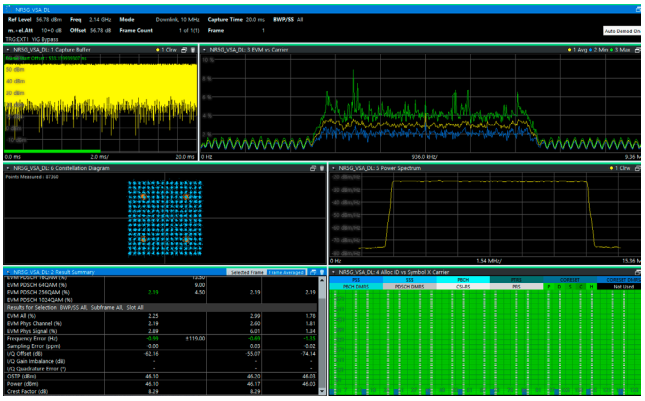
VERIFYING O-RAN RADIO UNITS

O-RAN makes radio access networks more open, disaggregated and flexible. O-RUs need to comply with 3GPP and O-RAN standards. Automation is crucial for extensive O-RAN conformance testing since O-RAN network elements are asynchronously released.



Signal analysis using the R&S®VSE vector signal explorer software

Your task

The evolution of Open RAN (O-RAN) is making radio access networks more open, disaggregated and flexible. Opening network architecture can foster innovation, accommodate individual needs and enhance network efficiency.

Interface standardization allows network operators to mix and match vendors. The standardization also creates new challenges for interoperability between network components. Test equipment is vital for the development, certification and regression testing of individual network elements such as O-RAN radio units (O-RU). While automation has always helped save time and money, it is crucial to conduct comprehensive O-RAN testing because O-RAN network elements have asynchronous hardware and software releases.

Rohde&Schwarz solution

Together with VIAVI Solutions, Rohde&Schwarz has a proven, powerful test solution to verify O-RU conformance. The joint setup also offers a cost optimized, fully automated solution to maintain O-RU quality between different hardware and software releases. The solution is also ideal for testing and comparing KPIs for different O-RUs.

In the test setup, the VIAVI TM500 O-RU Tester emulates the distributed unit (DU) and synchronizes and configures the O-RU under test. The Rohde&Schwarz signal generator and signal and spectrum analyzer provide RF signals and waveforms, capture signals and analyze the I/Q data both in uplink and downlink.

The VIAVI O-RU Test Manager Application controls the full test setup and simplifies O-RU conformance testing. Select a test case and the test manager will automatically trigger the appropriate configurations, run the test case and generate a test report.

How to measure O-RU performance

For transmitter tests, predefined O-RAN/3GPP test cases or user-specific FDD/TDD waveforms can be generated with the signal generator and loaded on the O-RU tester with the U-plane format. After initial O-RU configuration via the M-plane, the O-RU tester sends the C-plane and U-plane information along with S-plane data to the O-RU, which processes the data and transmits the RF signal. The Rohde&Schwarz signal and spectrum analyzer captures and demodulates the signal.

The transmitted RF signal can be selected from the signal generator for receiver tests. The O-RU processes the captured signal and sends it to the O-RU tester via an Ethernet link following O-RAN split 7-2x.

The VIAVI O-RU Test Manager Application provides a clear pass/fail report for the test results. Users can run the R&S®VSE vector signal explorer software to analyze signals in further detail for in-depth debugging.

In contrast to O-RU conformance testing, full 3GPP base station conformance testing requires a pairwise setup with an O-RU and O-DU. The O-RU test solution provides 3GPP base station pre-conformance testing for an O-RU in isolation.

Single box solution for release and production testing

For production or R&D release/regression testing, the PVT360A meets the speed and cost requirements with a small form factor. The PVT360A can also provide two VSGs and VSAs in one box for parallel O-RU testing.

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 software
- VIAVI TM500 O-RU Tester
- VIAVI O-RU Test Manager Application
- PVT360A performance vector tester
  A single box solution for release and production testing that can replace signal generators and signal and spectrum analyzers

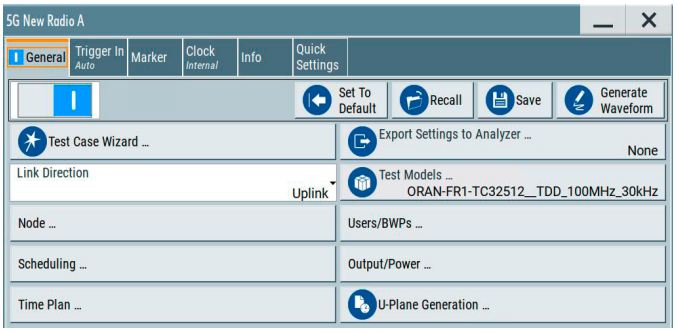
Summary

The market-leading signal generation and analysis solutions from Rohde&Schwarz fully support 3GPP TS 36.141 and TS 38.141 base station conformance testing. The solutions have been extended to support automated O-RAN WG4 conformance testing (O-RAN.WG4.CONF) when paired with a VIAVI TM500 O-RU Tester. Users can benefit from the future proof Rohde&Schwarz measurement instruments both in the R&D lab and during production.

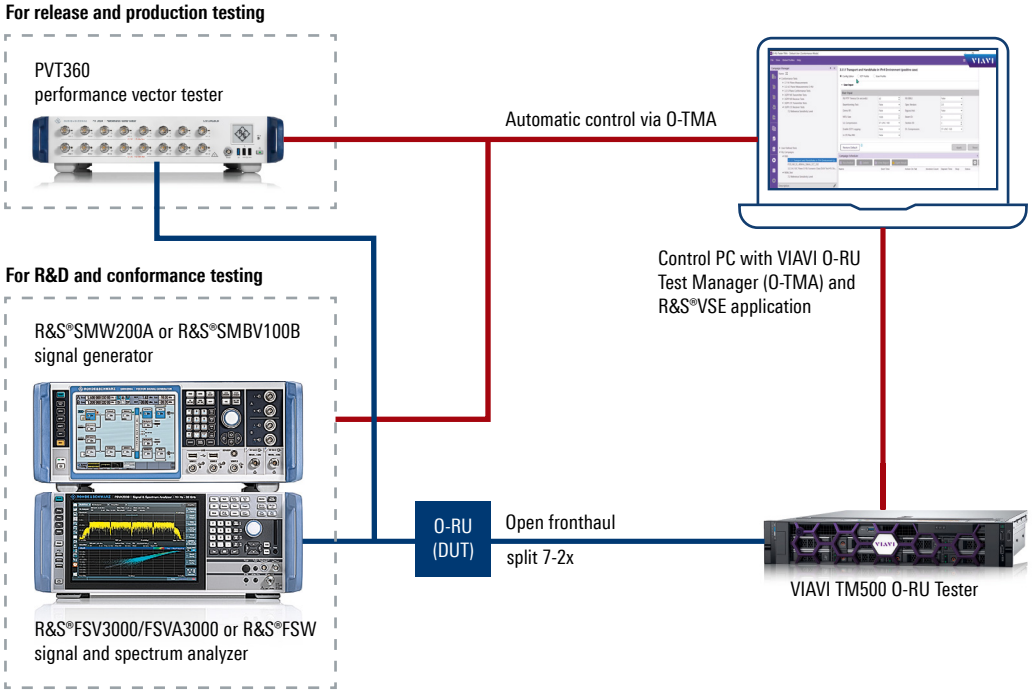
See also

www.rohde-schwarz.com/wireless/o-ran

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



Fully automated test setup for O-RU testing



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Verifying O-RAN radio units
Data without tolerance limits is not binding | Subject to change

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