



KT SAT Achieves Seamless NR-NTN Handover for Next-Generation Satellite Networks

Satellite Communications and Non-Terrestrial Networks

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Keysight and KT SAT Achieve Industry-First Multi-Orbit NTN Handover Between GEO Satellite And Emulated LEO Link

01**Company**

KT SAT, satellite communications provider validates NTN capabilities using operational GEO satellites

02**Solutions**

Keysight Network Emulator Solutions and UeSIM RAN Testing Toolset for GEO-to-emulated-LEO NTN handover validation

03**Challenge**

Validate service continuity across satellite orbits while addressing delay, Doppler effects, and dynamic link conditions

04**Results**

Demonstrated NR-NTN handover between a live Ku-band GEO connection and an emulated LEO link

KT SAT is advancing non-terrestrial network mobility validation as satellite and terrestrial networks move toward tighter integration. Working with Keysight, KT SAT demonstrated a successful NTN handover using the KOREASAT-6A satellite at KT SAT's Kumsan Satellite Network Operation Center in Korea.

The companies established an NR-NTN multi-orbit handover between a commercial geostationary earth orbit (GEO) satellite and an emulated low Earth orbit (LEO) link in a controlled lab environment. The demonstration maintained service continuity during the handover and operated over a live Ku-band GEO connection.

“**Seo Young-soo****CEO, KT SAT**

As the only satellite communications service provider in Korea, KT SAT is progressively validating the applicability of NTN gNB and UE using our five operational GEO satellites.

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The Challenge

Future communications networks will rely on closer integration between terrestrial and satellite systems. Non-terrestrial networks can extend coverage to remote, mobile, and disaster-affected areas, but they also introduce new mobility challenges that must be validated before commercial deployment.

Satellite links behave differently from terrestrial cellular networks. They can introduce longer delays, Doppler effects, and dynamic link conditions that complicate mobility and handover across space and ground domains. These effects become more complex when services move across different satellite orbits.

KT SAT needed to validate how multi-orbit NTN mobility could work using its GEO satellite infrastructure while also preparing for future LEO and medium Earth orbit service models. The goal was to move beyond point-to-point satellite connectivity and explore continuous service across orbit types.

A practical validation method had to combine live satellite operation with emulated conditions. That approach would allow KT SAT to study handover behavior before future satellites or user devices are widely deployed. It would also reduce dependence on expensive field trials during early development and give operators and device vendors earlier insight into real-world propagation, timing, and interoperability behavior.



Figure 1. Non-terrestrial networks can extend coverage to remote, mobile, and disaster-affected areas, but they also introduce new mobility challenges that must be validated before commercial deployment.

The Solution

Keysight and KT SAT used **Keysight Network Emulator Solutions** and **UeSIM RAN Testing Toolset** to emulate the base station and user equipment. The teams established a two-way link through KOREASAT-6A and maintained service continuity during handover from GEO to an emulated LEO connection.

The demonstration used a live Ku-band GEO connection, with downlink around 12.3 GHz and uplink around 14.4 GHz. This matters because Ku-band operation maps to 3GPP Release 19 NTN spectrum entering commercial planning, making the validation relevant to emerging operator deployment strategies.

By combining live satellite connectivity with emulated LEO conditions, the test environment brought future multi-orbit network behavior into the lab. This allowed KT SAT and Keysight to study mobility behavior, timing, and interoperability under controlled conditions.

The solution gave KT SAT a framework for evaluating how integrated GEO, LEO, and future MEO services could support continuous coverage. It also gave device and chipset vendors a lab-based path for NTN mobility validation without relying only on live multi-orbit field trials.



Network Emulators



UE Emulators

Results

KT SAT and Keysight demonstrated NR-NTN multi-orbit handover between a commercial GEO satellite and an emulated LEO link. The test maintained service continuity during the handover, validating a core mobility behavior needed for future satellite-terrestrial networks.

The demonstration also advanced Ku-band NTN mobility validation. By operating the live GEO link in Ku-band, the work generated insights that map to Release 19 NTN frequency bands now entering commercial planning. This gives operators and vendors earlier visibility into propagation, timing, and interoperability behaviors relevant to future deployments.

For KT SAT, the test supports exploration of advanced NTN mobility scenarios in the lab before satellites and user devices are broadly deployed. This can help accelerate roadmap development and reduce the time and cost associated with bringing new multi-orbit services to market.

For the broader NTN ecosystem, the work shows how emulation can de-risk early development. Operators can study coverage and handover strategies, while device and chipset vendors can validate NTN mobility behavior in repeatable conditions. These insights are intended to inform standards discussions and operator evaluations.

Conclusion

Multi-orbit NTN services require dependable mobility across satellite orbits and ground network domains. To deliver resilient coverage, operators must understand how handover behaves under realistic satellite delay, Doppler, and link-condition changes.

Keysight's network emulation capabilities helped KT SAT validate GEO-to-emulated-LEO handover using a live Ku-band GEO connection. The work gives KT SAT and the broader ecosystem a practical path to evaluate NTN mobility earlier, reduce trial complexity, and prepare for integrated satellite-terrestrial services.

Related Information

- [Non-Terrestrial Network](#)
- [Keysight Network Emulator Solutions](#)
- [Keysight UeSIM RAN Testing Toolset](#)
- [Keysight and KT SAT Achieve Industry-First Multi-Orbit NTN Handover Between GEO Satellite And Emulated LEO Link](#), December 11, 2025 press release



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