

Real Issues and Future Vision of 5G



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The commercial service of NTT DOCOMO's fifth-generation mobile communications system (5G) was launched on March 25, 2020. As someone who has been involved in 5G from the beginning of its research and development, I can say "Finally, this day has come," but in a sense, we have just arrived at the starting line of 5G.

Studies toward 5G began just after the commercial launch of LTE services in 2010. Up to now, a new generation of mobile communications has come to be launched in a roughly 10-year cycle, so 2020 was targeted as the 5G launch period from the very start. We began with studies of basic 5G concepts, and based on those studies, we exchanged opinions with key world players in a step-by-step manner to form a worldwide consensus. By 2014, a global view had been achieved on main requirements, such as transmission speeds in excess of 10 Gbps and low latency on the order of milliseconds, and on elemental technologies. Wireless transmission experiments began in earnest in 2014 to demonstrate the technical feasibility of these requirements, and transmission speeds exceeding 10 Gbps and low latency on the millisecond level were achieved. In addition, given the rising expectations in other industries toward 5G and the need to formulate 5G use cases from an early stage to explore business opportunities for NTT DOCOMO as well, we began in 2017 to hold many use-case trials and exhibitions showcasing 5G features in collaboration with players from diverse industries. Then, in 2018, the DOCOMO 5G Open Partner Program was launched to expand activities toward the creation of new usage scenarios together with an even broader group of partners. These activities were taken up in many press releases and articles thereby spreading the word throughout Japan on the potential of 5G to solve pressing social problems and bring innovative changes to many industries.

In truth, however, this coverage in the media gave the false impression that high performance reflected by 5G requirements and the many use cases targeted by trials would soon become a reality throughout the country. At present, there are no 5G commercial systems anywhere in the world that are operating at transmission speeds of 10 Gbps with low latency on the millisecond level, and areas with 5G coverage are limited. This is the same pattern followed in past generations, namely, that several years would be needed to ramp up performance and that use cases even for business would be created gradually. On the other hand, 5G differs from past generations in a number of ways. For example, many studies and experiments have been conducted and reported both inside and outside Japan toward the creation of new services, and diverse industries and local governments have been expressing great expectations of 5G even prior to the launch of the commercial service. Thus, with today's 5G issues in mind, we feel that it is extremely important to pursue research and development that can drive the evolution of 5G into the future. We need to understand real performance in today's real environment and plan the creation of new services and business opportunities in a steady manner. At the same time, we need to adequately grasp the gap with real market needs and plan for future 5G enhancements. Additionally, to meet the expectations of a broad range of industries, enhancements to the public mobile communications network will not be sufficient. We need to meet special requirements for private use in a variety of industrial scenarios such as factories, construction sites, and farmland. There will also be a need to promote short-term and medium-term initiatives toward solving social problems and achieving a social transformation as described in Sustainable Development Goals (SDGs)*1 and Society 5.0*2.

Today, with 5G commercial services coming to be launched around the world, 6G studies have commenced on a global basis as a future long-term mobile communications system toward a 2030 launch. NTT DOCOMO has already published white papers and promoted discussions on 5G evolution and 6G. As a member of the NTT DOCOMO R&D team, I am committed to making the 5G system and business opportunities expected by general users and diverse industries a reality at an early stage and to continue with my R&D efforts toward a long-term mobile communications system of the future.

*1 SDGs: A set of global goals adopted by United Nations General Assembly in 2015 for the period from 2016 to 2030. They consist of 17 goals and 169 targets with the aim of achieving a sustainable society.

*2 Society 5.0: A new economic society advocated by the Japanese government to enrich people's lives through maximum use of ICT as the next stage in world history following the hunter-gatherer society, agricultural society, industrial society, and information society.