

Global Mobile Industry Leaders Commit to Accelerate 5G NR for Large-scale Trials and Deployments

- *Operators and technology partners to support proposal to accelerate the schedule for 3GPP 5G NR standardization to meet increasing global mobile broadband needs —*
- *New proposal introduces an intermediate milestone to complete standardization of a variant called Non-Standalone 5G NR –*

BARCELONA, Spain— February 26, 2017 — Today a contingent of mobile communications companies announced their collective support for the acceleration of the 5G New Radio (NR) standardization schedule to enable large-scale trials and deployments as early as 2019. AT&T, NTT DOCOMO, INC., SK Telecom, Vodafone, Ericsson (NASDAQ:ERIC), Qualcomm Technologies, Inc., British Telecom, Telstra, Korea Telecom, Intel, LG Uplus, KDDI, LG Electronics, Telia Company, Swisscom, TIM, Etisalat Group, Huawei, Sprint, Vivo, ZTE and Deutsche Telekom will support a corresponding work plan proposal for the first phase of the 5G NR specification at the next 3GPP RAN Plenary Meeting on March 6-9 in Dubrovnik, Croatia.

The first 3GPP 5G NR specification will be part of Release 15 – the global 5G standard that will make use of both sub-6 GHz and mmWave spectrum bands. Based on the current 3GPP Release 15 timeline the earliest 5G NR deployments based on standard-compliant 5G NR infrastructure and devices will likely not be possible until 2020. Instead, the new proposal introduces an intermediate milestone to complete specification documents related to a configuration called Non-Standalone 5G NR to enable large-scale trials and deployments starting in 2019. Non-Standalone 5G NR will utilize the existing LTE radio and evolved packet core network as an anchor for mobility management and coverage while adding a new 5G radio access carrier to enable certain 5G use cases starting in 2019. The new proposal and the intermediate milestone

also re-affirm and solidify the schedule for the complete standard, including Standalone 5G NR in Release 15.

The supporting companies are further committed to make forward compatibility a key design principle for the standardization of the first release of 5G NR. This will enable in-band introduction of new capabilities and features in subsequent releases critical to enabling yet to be identified industries and use cases and achieving the 5G vision to connect everything to everything.

The proposal is consistent with 3GPP's commitment to enable a flexible evolution and inter-working of the radio access network towards 5G NR and the evolution of the core network towards the 5G System.

As proven by the broad Industry support, this proposal delivers the ability to address the increasing global demand for enhanced mobile broadband services with 5G NR in 2019, while continuing to address the broader vision for 5G NR in 2020 and beyond.

AT&T

“We support both the Standalone and Non-Standalone configurations of 5G New Radio,” said Tom Keathley, senior vice president- wireless network architecture and design, AT&T. “Our focus is on prioritizing important specifications in the standards to bring 5G to market as quickly as possible. In the process of defining any standard, it is normal to make some decisions earlier than others. These accelerated decisions on key components of 5G New Radio standards will

allow an earlier start on the development of the infrastructure and devices of tomorrow's 5G deployments.”

NTT DOCOMO, INC.

Seizo Onoe, executive vice president and chief technology officer, NTT DOCOMO said, “5G is the key enabler to create new business opportunities across industries. DOCOMO plans a commercial launch with Non-Standalone 5G NR by 2020. Acceleration of the standardization schedule will facilitate early implementation of the standard-compliant 5G NR. We will ensure the highly-stable 5G services through large-scale trial activities with a wider range of industry partners.”

SK Telecom, Co. Ltd.

Park Jin-hyo, Senior Vice president, Head of Network Technology R&D Center, SK Telecom said, “As the demand for 5G commercialization is rapidly increasing, it is crucial to complete globally agreed 5G standardization in time. 3GPP NR is the global 5G standard and we are making continuous efforts to accelerate 3GPP NR standardization with partners.”

Vodafone Group

Luke Ibbetson, head of research and development and strategy, Vodafone Group, said:

“Standardisation of the New Radio interface will be critical to the successful development of 5G over the coming years. As the industry starts to design and test a new generation of services and applications, a common global standard for the underlying mobile technology will allow innovation to flourish and help us achieve economies of scale.”

Ericsson

Arun Bansal, Senior Vice President and Head of Business Unit Network Products, says: “The faster we commercialize 5G based on 3GPP specifications, the faster we will realize its benefits for the entire industry. We are thrilled to participate in this initiative to accelerate the 5G ecosystem and commercial deployment.”

Qualcomm Technologies, Inc.

Cristiano Amon, executive vice president, Qualcomm Technologies, Inc., and president, QCT said, “5G NR technologies will be critical to meet the ever-increasing connectivity requirements for emerging mobile broadband experiences such as virtual reality, augmented reality and connected cloud computing, and we are already seeing the need to bring these technologies to devices globally sooner rather than later. There is great value in accelerating the timeline to commercialization, while maintaining the global scale through the proper standardization process in 3GPP.”

British Telecom

Howard Watson, CEO BT TSO noted, “By accelerating the creation of the new radio interface we will be able to enable the 5G experience for customers sooner driving our purpose of using communications to make a better world”.

Telstra

Mike Wright, Telstra's Group Managing Director Networks, said "Telstra is committed to the benefits of industry standardization and the development of this intermediate milestone for 5G NR would allow the benefits of early launch of 5G in the 2019 timeline following extensive pre-5G testing planned by Telstra during 2018."

Korea Telecom, Co. Ltd.

"We are pretty encouraged by the increasing voices heard within the telecom industry that the process of New Radio Specification should be expedited," said YongGyoo Lee, Senior Vice President – Network Strategy, Korea Telecom. "KT views that Non-Standalone and Standalone modes are equally important for the sake of completeness of the Standard Specification. However, we believe that early introduction of 5G network, compensated by already-prevailing LTE coverage, is a reasonable approach for the operators when taking the ROI factors into the consideration, and it justifies the slight preference for NSA mode in terms of priority. Our view is that 5G is not just the matter of achieving higher data speed. Rather, we believe that it will completely turn around the way the communication service is provided to the customers and eventually open up the opportunity for the telecom operators to diversify the new revenue streams in a cost-effective way. I am sure that the whole industry will enjoy the benefits from quick introduction of 5G into the market, enabled by the acceleration of 5G NR Specification in 3GPP."

Intel Corporation

Asha Keddy, vice president and general manager of Next Generation Standards, Intel Communications and Devices Group, says, “Intel is committed to accelerating the roll out of 5G from the cloud to the network to the device. Global industry collaboration to accelerate the 3GPP NR standard is a lynchpin to making 5G a worldwide success and to scale. 5G is a true inflection point in technology and will transform our lives and society in ways far beyond previous connectivity standards, and as such, the ability to solidify a global standard is more critical than ever.”

KDDI Corporation

Yoshiaki Uchida, Managing Executive Officer, Technology Sector, Member of the Board, KDDI Corporation said, "For rapid commercialization of 5G, forming an ecosystem by global harmonization including frequency bands and specifications is even more crucial than in the previous generations. KDDI is targeting to start 5G services in 2020, which mandates early completion of NR specification. We sincerely hope the acceleration of related 3GPP activities."

LG Electronics

Go-Hee Choi, Senior Vice President, Head of Advanced Standard R&D Lab, said, “LG Electronics believes that the early completion of 5G NR global standardization would be crucial in satisfying growing market demands for new innovative 5G experiences and making 5G a worldwide success. We fully support the initiative for 5G NR global acceleration and will make every effort to expedite the completion of 5G NR specification in 3GPP based on global partnership.”

Telia Company

Mauro Costa, Director, Network Architecture & Strategy, Telia Company says, “A global standard is a fundamental pre-requisite to make 5G a success and open up for innovation and new business opportunities. Considering the large and increasing 5G interest from our customers, we see a strong need to have the standard to progress fast and complete on time. The acceleration of the 3GPP NR standard is an essential step in this direction.”

Swisscom

Daniel Staub, Head of Joint Mobile Group, Swisscom and in charge of the 5G implementation said: "As a European technology leader, Swisscom wants to get 5G early. Swisscom is fully committed to standards. Therefore, a proprietary or close-to-standard implementation is not of interest to Swisscom. As a consequence, Swisscom is fully supporting 5G NR acceleration to always provide the best experience on the best network to our customers."

Etisalat Group

Hatam Bamatraf, Chief Technology Officer, International said: “Etisalat Group is committed to the accelerated development of 5G that meets a global standard. Such a standard will have a positive impact on efficiency and the quality of the services we can deliver to our customers. Being part of this collective effort from the industry to take forward 5G NR, reflects Etisalat Group’s open approach to partnership and our focus on innovation.”

Huawei

"5G will usher in an era of deep convergence between telecom and vertical industries, meaning 5G standards will apply to multiple scenarios and enable the digital transformation of multiple industries." Mr. Yang Chaobin, President of Huawei 5G, said: "We need to define a Future-Proof 5G architecture which combining innovative achievements from various industries, to meet the requirements of numerous applications step by step and then to ensure the strategic vision and leading capabilities of 5G."

vivo

Yujian Shi, senior vice president, vivo said, "Both Non-Standalone and Standalone 5G NR are very important scenarios. A unified 5G standard for both scenarios has contribution to build up a global 5G ecosystems. The acceleration of 5G will help the earlier mature of 5G terminal industry. As a global terminal vendor, we will continuously create surprising to our customers in coming 5G era. "

ZTE

Xu Huijun, CTO of ZTE, said, "As a global leader in telecommunications and information technology, ZTE sees the significant importance of 3GPP standard beneficial to whole industrial chain and keeps contributing actively to global standards. ZTE will work together with partners to push forward 5G test and trial steadily, to promote the 5G commercialization world widely."

Deutsche Telekom

“Deutsche Telekom is committed to this initiative to accelerate the availability of standardized 5G technologies to meet the evolving broadband demands of our customers,” says Bruno Jacobfeuerborn, CTO, Deutsche Telekom. “The early availability of standards will enable smooth evolution paths towards the next generation of communications, provide the basis for extensive pre-testing activities and generate confidence in the benefits and potential of the new technology for the entire industry.”

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About AT&T

AT&T Inc. ([NYSE:T](#)) helps millions around the globe connect with leading entertainment, business, mobile and high speed internet services. We offer the nation’s best data network and the best global coverage of any U.S. wireless provider. We’re one of the world’s largest providers of pay TV. We have TV customers in the U.S. and 11 Latin American countries. Nearly 3.5 million companies, from small to large businesses around the globe, turn to AT&T for our highly secure smart solutions.

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About NTT DOCOMO

NTT DOCOMO provides innovative, convenient and secure mobile services that enable smarter living for each customer. The company serves over 72 million mobile customers in Japan via advanced wireless networks, including a nationwide LTE network and one of the world's most progressive LTE-Advanced networks. DOCOMO is a leading developer of a 5G network that it plans to deploy by 2020, as well as network function virtualization (NFV), NFC infrastructure and services, emerging IoT solutions, and more. Outside Japan, the company is providing technical and operational expertise to seven mobile operators and other partner companies, and is contributing to the global standardization of all-new mobile technologies. DOCOMO is listed on stock exchanges in Tokyo (9437) and New York (DCM). Please visit <https://www.nttdocomo.co.jp/english/>.

About SK Telecom

Established in 1984, SK Telecom is the largest mobile operator in Korea by both revenue and number of subscribers. As of December 2016, the company holds around 50 percent of the market, with 29.60 million mobile subscribers including 21.1 million LTE subscribers. It has reached KRW 17.092 trillion in revenue in 2016.

SK Telecom has led the advancement of mobile technologies ranging from 2G to 4G, and is currently setting important milestones in its journey to 5G. The company is not only leading innovation in the field of mobile network, but also providing IoT, media, home and platform services.

SK Telecom is determined to play a significant role in the Fourth Industrial Revolution by achieving innovations and promoting shared growth with other players in the industry.

For more information, please visit www.sktelecom.com/en or contact skt_press@sk.com.

About Ericsson

Ericsson is a world leader in communications technology and services with headquarters in Stockholm, Sweden. Our organization consists of more than 111,000 experts who provide customers in 180 countries with innovative solutions and services. Together we are building a more connected future where anyone and any industry is empowered to reach their full potential. Net sales in 2016 were SEK 222.6 billion (USD 24.5 billion). The Ericsson stock is listed on Nasdaq Stockholm and on NASDAQ in New York. Read more on www.ericsson.com.

About Qualcomm

Qualcomm's technologies powered the smartphone revolution and connected billions of people. We pioneered 3G and 4G – and now we are leading the way to 5G and a new era of intelligent, connected devices. Our products are revolutionizing industries, including automotive, computing, IoT, healthcare and data center, and are allowing millions of devices to connect with each other in ways never before imagined. Qualcomm Incorporated includes our licensing business, QTL, and the vast majority of our patent portfolio. Qualcomm Technologies, Inc., a subsidiary of Qualcomm Incorporated, operates, along with its subsidiaries, all of our engineering, research and development functions, and all of our products and services businesses, including our QCT semiconductor business. For more information, visit Qualcomm's [website](#), [OnQ blog](#), [Twitter](#) and [Facebook](#) pages

About Telstra

Telstra is a leading telecommunications and information services company. We offer a full range of services and compete in all telecommunications markets in Australia, operating the largest mobile and Wi-Fi networks. Globally, we provide end-to-end solutions including managed network services, global connectivity, cloud, voice, colocation, conferencing and satellite solutions. We have licenses in Asia, Europe and the United States and offer access to more than 2,000 points of presence across the globe. For more information visit www.telstra.com.

About Korea Telecom

KT is leading the development of the ICT industries of Korea since its foundation in 1981. Being a formerly state-owned firm, KT is South Korea's first telephone company and dominates the local landline and broadband business. It serves roughly 90% of the country's fixed-line subscribers and 45% of high-speed internet users.

Since the merger with its wireless subsidiary KTF back in 2009, KT expanded its business scope and included mobile communication as its main service. Its mobile subscriber base totals around 18.9 million as of the end of 2016 and about 75% of it, that is, roughly 14.2 million are LTE subscribers.

KT also has keen interests in introducing the most innovative technology to the market and hence providing the best service quality to the customers. As an official partner for Pyeongchang Winter Olympic Games in 2018, KT is committed to provide the telecommunication service for the event and more specifically will showcase the world-first 5G trial service during the Games. For more information, you can visit at www.kt.com/eng/.

About Intel

Intel (NASDAQ: INTC) expands the boundaries of technology to make the most amazing experiences possible. Information about Intel can be found at newsroom.intel.com and intel.com.

About KDDI Corporation

KDDI, a comprehensive communications company offering fixed-line and mobile communications services, strives to be a leading company for changing times. For individual customers, KDDI offers its mobile communications (mobile phone) and fixed-line communications (broadband Internet/telephone) services under the brand name au, helping to realize Fixed Mobile and Broadcasting Convergence (FMBC). For business clients, KDDI provides comprehensive Information and Communications services, from Fixed Mobile Convergence (FMC) networks to data centers, applications, and security strategies, which help clients strengthen their businesses. For more information please visit <http://www.kddi.com/english>.

About LG Electronics

LG Electronics, Inc. is a global leader and technology innovator in consumer electronics, mobile communications and home appliances, employing 77,000 people working in 125 locations around the world. LG comprises four business units: Home Appliance & Air Solutions, Mobile Communications, Home Entertainment and Vehicle Components. Especially, LG Mobile Communications is a global leader and trend setter in the mobile and wearable industry with breakthrough technologies and innovative designs. By continually developing highly competitive core technologies in the areas of display, battery, camera optics and LTE/LTE-A technology, LG creates handsets and wearables that fit the lifestyles of a wide range of people all over the world.

LG is seeking to provide a playful mobile experience that extends beyond the scope of traditional smartphones. For more news and information on LG Electronics, please visit www.LG.com.

About Telia Company

We're Telia Company, the New Generation Telco. Our 21 000 talented colleagues serve millions of customers every day in one of the world's most connected regions. With a strong connectivity base, we're the hub in the digital ecosystem, empowering people, companies and societies to stay in touch with everything that matters 24/7/365 - on their terms.

Headquartered in Stockholm, the heart of innovation and technology, we're set to change the industry and bring the world even closer for our customers.

For more information, please contact our press office +46 771 77 58 30, visit our Newsroom or follow us on Twitter @Teliacompany.

About Swisscom

Swisscom, Switzerland's leading telecoms company and one of its leading IT companies, is headquartered in Ittigen, close to the capital city Berne. Swisscom's international activities are concentrated mainly in Italy, where its subsidiary Fastweb is one of the biggest broadband providers. More than 21,000 employees achieve a revenues of CHF 11.64 billion to the end of 2016. Swisscom is one of the most sustainable companies in Switzerland and Europe.

About TIM

TIM Group is Italy's leading ICT company, supporting the country's "Digital Life". TIM's offer is built on top quality and maximum dissemination of convergent services and premium content relying upon innovative infrastructures, a vast choice of APPs and devices, tailored and modular solutions, both for retail and business. The three-year business plan 2017-2019 provides for approx. 11 bln. euros in investments in Italy, of which circa 5 bln. euros to accelerate UBB networks development. By 2019, TIM targets to cover 95% of households with fibre and 99% of the population with 4G.

About Etisalat Group

Etisalat Group is one of the world's leading telecom groups in emerging markets. Etisalat's current market cap is over 132 billion AED (36 billion USD). With reported net revenues of AED 51.7 billion and net profit of AED 8.3 billion for 2015, Etisalat ranks amongst the most profitable telecom groups in the world. Its high credit ratings at AA-/A+/Aa3 reflect the company's strong balance sheet and proven long-term performance. Headquartered in Abu Dhabi, Etisalat was established four decades ago in the UAE as the country's first telecommunications service provider. An international blue-chip organisation, Etisalat Group provides innovative solutions and services to 163 million subscribers in 17 countries across the Middle East, Asia and Africa. Etisalat Group's mission is to provide a best-in-class total customer experience domestically and internationally, deliver attractive returns to shareholders while investing in the long-term future of the company, and supporting economic development in all the markets we operate in.

About Huawei

Huawei is a leading global ICT solutions provider. As a responsible and robust business player, innovative information society enabler, and cooperative industry contributor, Huawei is committed to building a Better Connected World. Through our dedication to customer-centric innovation and strong partnerships, we have established end-to-end capabilities and strengths across carrier, enterprise, consumer, and cloud computing domains. Huawei's 170,000 employees worldwide create maximum value for telecom operators, enterprises and consumers. Our innovative ICT solutions, products and services have been deployed in over 170 countries and regions, serving more than one-third of the world's population. Founded in 1987, Huawei is a private company that is fully owned by its employees. For more information, please visit Huawei online at www.huawei.com.

About vivo

vivo is a fast-growing world leading smartphone brand. The company is one of the top 3 smartphone vendors in China. More 100 million users from China and South-east Asia are enjoying exciting mobile broadband lives with vivo smartphone. vivo creates products for energetic, trendy, pleasure-seeking young urbanites, combining extraordinary appearance, professional-grade audio, and a fast and smooth user experience. At vivo, we are firmly dedicated to pursuing true perfection, while continuously creating the surprising. Additional information about vivo products is available at <http://www.vivoglobal.com>.

About ZTE

ZTE is a provider of advanced telecommunications systems, mobile devices, and enterprise technology solutions to consumers, carriers, companies and public sector customers. As part of ZTE's M-ICT strategy, the company is committed to provide customers with integrated end-to-end innovations to deliver excellence and value as the telecommunications and information technology sectors converge. Listed in the stock exchanges of Hong Kong and Shenzhen (H share stock code: 0763.HK / A share stock code: 000063.SZ), ZTE's products and services are sold to over 500 operators in more than 160 countries. ZTE commits 10 per cent of its annual revenue to research and development and has leadership roles in international standard-setting organizations. ZTE is committed to corporate social responsibility and is a member of the UN Global Compact. For more information, please visit www.zte.com.cn.

About Deutsche Telekom:

With some 156 million mobile customers, 29 million fixed-network lines and more than 18 million broadband lines, Deutsche Telekom is paving the way for the gigabit society. For more information, please visit telekom.com