



PRESS RELEASE
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Global Mobile Industry Leaders Achieve Multi-Band 5G NR Interoperability

- AT&T, Ericsson, NTT DOCOMO, Orange, Qualcomm Technologies, SK Telecom, Sprint, Telstra, T-Mobile US, Verizon, and Vodafone demonstrate a multi-vendor interoperability connection compliant with the Non-Standalone (NSA) 5G New Radio (NR) global 3GPP standard
- Live demonstrations showcased both sub-6 GHz and mmWave end-to-end 5G NR systems, using Ericsson's 5G NR pre-commercial base stations and Qualcomm Technologies' 5G NR UE prototypes
- Demonstrations serve as a significant milestone toward standard-compliant trials and commercialization, as part of an ongoing industry collaboration to accelerate 5G NR for commercial network launches starting 2019

An important technology milestone based on the newly-approved NSA 5G NR standard has been achieved by a group of leading mobile communications companies. Ericsson (NASDAQ: ERIC) and Qualcomm Technologies, Inc., a subsidiary of Qualcomm Incorporated (NASDAQ: QCOM), in collaboration with AT&T, NTT DOCOMO, Orange, SK Telecom, Sprint, Telstra, T-Mobile US, Verizon, and Vodafone, showcased 3GPP-compliant 5G NR multi-vendor interoperability during live demonstrations held in both the Ericsson Lab in Kista, Sweden and the Qualcomm Research lab in New Jersey, USA.

The successful demonstrations show the companies' combined strength in carrying out timely trials that pave the way for commercial launches of 5G standard-compliant infrastructure and devices. Ericsson's 5G NR pre-commercial base stations and Qualcomm Technologies' 5G NR UE prototypes will enable operators to conduct live tests in their own networks.

Fredrik Jejdling, Executive Vice President and Head of Business Area Networks at Ericsson, says: "This milestone builds on years of researching and developing 5G technology as well as on leading and contributing to the standardization work. By working closely with our key partners in early trials and fine-tuning our global portfolio, we ensure that we can bring the standard-compliant technology to the benefits of our customers and their customers."

"Achieving multi-vendor interoperability based on the global 5G NR standard is a true testament to our continued 5G leadership, delivering fundamental contributions to the 3GPP standard and driving toward the launch of standard-compliant commercial networks and devices starting in 2019," says Cristiano Amon, Executive Vice President, Qualcomm



Technologies, Inc. "As we did in both 3G and 4G, we are excited to collaborate with Ericsson as an industry leader to accelerate the path to 5G globally."

The over-the-air Interoperability Development Testing (IODT) was conducted for lower layer data connections operating at both 3.5 GHz and 28 GHz bands. These just standardized layers are the fundamental building blocks of 5G NR.

NSA 5G NR will use the existing LTE radio and evolved packet core network as an anchor for mobility management and coverage while adding a new 5G NR radio access carrier to enable certain 5G use cases starting in 2019.

AT&T

"The network of the future is being built – and it's happening fast. We're proud to be one of the top North American wireless carrier contributors into 3GPP's work on 5G standards and to be part of the group of companies that advocated for standards acceleration earlier this year," says Marachel Knight, SVP Wireless Network Architecture Design at AT&T. "We're excited to be a part of standards-based interoperability testing as this helps speed up development of 5G devices and hardware and helps pave the way to launch standards based 5G NR service as soon as the end of 2018."

NTT DOCOMO

Dr. Hiroshi Nakamura, Chief Technology Officer at NTT DOCOMO, says: "We are very pleased with this initiative and believe early IODT is a key to enable a strong and robust ecosystem. NTT DOCOMO has worked on 5G trials with Ericsson for years. We can accelerate co-creation of new services and businesses with vertical industry partners."

Orange

"On the road to 5G, Orange welcomes this first 5G NR Interoperability between Qualcomm and Ericsson. As sponsor of NGMN Trial and Testing Initiative, Orange supports key industry collaboration towards 3GPP standard-compliant trials. Orange is committed to roll-out 5G multi-service connectivity in the future therefore leveraging its potential to cover a large variety of uses," says Arnaud Vamparys, SVP Radio Networks at Orange.

SK Telecom

"SK Telecom is proud to be the first operator to initiate a discussion of early 3GPP-compliant trials with Ericsson and Qualcomm in 2016, which eventually led to this industry-first successful joint demonstration. We believe this is a meaningful industry collaboration bringing global 5G players together," says Jinyo Park, EVP, Head of ICT R&D Center, SK Telecom. "We will continue to drive 5G ecosystem to work on global standards and to enable early 5G commercialization."



Sprint

“Tremendous progress is being made in the development of 5G NR for our sub-6 GHz spectrum, the largest such block available for wide-scale use in the United States,” says Dr. John Saw, Sprint CTO. “We see great opportunity in mobile 5G, massive machine type communications, and ultra-reliable and low-latency communications. Cloud robotics, connected cars and drones, augmented and virtual reality – these are just the start of the applications that will drive new levels of innovation and progress around the world.”

Telstra

Mike Wright, Telstra’s Group Managing Director Networks, says: “Telstra has been working to accelerate the introduction of 5G in Australia and this interoperability testing is a significant milestone towards commercialisation. The strength of the 3GPP ecosystem is in the rigorous analysis to ensure devices and networks are fully tested together, so that our customers can purchase a 5G device in the future and have it work effortlessly on Telstra’s mobile network.”

T-Mobile US

“This achievement is a major step forward toward our commitment to build a nationwide 5G network by 2020 and bring 5G to our customers,” says Neville Ray, Chief Technology Officer for T-Mobile. “The demonstration used both millimeter wave and spectrum below 6GHz – proving the Un-carrier vision that spectrum across all bands will be used for 5G.”

Verizon

“Verizon was pleased to participate in the successful 5G NR multi-vendor interoperability demonstrations,” says Ed Chan, Chief Technology Architect and Network Planning. He added, “These demonstrations represent a key milestone in moving us another step closer towards commercial availability of 5G mobile services for customers.”

Vodafone

Luke Ibbetson, Vodafone’s Head of Group R&D, says: “This first multi-vendor interoperability test of 5G within days of the completion of the 3GPP standard paves the way for Vodafone to trial commercial grade equipment in the coming year. 5G has the potential to provide up to a ten-fold improvement in cost efficiency to help us meet the growing demand for mobile data from Vodafone customers. The capabilities delivered by 5G will also help create the Gigabit societies of the future.”

The IODT test complies with the following key characteristics of the 3GPP 5G NR specifications:

- Waveform: flexible OFDM, Orthogonal Frequency Division Multiplexing, waveform numerologies supporting low-band, as well as mid-band and high-band spectrum allocations for wideband operation and low latency services.
- Dynamic, slot-based frame structure: enables future-proof and ultra-lean design as well as self-contained subframe structure that allows for data transmissions that



efficiently support diverse use cases with requirements that include low latency, high peak-rate, and high reliability.

- Massive MIMO: control and data channel support for Massive MIMO features based on beam-centric design that improve spectral efficiency and achieve higher data rates, boosting performance for consumers.
- Mobile mmWave: control and data channel support for adaptive beamforming and beam-tracking techniques to enable use of high-band mmWave spectrum that deliver extreme data rates and capacity in a mobile environment.
- Channel codecs: channel coding schemes based on latest technology in advanced low-density parity-check (LDPC) codes to support large data blocks and extreme peak rates, and Polar codes for reliable control channels.

At Mobile World Congress 2017, global industry leaders pledged to [accelerate 5G NR for large-scale trials and deployments](#). This was followed by 3GPP approval in March of a work plan to speed up the development of NSA 5G NR specifications by six months and this week approved as a standard at the 3GPP RAN Plenary Meeting in Lisbon, Portugal. This will aid meeting the increasing connectivity requirements for enhanced mobile broadband services, as evidenced in the latest [Ericsson Mobility Report](#).

NOTES TO EDITORS

[5G interoperability milestone](#)

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