

VALOR

VIAVI Automated Lab-as-a-Service for Open RAN



The project is funded by the
Public Wireless Supply Chain Innovation Fund.



Public Wireless Supply Chain
INNOVATION FUND

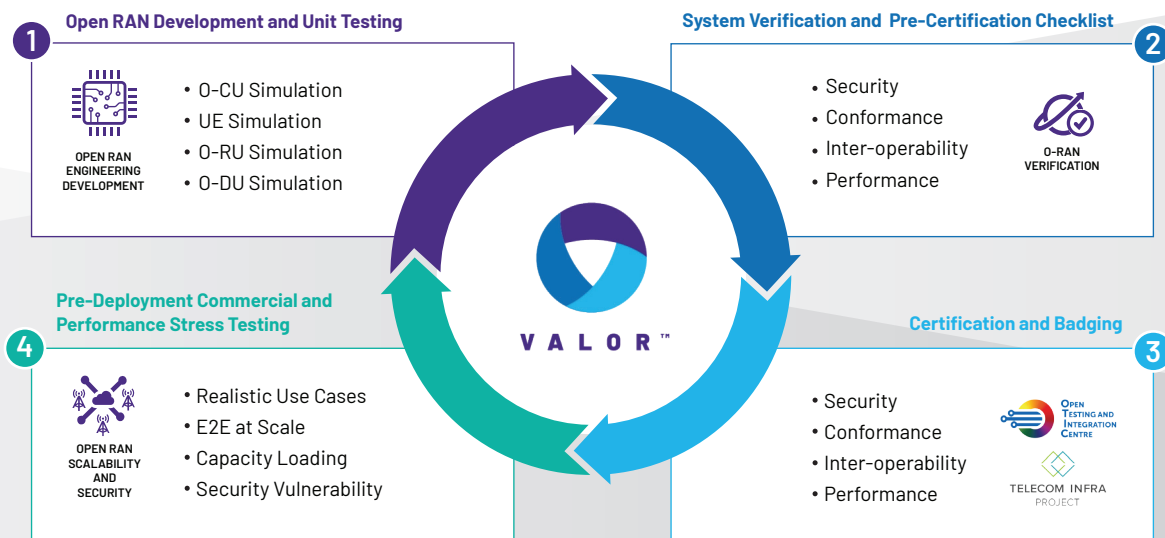
ACCELERATE THE PATH TO OPEN RAN WITH VALOR™

VIAVI Automated Lab-as-a-Service for Open RAN (VALOR™) based on VIAVI's industry-leading NITRO® Wireless portfolio provides a fully automated, cooperative, open and impartial Lab-as-a-Service/ Test-as-a-Service offering dedicated to Open RAN interoperability, performance and security.

VALOR is designed to manage and support 5G and Open RAN deployments that would benefit from access to tools and expert staff with a minimal ramp-up time.

A recipient of the NTIA PWSCIF First Notice of Funding Opportunity, VALOR provides a pathway to certification in the U.S. for new entrants, startups and academia. Access to VALOR is free for academic institutions and NTIA co-grantees, subject to availability.

VALOR Services Life Cycle



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With comprehensive, on-demand test suite throughout the entire product lifecycle, VALOR addresses major Open RAN testing gaps:

1. Pre-certification, pre-badge development and system verification with ongoing testing
2. As the first Telecom Infra Project (TIP) authorized test lab, VALOR's cloud-based and virtual testing capabilities will be incorporated into TIP's system performance certification program
3. Pre-deployment realistic and commercial grade performance testing

VIAVI also offers Test-as-a-Service (TaaS) and Lab-as-a-Service (LaaS) supporting short-term and time-sensitive 5G and Open RAN projects. Available to major NEMs and CSPs, the TaaS/LaaS offerings provide a complementary alternative to handle peaks in lab demand with customers' in-house testing approach.



CUSTOMER BENEFITS

Hybrid Physical and Cloud-Based: Flexible Deployment

A hybrid physical lab infrastructure and cloud-based testing Lab-as-a-Service (LaaS) ensures flexible and scalable deployment on COTS x86 appliance and cloud native platforms.

Realistic, Scalable Carrier-Grade Testing

VALOR offers a comprehensive, on-demand test suite throughout the entire product lifecycle: from conformance, performance, scale, IoT, E2E, security in hybrid physical and cloud-based environments for preliminary testing to extensive multi-cell load-and stress testing for Open RAN components.

Accessible to All Open RAN Ecosystem Players

VALOR's accessible, affordable pay-as-you-go fee structure makes it accessible to all Open RAN ecosystem players – from component and service providers to system integrators.

Industry Neutrality

VALOR is partner-friendly and vendor-neutral. VIAVI will leverage ecosystem partners to build VALOR including providing fair access to OTICs/NEMs to VALOR. It is suitable for multi-vendor ecosystem.

Minimize Upfront Investment

VALOR acts as an alternative to test tooling CAPEX investment: minimize upfront investment in building out Open RAN testing capabilities and enable quicker time-to-market while offloading some of the associated risks to VIAVI for flexible deployment with lowest TCO.

Complementary to Existing OTICs/Open RAN Labs

VALOR offerings are complementary to most current existing industry testing labs (like OTICs) and other initiatives. VALOR will facilitate better readiness/preparation of the Open RAN component suppliers for the certification/badging and/or acceptance tests offered by OTICs and CSP Labs. In addition, VALOR is the first Telecom Infra Project (TIP) authorized test lab.



VALOR PHYSICAL LAB IN CHANDLER, AZ

At the VALOR lab, we provide an on-demand test suite. In addition, leveraging golden Open RAN compliant O-RUs, O-DUs and O-CUs provided by several reputable partners and a large RF anechoic chamber, VALOR offers Massive MIMO and beamforming over-the-air (OTA) validation including system-level Massive MIMO performance testing for up to 16 parallel spatial layers.

We look forward to welcoming you in person to the VALOR Lab in Chandler, AZ soon.



AVAILABLE TESTS

VALOR offers over 500+ Open RAN test cases compliant with Open RAN WG4, WG5, WG11, TIFG and 3GPP specifications.

O-RU Conformance and Performance	O-DU Conformance and Performance	O-CU Functional and Performance
<p>DU Emulator with VSA/VSG or UE Emulator</p> <p>WG4 O-RU and O-DU Fronthaul Interoperability</p> <ul style="list-style-type: none"> • CUSM Planes • Open RAN Pre-badging <p>O-RU + O-DU Performance</p> <ul style="list-style-type: none"> • Real or Emulated O-CU • Emulate Large Number of UEs with Various Channel Conditions and Traffic Patterns 	<p>UE/RU Emulator and O-CU/Core Emulator for O-DU Testing</p> <p>WG4 O-DU Fronthaul Conformance</p> <ul style="list-style-type: none"> • CUSM Planes • Open RAN Pre-certification <p>O-DU Performance</p> <ul style="list-style-type: none"> • System Throughput • Multi-bearer/Multi-UE • Multi-Cell/CA • MAC Procedures • Intra-O-DU Mobility • And more ... 	<p>F1 Load Generator and Core Emulator for O-CU Testing</p> <p>Large Scale O-DU Emulation</p> <ul style="list-style-type: none"> • Emulate Large Number of DU Nodes at F1 • Realistic Traffic from Large Number of UEs • Dynamic Traffic Conditions <p>X2 Support for NSA Scenarios</p> <ul style="list-style-type: none"> • UE Context Signaling Utilizing X2-C for NSA • Support X2-U Data Traffic for Split Bearer Testing
O-RU + O-DU Interoperability and Performance	O-DU + O-CU Interoperability and Performance	E2E Functional, Performance, and Security
<p>UE Emulator with O-CU/ Core Emulator</p> <p>WG4 O-RU and O-DU Fronthaul Interoperability</p> <ul style="list-style-type: none"> • CUSM Planes • Open RAN Pre-badging <p>O-RU + O-DU Performance</p> <ul style="list-style-type: none"> • Real or Emulated O-CU • Emulate Large Number of UEs with Various Channel Conditions and Traffic Patterns 	<p>UE+RU Emulator with Core Emulator</p> <p>WG5 Interoperability</p> <ul style="list-style-type: none"> • O-DU and O-CU F1 Interoperability • X2/Xn Interoperability with Emulated/Real O-CU/eNB <p>O-DU + O-CU Performance Test</p> <ul style="list-style-type: none"> • Using Real or Emulated O-Rus • Emulated Core • Capacity and Load Testing 	<p>UE Emulator with Core Emulator</p> <p>TIFG E2E Functional</p> <ul style="list-style-type: none"> • Open RAN Pre-badging <p>TIFG Performance, Services, Load and Stress</p> <ul style="list-style-type: none"> • Multi-Cell/Carrier Handover • Emulate Large Number of UEs with Various Conditions /Traffic Patterns <p>3GPP/O-RAN WG11 Security</p> <ul style="list-style-type: none"> • Open RAN Pre-badging for SCAS • DoS, Fuzzing • O-CLOUD, OFH, Security Protocol • Port Scanning, Vulnerability

Additional Tests

Massive MIMO/FR2 Over-the-Air Testing Using RF Anechoic Chamber

- 25'x35' FR1/FR2/FR3 Chamber

WG4 O-RU Fronthaul Conformance

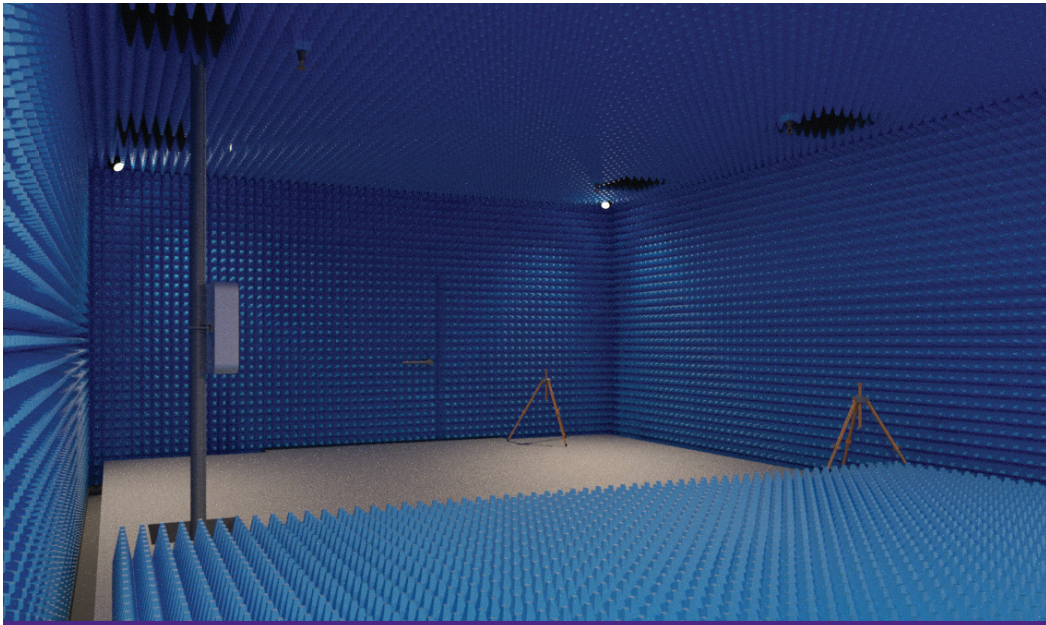
- CUSM Planes
- Open RAN pre-certification
- (Over-the-air)

3GPP RF Conformance

- 38.141 Tx/Rx Tests Over-the-air Testing

5G NR Performance

- Exercise the O-RU in realistic conditions with Multi-UE Emulation
- Beam mobility



RF Anechoic Chamber

VALOR is enabled by VIAVI Automation Management and Orchestration System (VAMOS).

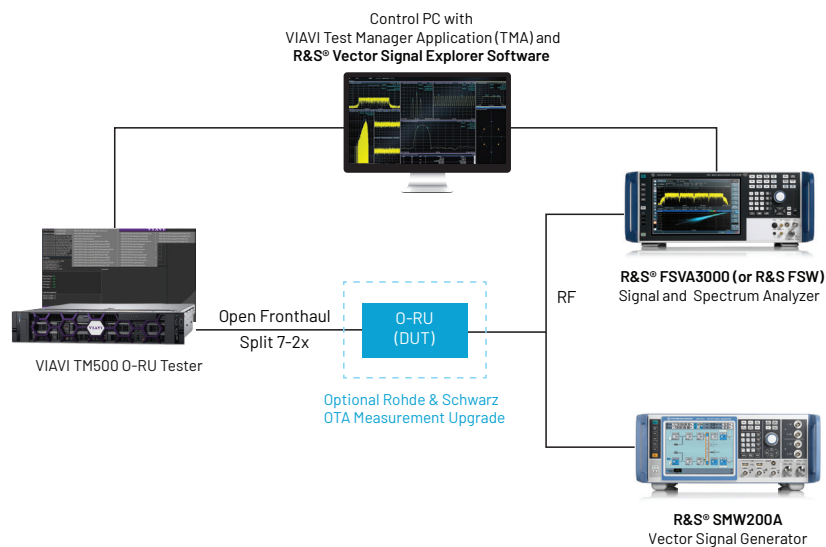
Integrated with the VIAVI NITRO Wireless portfolio, VAMOS automates test campaigns, cases, and executions in a single cloud-based platform.

Customizable workspaces and configurations streamline the testing process and improve resource use across teams and lab locations. Shared tool testbeds and individual sandboxes accommodate many test needs, while the platform's solid analytics and reporting help maximize test resource utilization and boost test accuracy.

VALOR PARTNERS

VIAMI collaborates with leaders in the Open RAN space to facilitate a collaborative environment where innovative technologies are developed, tested and certified.

VIAMI and **Rohde & Schwarz** have combined their industry-leading capabilities to deliver comprehensive and scalable Open RAN development and test solutions. Based on specifications set by TIP, 3GPP, O-RAN Alliance Working Groups, and TIFG, our solutions cover the entire product life cycle, enabling you to launch products on time, within budget and at scale in a multi-vendor MNO ecosystem.



ETS-Lindgren provides VALOR's RF-shielded anechoic chamber to support Massive MIMO over-the-air (OTA) performance testing of Open Radio Units (O-RUs) at the VALOR Lab. The chamber enables VALOR to offer Massive MIMO and beamforming OTA validation including system-level Massive MIMO performance testing for up to 16 parallel spatial layers.

VALOR is a **Telecom Infra Project (TIP)** authorized Open RAN test lab. The first of TIP's network of authorized test labs, VALOR's cloud-based and virtual testing capabilities will be incorporated into TIP's system performance certification program, streamlining the certification process, reducing duplication of efforts and accelerating the time-to-market for Open RAN solutions.

VALOR is equipped with a number of Open RAN compliant 3rd party golden DUTs, such as O-RU/O-CU/O-DUs from valuable partners such as FUJITSU, SOLID and Capgemini.

VIAMI also plays a key role in the O-RAN Alliance Global Plugfests, contributing a comprehensive Open RAN testing suite and expertise to validate new products, specifications and use cases. Since 2019, VIAMI has participated in more than 100 Global O-RAN Plugfest demos in 16 locations with 60 Open RAN vendors

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To reach the VIAVI office nearest you, visit viavisolutions.com/contact

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