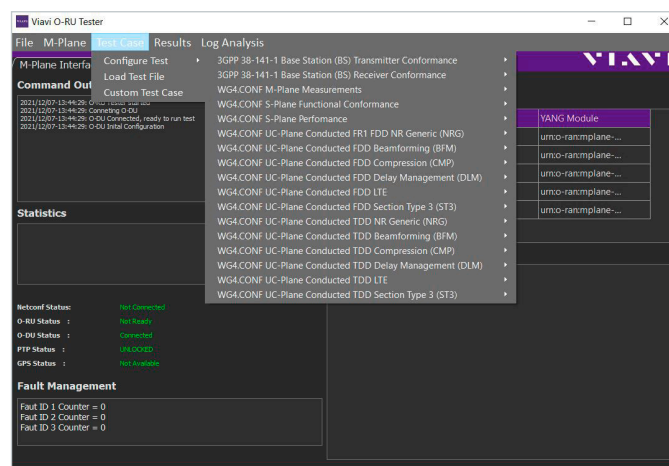
Rohde & Schwarz GmbH & Co. KG
www.rohde-schwarz.com

Rohde & Schwarz training
www.training.rohde-schwarz.com
Rohde & Schwarz customer support
www.rohde-schwarz.com/support