

Technology Reports

5G Pre-commercial Service

High Speed – Large Capacity/Low Latency/Massive Connectivity

Spectator Support Services

Special Articles on 5G Pre-commercial Service

5G Pre-commercial Services Making Full Use of 5G Features

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NTT DOCOMO launched a 5G pre-commercial service in September 2019 ahead of its 5G commercial service scheduled for spring 2020. Coinciding with the holding of “Rugby World Cup 2019^{TM*1} in Japan,” the 5G pre-commercial service is rolling out spectator support services such as 5G high-presence public viewing and multi-angle viewing. It is also providing the “Shintaikan Live” service featuring live streaming and multi-angle viewing as a new form of entertainment for the 5G era. This article introduces key 5G pre-commercial services deployed by NTT DOCOMO, a driving force of the 5G era, and describes NTT DOCOMO’s 5G event held at Tokyo Game Show 2019^{®*2} prior to the launch of the 5G pre-commercial service.

1. Introduction

NTT DOCOMO’s 5G pre-commercial service got under way on September 20, 2019 providing a variety of new user experiences reflecting the 5G era. These include spectator support services for

the Rugby World Cup, the first to be held in Asia, and the Shintaikan Live service that enables users to view live performances by artists through live streaming and multi-angle viewing. NTT DOCOMO also held an event envisioning a new era in gaming through 5G at Tokyo Game Show 2019 held

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^{*2} Tokyo Game Show: A registered trademark of Computer Entertainment Supplier’s Association (CESA).

from September 12 to 15, 2019 just prior to the launch of the 5G pre-commercial service. This article describes a variety of 5G pre-commercial services deployed by NTT DOCOMO, a major force behind the 5G era.

2. Initiatives toward Rugby World Cup 2019 in Japan

NTT DOCOMO's 5G pre-commercial service was launched alongside "Rugby World Cup 2019 in Japan." This is because the Rugby World Cup, which drew a total attendance of 2,470,000 fans last time [1], is an international sporting event on par with the FIFA World Cup^{*3} and Olympics^{*4} making it a perfect opportunity for large-scale promotion of 5G both inside and outside Japan. This time, moreover, it was the first Rugby World Cup to be held in Asia, so it was thought that it would

attract considerable attention not only from diehard rugby fans but also from the general public in Japan thereby enabling even more users to recognize the merits of NTT DOCOMO 5G services. NTT DOCOMO was also a cosponsor of this event in its role as a Tournament Supplier, so as part of its 5G pre-commercial service, it provided the following 5G spectator support services during the tournament at various stadiums and at a public viewing site (Figure 1).

2.1 5G High-presence Public Viewing

NTT DOCOMO held "Rugby World Cup 2019 5G Public Viewing" events inviting a total of 600 general users to participate. At these events, match video from either Tokyo Stadium^{*5} or International Stadium Yokohama^{*6} was transmitted to a public viewing site (Bellesalle^{*7} Shiodome) sponsored by NTT DOCOMO over a 5G network and projected



Figure 1 Spectator support services at Rugby World Cup 2019

*3 FIFA World Cup®: A registered trademark of Fédération Internationale de Football Association.

*4 Olympics®: A registered trademark of the International Olympic Committee.

*5 Tokyo Stadium®: A registered trademark of Tokyo Stadium Co., Ltd.

*6 International Stadium Yokohama®: A registered trademark of Yokohama Sports Association.

*7 Bellesalle®: A registered trademark of Sumitomo Realty & Development Co., Ltd.

onto large screens for viewing. Making full use of the high-speed, large-capacity, and low-latency features of 5G, this service can transmit large amounts of information such as video and audio at multiple angles from a match venue with low latency. It enabled an exciting public viewing experience at locations away from the stadium (Figure 2).

2.2 Multi-angle Viewing

This service delivered multi-viewpoint video of matches played at eight venues around Japan along

with additional information such as commentaries, player data, and replay video via a 5G network to 5G terminals provided by NTT DOCOMO within a stadium or public viewing site (for two matches). With this service, users could check out video from various angles, player data, etc. at their fingertips while watching a match at a stadium or public viewing site, all of which made the watching of those sporting events even more enjoyable (Figure 3).

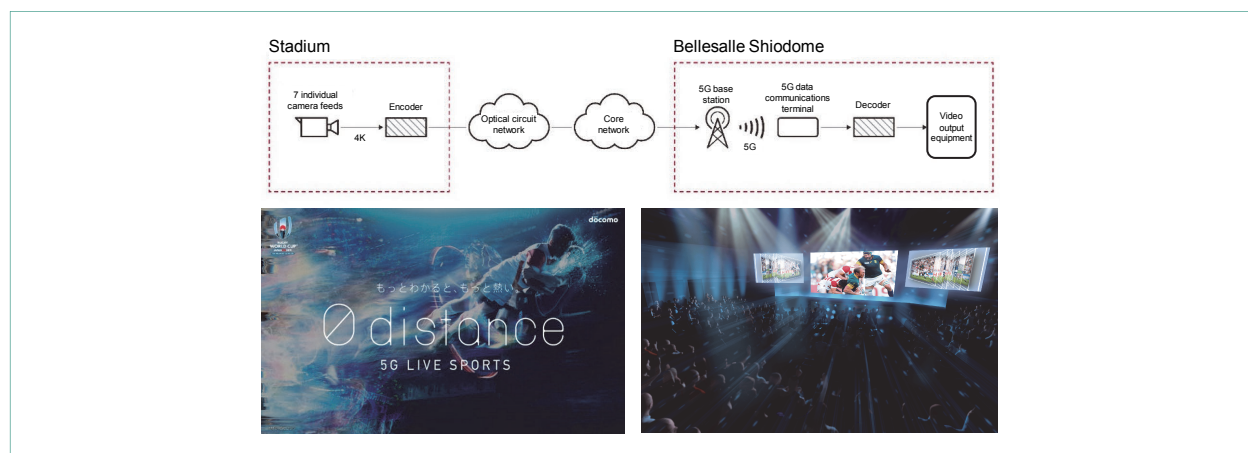


Figure 2 High-presence public viewing service

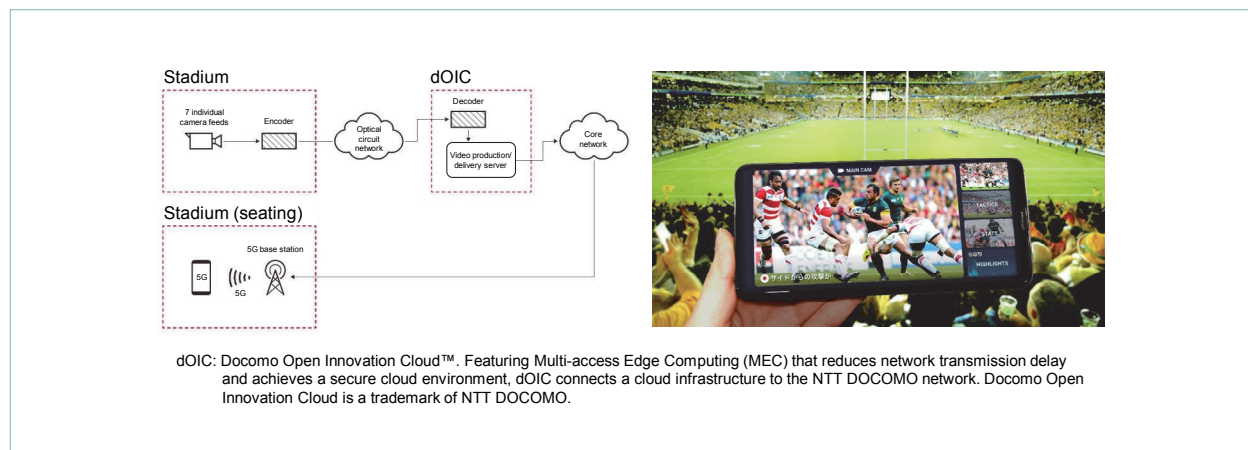


Figure 3 Multi-angle viewing service

3. Entertainment for the 5G Era

In addition to services for Rugby World Cup 2019 in Japan, NTT DOCOMO is providing consumer-oriented services applying the 5G features of high speed and large capacity, low latency, and massive connectivity.

3.1 Shintaikan Live

Shintaikan Live is a service that uses cutting-edge 5G video technologies to enable users to experience and enjoy a new style of watching live video anywhere. This service features “Multi-Angle Live” and “AR Figurines,” each of which includes interactive communication functions.

Multi-Angle Live means the viewing of live video of concerts, stage performances, sporting events, etc. from various camera angles. The user can select and view video shot from among multiple angles and delivered in real time from the venue. For example, while Multi-Angle Live can, of course, deliver video showing all members of a band, it can also deliver individual fixed-camera video of a guitar, drum, bass, etc. enabling the user to specify preferred angles. In short, the user has the option of displaying and zooming in on the video from cameras fixed on favorite band members all on one screen. Furthermore, since live streaming video can also be viewed later as a missed program (deferred delivery), users can enjoy an artist’s live performance without time or geographical constraints on a smartphone, tablet, or personal computer if viewing in real time is impractical. An interactive function is also provided so that users can post comments in real time during live streaming.

With AR Figurines, a computer-generated (CG) figurine of an artist appears on the user’s screen when reading with a specialized app an AR marker*⁸ printed on merchandise or other items related to that artist. At this time, the user can view a performance by the artist from any angle throughout a 360-degree range. The video in this case is not simply an illustration of the artist but rather digital data obtained by shooting the artist while wearing a motion capture suit. This approach can faithfully reproduce the artist’s singing style, mannerisms while performing, etc.

The Shintaikan Live service has also introduced TIG®*⁹ technology in promotional content for Multi-Angle Live and AR Figurines. This is interactive video technology provided by Paronym Inc. that enables a user to access desired information simply by touching an object of interest in video. Going forward, the plan is to introduce TIG technology in real-time video as well under a joint-development project between NTT DOCOMO and Paronym. In this way, NTT DOCOMO is promoting new video viewing experiences in which information navigation can be performed through simple operations from the video itself.

Following the launch of 5G services, NTT DOCOMO will continue to take advantage of the 5G features of high speed, large capacity, and low latency to study Multi-Angle Live with even higher levels of picture quality and more viewpoints as well as enhanced high-presence viewing styles that incorporate Virtual Reality (VR)*¹⁰ technology (Figure 4).

3.2 Tokyo Game Show

The 5G era will not simply “enable” online gaming entertainment—it will also change the style

*⁸ AR marker: Technology that uses image recognition via a device such as a smartphone or tablet equipped with a specialized app to display previously prepared 3D CG video on the smartphone/tablet screen in such a way that the CG appears to be real.

*⁹ TIG®: A registered trademark of Paronym Inc.

*¹⁰ VR: Technology that gives the user the illusion of being in a virtual world.

of such entertainment by enabling commentary, watching, and communication during a competition. NTT DOCOMO introduced the creation of new value in this evolving gaming industry at TOKYO GAME SHOW 2019 held at Makuhari Messe^{*11} in September 2019.

In particular, NTT DOCOMO held a trial of simultaneous competition among many players using smartphones making full use of the 5G features of

high speed, large capacity, and low latency while live streaming the event. Additionally, as optical circuits were no longer essential to online gaming thanks to 5G, NTT DOCOMO proposed the concept of a “LAN Party” in which participants compete with each other anywhere using all sorts of equipment such as personal computers and gaming devices and also proposed a new game watching style using AR in esports (Figure 5).

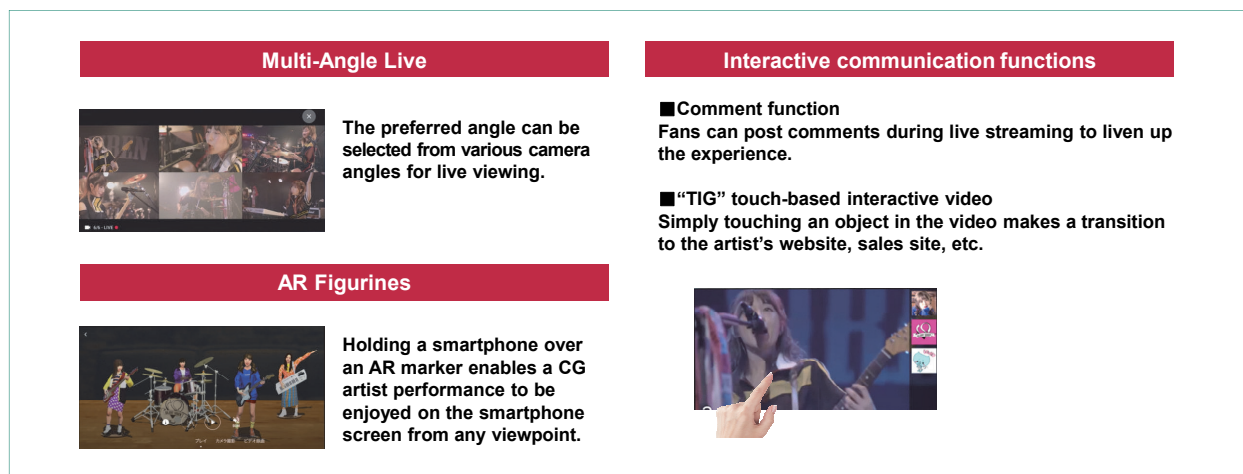


Figure 4 Shintaikan Live service



Figure 5 TOKYO GAME SHOW 2019

*11 Makuhari Messe[®]: A registered trademark of Makuhari Messe, Inc.

4. Conclusion

Through collaboration with many partners, NTT DOCOMO's 5G pre-commercial service has been supporting business development through sports-viewing solutions, management solutions, and tourism solutions including inbound traveling to Japan and consumer-oriented service development such as Shintaikan Live and esports. At present, the 5G pre-commercial service is also taking up solutions and services that make extensive use of 5G features in the fields of medicine and industry.

At NTT DOCOMO, we seek to co-create "new

value" for 2020 and beyond along with partners in diverse fields through innovative initiatives that make maximum use of 5G features. We wish to contribute to society by providing amazing and moving experiences exceeding everyone's expectations while aiming for a super prosperous future made possible by the wonders of 5G.

REFERENCE

- [1] Ministry of Internal Affairs and Communications, Regional Power Creation Group, Regional Development Office: "Survey and Research Report on Regional Revitalization through Rugby World Cup 2019," p.1, Mar. 2018 (in Japanese).