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TOPIC

Toward the Realization of Beyond 5G to Support Social Infrastructure in the 2030s—Beyond 5G International Conference 2021 held

1. Significance of Beyond 5G and efforts to realize Beyond 5G

Beyond 5G is the next generation technology after 5G, i.e., the fifth-generation wireless technology commercially available in 2020. Beyond 5G is expected to play a leading role in society 5.0, proposed as Japan's future vision. Furthermore, it is expected to become the foundation for industrial and social life in the 2030s and a further social change.

From this perspective, MIC compiled *Strategy Outline of Beyond 5G Promotion—Roadmap to 6G* on June 30, 2020. Based on this strategy, the Beyond 5G Promotion Consortium was established as a core organization to promote Beyond 5G, and industry, academia, and government are working together to realize Beyond 5G.

Under these circumstances, the Beyond 5G International Conference 2021 was held in November 2021 by MIC and the Beyond 5G Promotion Consortium as co-organizer. The conference focused on accelerating research and development (R&D) efforts and strengthening international collaboration to realize Beyond 5G. Various domestic and international actors participated in international discussions on the vision for realizing Beyond 5G and the requirements, technologies, and use cases necessary for its realization.

2. Japan's efforts to realize Beyond 5G

At the beginning of the conference, three representatives made opening remarks on behalf of the organizers, i.e., MIC and the Beyond 5G Promotion Consortium. These representatives were Mr. NAKANISHI Yusuke (State Minister for Internal Affairs and Communications), Mr. GONOKAMI Makoto (President of the Beyond 5G Promotion Consortium), and Mr. TOKURA Masakazu, (Vice-President of the Beyond 5G Promotion Consortium). To realize Beyond 5G, they sent out a strong message that they would accelerate the efforts under international cooperation by mobilizing the power of industry, academia, and government and present concrete convenience and consumer value in a tangible form.



Opening remarks by Mr. NAKANISHI Yusuke,
State Minister for Internal Affairs and Communications



Opening remarks by Mr. GONOKAMI Makoto,
President of the Beyond 5G Promotion Consortium

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Following the opening remarks, Mr. TAKEUCHI Yoshiaki, Vice-Minister for Policy Coordination, delivered a keynote speech under the theme of *Japan's Initiative on Beyond 5G*. In his presentation, he explained that Beyond 5G would be the foundation of industrial and social life in the 2030s. He also explained the necessity of promoting R&D while further improving the performance functions of the current 5G, such as high-speed, low-latency, and multiple simultaneous connections, and adding performance functions, including ultra-low power consumption contributing to carbon neutrality. He stated that Beyond 5G would be used in various situations, such as telemedicine and safe and secure transportation systems. From the perspective of strengthening international competitiveness, he also stated that Japan would promote joint research in cooperation with other countries to obtain a 10% or more share of essential patents. He added that the Osaka-Kansai World Exposition in 2025 would be a “showcase” of Japan's Beyond 5G for the world and that Japan would invest 100 billion yen of government funds in the five years from 2021 as a period of intensive investment to speed up the development and verification of the technology. The presentation material is available at “https://www.soumu.go.jp/main_sosiki/joho_tsusin/eng/presentation/pdf/Vision_toward_Beyond_5G.pdf”.

Mr. TOKUDA Hideyuki, President of the National Institute of Information and Communications Technology (hereafter referred to as “NICT”), delivered a keynote speech. NICT, as a public funding agency, set up a fund for R&D under MIC's Beyond 5G R&D Promotion Project and has been supporting R&D by private companies and universities. He stated that 44 projects were in motion as of November 2021 and explained NICT's ongoing development of an open testbed for research and demonstration of Beyond 5G.

Furthermore, he mentioned five R&D strategies for NICT's promotion of Beyond 5G. These five strategies are: (1) NICT itself will become a hub for R&D, (2) NICT's independent R&D projects and support projects will collaborate to refine research content, (3) NICT will update Japan's Beyond 5G White Paper, (4) NICT will promote the acquisition of intellectual property and standardization, which will be the core of realizing Beyond 5G, and (5) NICT will strengthen international collaboration and information dissemination.

Domestic telecommunication operators made presentations on their visions and initiatives for the realization of Beyond 5G as follows:

- Nippon Telegraph and Telephone Corporation (Mr. SAWADA Jun, President and CEO): The potential of the Innovative Optical and Wireless Network (IOWN) as a medium to connect the Umwelt (the world as experienced by a particular organism) in the age of optoelectronic convergence
- NTT Docomo, Inc. (Mr. II Motoyuki, President and CEO): Introduction of the R&D concept of 5G Evolution and 6G
- KDDI Corporation (Mr. TAKAHASHI Makoto, President, Representative Director): Resolving social issues through research into advanced technologies, such as networks and new lifestyles, based on KDDI Accelerate 5.0, a next-generation social concept.
- SoftBank Corporation (Mr. MIYAKAWA Junichi, President and CEO): Improvements in disaster resistance and fault tolerance by building a distributed cloud that achieves low latency, high availability, and energy conservation, and a non-terrestrial network such as high-altitude platform station (HAPS) systems.
- Rakuten Mobile, Inc. (Mr. YAMADA Yoshihisa, President & Representative Director): R&D activities for Beyond 5G promoted through industry-academia collaboration and fully virtualized cloud-native mobile networks and their international deployment

Members of the Beyond 5G Promotion Consortium reported the global trend of Beyond 5G and 6G. Also, there was an explanation about the preparation progress of Japan's Beyond 5G White Paper, which would serve as an input document contributing to Working Party 5D (WP5D) of the International Telecommunication Union Radiocommunication Sector (ITU-R). WP5D is promoting the international standardization of mobile communication systems. The first edition of the White Paper is scheduled to be compiled in March 2022.

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3. Reinforcement of international collaboration to realize Beyond 5G

The conference was attended by various international participants from industry, academia, and government. Foreign government participants included Ms. Julia Lopez (Minister of State at the Department for Digital, Culture, Media & Sport) from the United Kingdom and Mr. Jose W. Fernandez (Under Secretary for Economic Growth, Energy, and the Environment) from the United States, as well as dignitaries from Germany and the European Union. They explained the progress of institutional development to promote 5G and Beyond 5G. They also explained the status of policies and government investments in each country and region toward realizing 5G and Beyond 5G. All participants confirmed the importance of expanding 5G functions and promoting early domestic deployment with an eye on Beyond 5G first of all. Furthermore, to ensure safe and secure 5G and Beyond 5G systems that everyone could access, they confirmed the need for supply chain and cybersecurity reinforcement and efforts to achieve these goals.



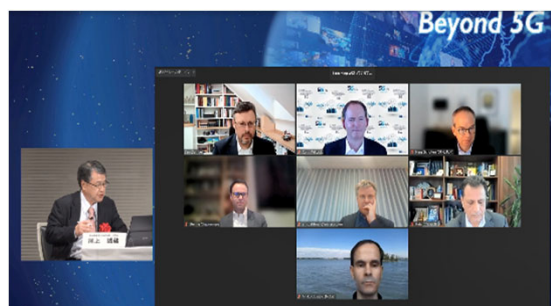
Speech by Mr. Jose W. Fernandez,
U.S. Under Secretary for Economic Growth, Energy, and the Environment



Speech by Ms. Julia Lopez,
British Minister of State at the Department for Digital, Culture, Media & Sport

Telecommunication companies from Europe and the United States, including Nokia and Qualcomm, explained the prospects of 5G and Beyond 5G, along with use cases and the requirements and technologies for implementing them. The explanations included Beyond 5G promoting projects in which the companies play central roles.

In addition, there was a panel discussion facilitated by Mr. ONOE Seizo, Chief Standardization Strategy Officer (CSSO) of Nippon Telegraph and Telephone Corporation, to discuss the necessary elements to realize Beyond 5G. Participants pointed out that Beyond 5G should contribute to the Sustainable Development Goals (SDGs), taking sustainability into account. They stressed the importance of reducing the power consumption of data exchange by giving top priority to environmental constraints and protecting highly confidential information and privacy in data exchange. They also stressed the importance of establishing and sharing a common vision for realizing Beyond 5G in each country early, and working towards it, considering essential collaboration with other countries for innovation and social value creation.



Panel discussion on the necessary elements for realizing Beyond 5G

The Beyond 5G Promotion Consortium recognizes the importance of international collaboration. The Beyond 5G Promotion Consortium's Chair of the International Committee, Mr. NAKAO Akihiro (professor at Graduate School of Engineering, the University of Tokyo), announced that the Consortium would actively disseminate Japan's technology to the world and collaborate with other countries.

At the end of the conference, closing remarks were made by Mr. KANEKO Yasushi, Minister for Internal Affairs and Communications.

He gave a strong message that Japan would lead the international discussions to realize Beyond 5G by further accelerating international exchanges and collaborations through this conference.



Closing remarks by Mr. KANEKO Yasushi,
Minister for Internal Affairs and Communications

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4. Prospects

International competition for Beyond 5G is intensifying year by year. While various studies and activities for Beyond 5G are progressing moment by moment in Japan and abroad, Japan will strategically promote R&D, intellectual property, international standardization, etc. to strengthen its international competitiveness. For this purpose, it is necessary to accumulate the efforts and knowledge of related organizations and major players in Japan and further specify the priority areas of research, development, and promotion measures. For this reason, the Information and Communications Council under MIC has been studying the ideal state of information and communications technology strategy for Beyond 5G since September 2021. The study is being conducted in cooperation with the Beyond 5G Promotion Consortium while incorporating useful opinions expressed by various parties involved in the discussions at the conference. MIC will continue further accelerating international exchanges and collaborations by taking advantage of the conference held annually and other opportunities to lead international discussions toward the realization of Beyond 5G in collaboration with other countries.