

ESA, MediaTek, Eutelsat, Airbus, Sharp, ITRI, and R&S Announce World's First Rel-19 5G-Advanced NR-NTN Connection over OneWeb LEO Satellites

- **Partners work together to enable the world's first Rel-19 5G-Advanced NR NTN connection over Eutelsat's OneWeb constellation and the infrastructure at ESA's European Space Research and Technology Centre (ESTEC) in The Netherlands**
- **Successful trial using 3GPP Rel-19 NR NTN configurations of 50MHz bandwidth over Ku-band with handover success**

Noordwijk, Netherlands – European Space Agency (ESA), MediaTek Inc. Eutelsat, Airbus Defence and Space, Sharp, the Industrial Technology Research Institute (ITRI) and Rohde & Schwarz (R&S) have conducted the world's first successful trial of 5G-Advanced Non-Terrestrial Network (NTN) technology over the Eutelsat's OneWeb low Earth orbit (LEO) satellites compliant with 3GPP Rel-19 NR NTN configurations. The tests pave the way for deployment of 5G-Advanced NR NTN standard, which will lead to future satellite and terrestrial interoperability within a large ecosystem, lowering the cost of access and enabling the use of satellite broadband for NTN devices around the world.

The trial used OneWeb satellites, communicating with the MediaTek NR NTN chipset, and ITRI's NR-NTN gNB, implementing 3GPP Release 19 specifications including Ku-band, 50MHz channel bandwidth and conditional handover (CHO). The OneWeb satellites, built by Airbus, carry transparent transponders, with Ku-band service link, Ka-band feeder link, and adopt the "Earth-moving beams" concept. During the trial, the NTN user terminal – with a flat panel antenna developed by SHARP – successfully connected over satellite to the on-ground 5G core using the gateway antenna located at ESA's European Space Research and Technology Centre (ESTEC) in The Netherlands.

The test was possible thanks to the support of ESA's Space for 5G/6G & Sustainable Connectivity programme, of the Directorate of ESA's Connectivity and Secure Communications (CSC) and the support of ESA's Directorate of Technology, Engineering and Quality (TEC).

With the full integration of 3GPP standards shared and accepted by the entire mobile industry, all compatible satellite constellations will naturally and seamlessly complement terrestrial networks, enabling truly ubiquitous connectivity with economies of scale, and opening up new markets for smart phones, automotive and Internet-of-Things.

"By partnering with Airbus Defence and Space and Eutelsat, this innovative step in the integration of terrestrial and non-terrestrial networks proves why collaboration is an essential ingredient in boosting competitiveness and growth of Europe's satellite communications sector", said Laurent Jaffart, Director of ESA's Connectivity and Secure Communications, which hosts the Space for 5G/6G & Sustainable Connectivity programme. "ESA is delighted to have exchanged knowledge and expertise with industry, as we work towards our joint aim to provide seamless connectivity for the benefit of Europe and beyond."

"As a global leader in terrestrial and non-terrestrial connectivity, we continue in our mission to improve lives by enabling technology that connects the world around us, including areas with little to no cellular coverage", said Mingxi Fan, Head of Wireless System and ASIC Engineering at MediaTek. "By making real-world connections with Eutelsat LEO satellites in orbit, together with our ecosystem partners, we are now another step closer to bring the next generation of 3GPP-based NR-NTN satellite wideband connectivity for commercial uses.

Daniele Finocchiaro, Head of Telecom R&D and Projects at Eutelsat, said: "We are proud to be among the leading companies working on NTN specifications, and to be the first satellite operator to test NTN broadband over Ku-band LEO satellites. Collaboration with important partners is a key element when working on a new technology, and we especially appreciate the support of the European Space Agency. Together, we shape the future world of broadband connectivity, always aiming to provide better services to our customers."

Elodie Viau, Head of Telecom and Navigation Systems at Airbus, said: "This connectivity demonstration performed with Airbus-built LEO Eutelsat satellites confirms our product adaptability. The successful showcase of Advanced New Radio NTN handover capability marks a major step towards enabling seamless, global broadband connectivity for 5G devices. These results reflect the strong collaboration between all partners involved, whose combined expertise and commitment have been key to achieving this milestone. Airbus is proud to advance the satellites integration into everyday connectivity for our customers."

Masahiro Okitsu, President & CEO, Sharp Corporation, said: "We are proud to announce that we have successfully demonstrated Conditional Handover over 5G-Advanced NR NTN connection using OneWeb constellation and our newly developed user terminals. This achievement marks a significant step toward the practical implementation of non-terrestrial networks. Leveraging the expertise we have cultivated over many years in terrestrial communications, we are honored to bring innovation to the field of satellite communications as well. Moving forward, we will continue to contribute to the evolution of global communication infrastructure and strive to realize a society where everyone is seamlessly connected."

"In this trial, ITRI showcased its advanced NR-NTN gNB technology as an integral part of the NR-NTN communication system, enabling conditional handover on the Rel-19 system", said Dr. Pang-An Ting, Vice President and General Director of Information and Communications Research Laboratories at ITRI. "We see great potential in 3GPP NTN communication to deliver ubiquitous coverage and seamless connectivity in full integration with terrestrial networks. As a pioneer in commercial NR-NTN connectivity solutions (Ameba RAN), ITRI is actively driving innovation in NR-NTN gNB development and is eager to work closely with ecosystem partners to seize emerging NTN opportunities."

Goce Talaganov, Vice President of Mobile Radio Testers at Rohde & Schwarz, said: "We at Rohde & Schwarz are excited to have contributed to this industry milestone with our test and measurement expertise. For real-time NR-NTN channel characterization, we used our high-end signal generation and analysis instruments R&S SMW200A and FSW. Our CMX500-based NTN test suite replicated the Ku-band conditional handover scenarios in the lab. This rigorous testing, which addresses the challenges of

satellite-based communications, paved the way for further performance optimization of MediaTek's and Sharp's 5G-Advanced NTN devices."

About ESA's Space for 5G/6G & Sustainable Connectivity programme

The European Space Agency (ESA) is Europe's gateway to space, coordinating the financial and intellectual resources of its Member States to conduct space programmes and activities. ESA's 'Space for 5G/6G & Sustainable Connectivity' strategic programme line is advancing 5G and 6G technologies to support the digital transformation of Europe by integrating satellite and ground networks. This fusion of terrestrial (TN) and non-terrestrial networks (NTN) will revolutionise how we live, work and communicate in terms of smart mobility, global coverage, security and network resilience. The programme aims to promote the standardisation of seamless global connectivity for various industries and applications, including telemedicine, tele-education, and autonomous vehicles, airplanes and ships.

The flagship ECSAT 5G/6G Hub (UK), developed by CGI with the UK Space Agency, is a centre for innovation and demonstration, tailored to meet the growing demands of stakeholders such as operators, technology and service providers, and applications developers. The ESTEC Telecom 5G/6G Lab (Netherlands) features a variety of testing facilities for TN/NTN and offers a collaborative space for our industry partners.

This programme is part of Advanced Research in Telecommunications Systems (ARTES), overseen by ESA's Connectivity and Secure Communications (CSC) directorate, which aims to connect everyone, everywhere, at all times.

Learn more at <https://connectivity.esa.int/space-5g-6g>