NITRO Wireless
Non-Terrestrial Networks
Reliability, Stability, and Performance

The Challenges Facing Non-Terrestrial Networks

NTNs face unique challenges compared to terrestrial networks, such as signal propagation delays, latency, Doppler shifts, and timing issues that require mitigation strategies. Limited spectrum availability demands efficient allocation and coordination with other operators to prevent interference. The rapid movement of satellites in Low Earth Orbit can also cause RACH storms, leading to congestion and increased signaling, making pre-deployment performance evaluation critical. Seamless integration with terrestrial and non-3GPP networks presents interoperability and handover challenges, while securing data and infrastructure from cyber-attacks and ensuring cross-border compliance adds further complexity.

The VIAVI Solution

The VIAVI NTN suite tackles 5G NTN challenges, ensuring reliable performance and compliance with the latest 3GPP. You can evaluate using a Digital Twin, test real devices (gNB or UE), and deploy with confidence using OTA tests. Our platform emulates satellite and UE mobility under fully controllable conditions, supporting both NTN and Terrestrial links. Key components include:

- **TM500 Network Tester:** Comprehensive end-to-end validation of 4G, 5G, and NTN networks, combined with Rohde & Schwarz CMX500 for digital twin testing across LEO, MEO, and GEO.

- **TeraVM AI RAN Scenario Generator:** Emulates traffic scenarios for ML model training.

- **VIAVI Automation Management and Orchestration System (VAMOS):** automates test campaigns, cases, and executions in a single cloud-based platform.

Business Impact

In satellite technology, precision is key. Launching into space remains costly and risky, demanding meticulous evaluation for mission success. Evaluating end-to-end network reliability, stability and performance is more vital than ever. Users need a comprehensive solution to anticipate and resolve issues, optimize resource allocation, and test various scenarios cost-effectively prior to rollout.
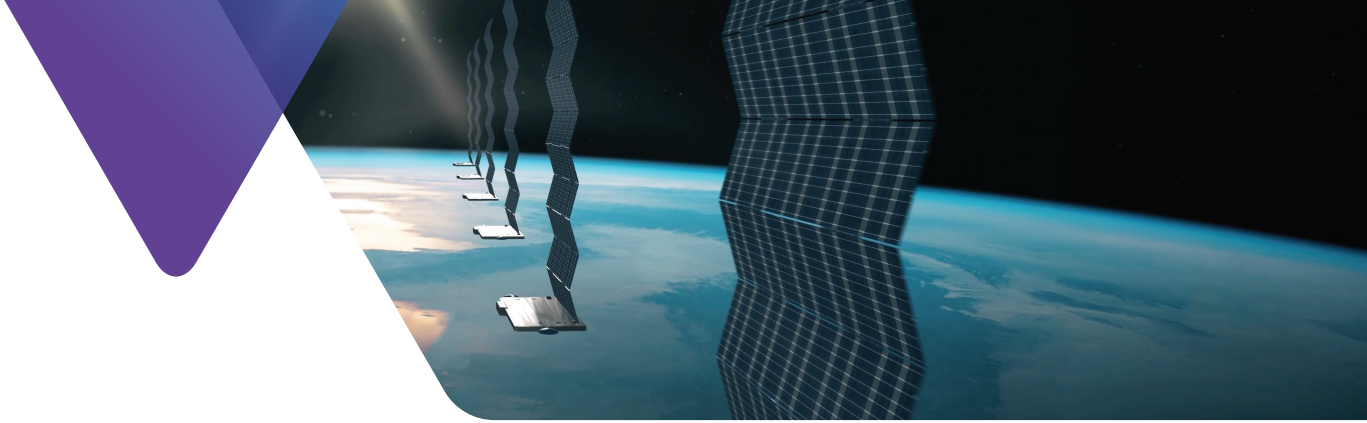
Sample Use Cases

Use Case 1: Satellite Operator PoC Test Bed

- 1 carrier on VIAVI TM500 + 1 Carrier on R&S CMX500
- VSAT for signal conditioning on TM500. Gateway will provide signal conditioning for CMX500
- RDA with full end-to-end data analysis

Use Case 2: Research and Network Operator Test Bed (Multicarrier)

- 2 Carriers on VIAVI TM500 + 1 Carrier on each CMX500 (up to 2x2 MIMO DL & UL on each RF link)
- RDA with full end-to-end data analysis
- For NB-NTN, either 1 or 2 CMX500 can be replaced with a CMW500 (up to 2x2 only)
- Mobility between carriers
- Comprehensive support for LTE and NR features

VIAVI Benefits

✓ **With VIAVI, get complete end-to-end solutions for your entire system:**

- Test network component integration
- Assess individual component performance
- Evaluate application performance in controlled conditions
- Test Service and Feeder Link for high-load capacity and UE mobility scenarios
- Conduct tests across various orbits: GEO, MEO, LEO, and HAPS
- Generate AI RAN Scenarios for AI-driven Radio Access Networks in NTN
- Emulate the 5G Core with full-scale RAN scenarios
- Ensure compliance with latest 3GPP standards from Rel-8 to Rel-17, Rel-18, and beyond
- Deploy solutions beyond the lab: resilient PNT for critical infrastructure, optical filters, and mission-critical monitoring for NTN
- Utilize Test-as-a-Service (TaaS) for complex NTN environments, provided by VIAVI experts

Get started with VIAVI NTN Test Solutions

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VIAVI Solutions

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