

## Approval of Specified Base Station Deployment Plans for Introduction of 5G

—For early, widespread national deployment of 5G—

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### 1. Introduction

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On April 10 this year, the Ministry of Internal Affairs and Communications (MIC) approved\* plans for deployment of specified base stations for 5<sup>th</sup> Generation mobile communication systems (5G) by four operators, which are NTT DOCOMO, KDDI/Okinawa Cellular, SoftBank, and Rakuten Mobile. 5G will extend previous mobile communications systems in both speed and capacity with “Ultra-high speed” (up to 10 Gbps), but will also have new features such as “Large numbers of simultaneous connections” (up to a million devices/km<sup>2</sup>), enabling communication with all kinds of IoT devices such as appliances and sensors, and “Ultra-low latency (latency on the order of 1 ms),” enabling remote, real-time communication. 5G is also expected to become core infrastructure, essential for life in the 21<sup>st</sup> century in the same way as expressways and Shinkansen high-speed trains. It will revitalize regions, increase activity, and provide services as rapidly as possible throughout the country.

This article describes concepts regarding deployment policies for specified base stations (hereinafter, “deployment policies”), which determine factors such as the indices used when allocating 5G frequencies and the obligations of authorized operators. We also give an overview of the deployment plans of these operators.

### 2. 5G Deployment Policy Concepts (allocation indices)

Currently, 4G is used mainly by smartphones and other mobile terminals, for voice calls and to connect to the Internet. Mobile phones are intended to be carried by a person at all times, so one of the most important indices used for allocating frequencies in deployment policies for 4G and earlier was “population coverage”, which indicates the percentage of people living within the communication range of a base station and able to use the communication services, based on population.

For example, policies for installing specified base stations when 4G was deployed required approved operators to ensure

population coverage of 50% or greater within four years. Generally, a greater proportion of the population can be covered by installing base stations in urban areas than in more remote areas, so priority was given to installing base stations in urban areas, to guarantee population coverage rates more efficiently.

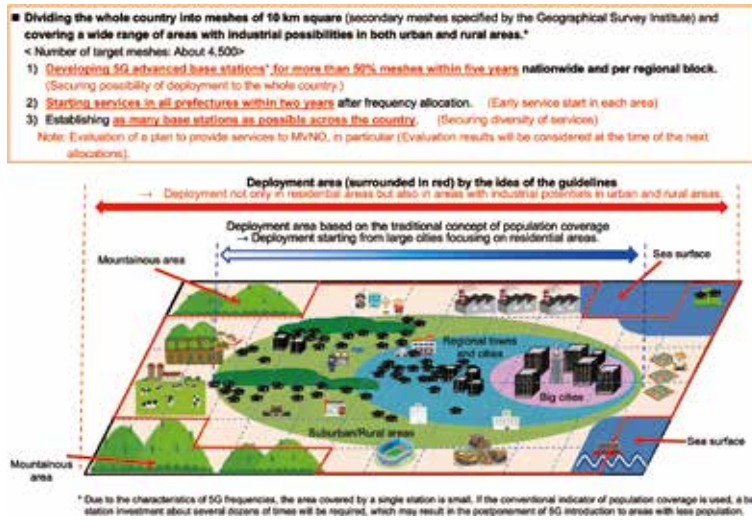
On the other hand, 5G has features suitable for IoT so beyond mobile phones, all kinds of objects in various industries can connect with base stations, such as automobiles, smart meters and devices used in agriculture, manufacturing, and medicine. With such potential to bring new value to various industries, 5G is anticipated for resolving regional issues and local development, so there is demand to ensure that 5G infrastructure is deployed early in all areas of the country that have business development potential, both urban and rural. Accordingly, policies for deployment of 5G have defined a new allocation index called “5G infrastructure deployment rate” (Figure 1), which will be used instead of “population coverage”.

5G infrastructure deployment rate divides all of Japan into a 10 km square meshes, and indicates the percent of all mesh sections that have 5G advanced specified base stations deployed. This includes all sections that have business potential, excluding areas such as uninhabited islands (approximately 4,500 mesh sections). A 5G advanced specified base station (parent base station) is one that is connected to a high capacity (10 Gbps) line, and can connect to multiple 5G specified base stations (child stations). In mesh sections where an applicable 5G advanced specified base station is deployed, 5G services can be extended with flexibility (Figure 2).

In 5G deployment policies, approved operators are obliged to ensure that 5G infrastructure deployment rate exceeds 50% within five years. The contribution to population cover rate is larger when a base station is installed in an urban area than in a remote area, but the contribution to 5G infrastructure deployment rate when a 5G advanced specified base station is installed in a mesh section in an urban area is about the same as in a rural area. Thus, by introducing 5G infrastructure deployment rate, urban and rural

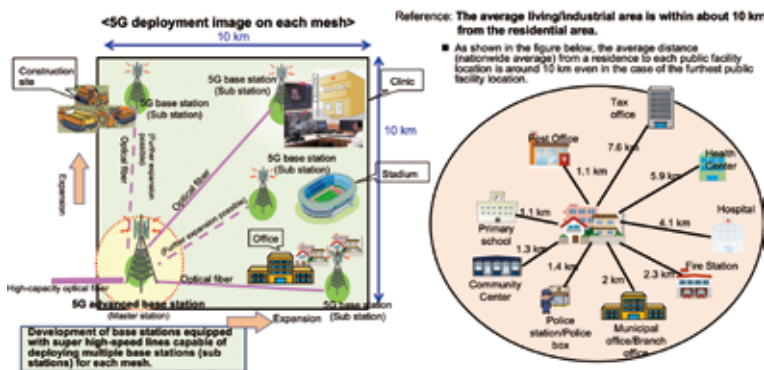
\* Under the deployment plan approval system, operators receiving approval have exclusive permission to apply for specified base station licenses for the specified frequencies.

**Figure 1: An example of deployment of 5G infrastructure in all areas of Japan**



**Figure 2: An example of deployment of 5G base stations**

■ By developing a 5G advanced base station (base stations serving as the basis for deploying additional base stations with flexibility) for each mesh of 10km square, achieving nationwide deployment of 5G.



areas will be evaluated equally, and this will contribute to broad deployment of 5G throughout Japan. These same deployment policies also require services to be started in all areas of Japan by the end of FY2020, among other duties, reducing differences in when services begin between urban and rural areas. When comparing deployment plans from each operator, emphasis was given to plans that will yield higher 5G infrastructure deployment rates, but also to aspects such as the number of base stations deployed nationally, and comprehensive plans to provide services to Mobile Virtual Network Operators (MVNOs).

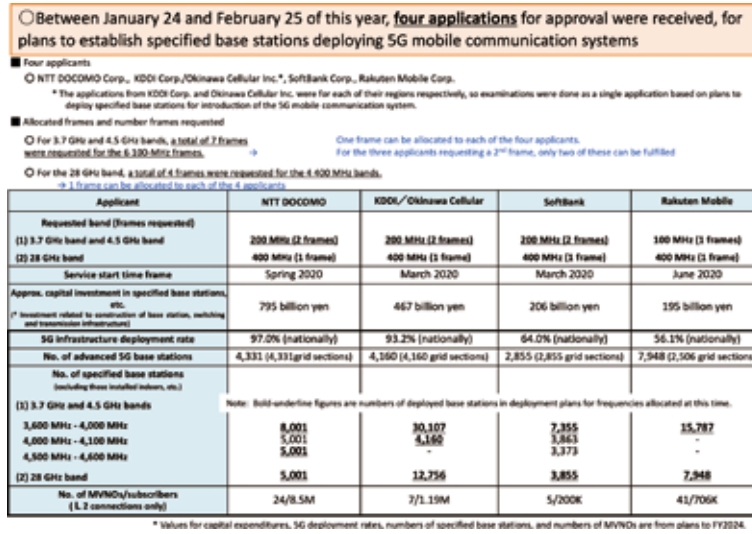
### 3. Overview of 5G Deployment Plans for each Provider

Overviews of the 5G deployment plans from the four applicants are shown in Figure 3. For items emphasized in evaluation of the deployment policies, NTT DOCOMO had the highest values for 5G infrastructure deployment rate, with 97.0%, and KDDI/Okinawa Cellular had the highest numbers of base stations, with 30,107 in the 3.7 GHz and 4.5 GHz bands, and 12,756 in the 28 GHz band. Regarding plans to provide

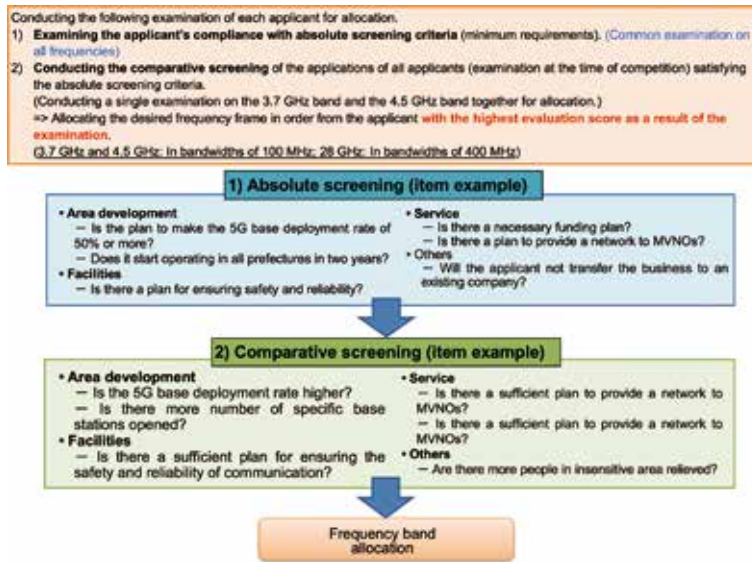
services to MVNOs, Rakuten mobile had 41 companies with L2 connections, but NTT DOCOMO planned for the largest number of MVNO subscribers, at 8.5 million. Each applicant also gave plans for other items, such as ensuring safety and reliability, expanding utilization of 5G, and reducing size of dead zones in terms of population.

Applications were examined in these areas according to the method shown in Figure 4. As a result, all applicants met the minimum requirements, but there was duplication in the frequency frames requested by the applicants. As such, a comparative examination was done (points were assigned for each item, and rankings decided). For the 3.7 GHz and 4.5 GHz bands, applicants were ranked in decreasing order as: NTT DOCOMO, KDDI/Okinawa Cellular, Rakuten Mobile, and SoftBank. For the 28 GHz band, they were ranked as: KDDI/Okinawa Cellular, NTT DOCOMO, Rakuten Mobile, and SoftBank. Frequencies were specified according to the frames requested by each applicant, resulting in the frequency allocations as summarized in Figure 5. NTT DOCOMO and KDDI/Okinawa Cellular were each allocated a total of 600 MHz of

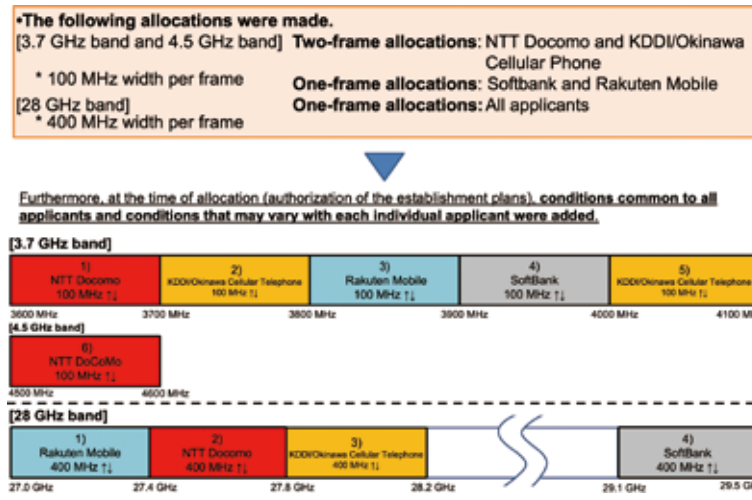
**Figure 3: Outline of 5G deployment plans from four applicants**



**Figure 4: Examining method**



**Figure 5: Summary of frequency allocations**



bandwidth, and SoftBank and Rakuten Mobile received a total of 500 MHz of bandwidth.

Note that with the approval of deployment plans for each applicant, the following conditions were applied, based on the objectives of the deployment policies.

#### <Approval Conditions>

1. To have an appropriate understanding of emerging needs, for both urban and rural areas, and to work steadily for the wide-ranging spread of diverse services utilizing the features of 5G mobile communications systems, in all regions with business potential.
2. In building a network, work to ensure appropriate and adequate optical fiber, which will be essential for providing diverse services that make full use of the features of 5G mobile communications systems.
3. Work to improve safety and reliability of telecommunication facilities with measures addressing power outages, congestion and communication interruptions, in light of communication failures caused by events such as the heavy rain in July 2018 and the Hokkaido Eastern Iburi earthquake in 2018 (except SoftBank).
4. Follow “Safety and Security Standards for Data Communication Networks” (1987, Posts and Telecommunications Ministry Bulletin No. 73), “Common Standards for Information Security Measures for Government Agencies and Related Agencies” (FY2018 edition), and “Arrangement regarding policies and procedures for public procurement of IT related goods and services” (Dec. 10, 2018 arrangement of related ministries and agencies), and take adequate cyber security measures, including coverage of supply chain risk.
5. For parties not receiving allocation of frequencies, work to promote use of specified base stations through connection to telecommunication facilities, wholesale telecommunication services or other means. In particular, work to promote use of specified base stations through electrical connection, communicating using GPRS tunneling protocol.
6. Work to establish easy-to-use fees that support diverse user needs for 5G mobile communication systems, including IoT services and individual end-user oriented services.
7. Take measures to prevent interference and other obstructions on radio stations and other facilities operated by existing licensees.
8. Recognizing that mobile communications systems are important for the livelihood of citizens, work steadily to establish base stations in dead zones.
9. Work to facilitate negotiation when proposals for contract or agreement are received, using frequencies between 4,600 and 4,800 MHz or between 28.2 and 29.1 GHz, by providing wholesale telecommunications services, connection to telecommunication facilities and other means, to promote utilization of specified base stations.

#### [Conditions imposed on Softbank only]

3. Work comprehensively on measures to prevent reoccurrence of past serious incidents, and to improve safety and reliability of telecommunication facilities with measures addressing power outages, congestion and communication interruptions, in light

of communication failures caused by events such as the heavy rain in July 2018 and the Hokkaido Eastern Iburi earthquake in 2018.

#### [Conditions imposed on Rakuten Mobile only]

- 10 Work steadily to establish base stations according to the principle that authorized mobile communication operators are developing their business with the intention of building their own networks.
- 11 Work to secure locations for installing base stations and collaborative agreements with construction companies so that completion of specified base stations can proceed smoothly and steadily.
- 12 Work to establish the internal systems necessary for reliable operation as a telecommunications provider. In particular, work to secure and deploy the technical and other personnel such as radio technicians, required for proper operation of specified base stations and other telecommunication equipment, and personnel to build such infrastructure.
- 13 Work to secure capital investment, operating funds and soundness of other financial affairs, as necessary to provide stable services, even in the event that the business environment changes due to competition.

## 4. Conclusion

This article has given an overview of “Approval of Specified Base Station Deployment Plans for Introduction of 5G.” With the start of commercial 5G services in the spring of 2020, MIC will continue to monitor the expansion plans of each operator, and continue promoting initiatives that encourage utilization of 5G, to lead the world with nation-wide expansion of 5G services.

### Cover Art



Picture of kabuki actor  
Nakamura Shikan as  
Chienai

Utagawa Toyokuni III  
(1786-1865)

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