

# **Frequency Reorganization Action Plan (FY2024 Version)**

December 13, 2024  
Radio Policy Division, Radio Department  
Telecommunications Bureau

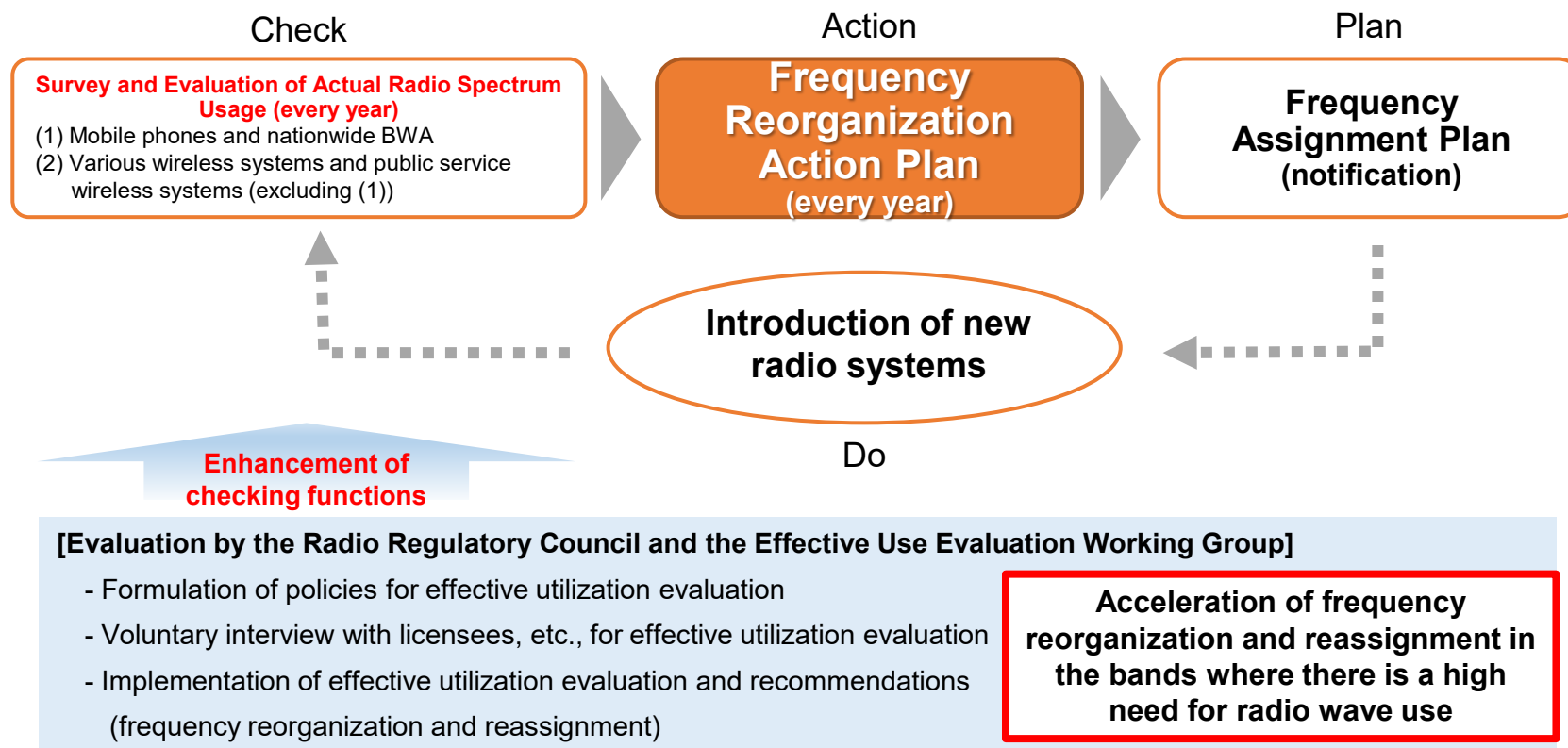
# Frequency Reorganization Action Plan

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## Overview

- To promote the effective utilization of finite and scarce radio wave resources and to cope with the introduction of new radio spectrum utilization systems and increasing frequency demand, the Ministry of Internal Affairs and Communications (MIC) has been formulating and announcing a Frequency Reorganization Action Plan since 2004.
- The MIC has formulated a Frequency Reorganization Action Plan based on the results of the Survey on Actual Radio Spectrum Usage by the MIC and the Evaluation of the Degree of Effective Utilization of Radio Spectrum by the Radio Regulatory Council.

## Frequency reorganization PDCA cycle



# Goals for Securing Frequency Bandwidth

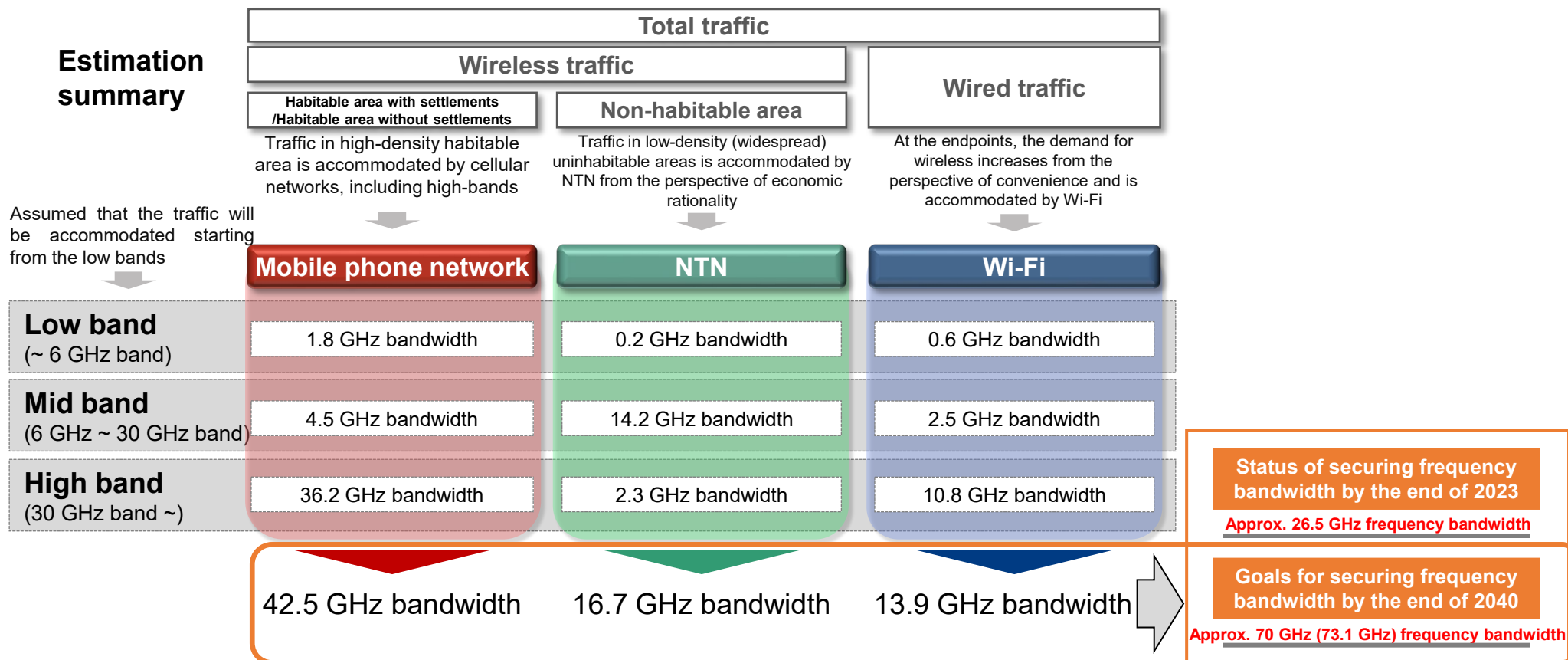
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## Goals for securing frequency bandwidth by the end of 2040

- According to the “Report of Radio Policy Roundtable For Expanding Digital Business (August 2024),” it has been estimated that a **total bandwidth of approximately 70 GHz (73.1 GHz) will be required** to accommodate the **wireless traffic in 2040** using Mobile phone networks, NTN, and Wi-Fi, categorized by region, etc. As of the end of 2023, approximately 26.5 GHz of bandwidth has been secured, and the **goal is to secure an additional 47 GHz of frequency bandwidth by the end of 2040**.

### [Goals for securing bandwidth by the end of 2040]

#### Estimation summary



## I. Securing of frequencies toward widespread adoption of 5G

With the aim of implementing a conditional auction for the 26 GHz and 40 GHz bands by the end of FY2025 and allocating them to 5G, MIC will compile the technical conditions by spring FY2025 while appropriately reflecting the transition measures of current systems and the progress of studies on frequency sharing and formulate the technical standards by autumn FY2025.

## II. Further enhancement and frequency extension of wireless LANs

Advance studies on the technical conditions for outdoor use of 6 GHz band wireless LAN and for extending the bandwidth including the outdoor use of 6.5 GHz band wireless LAN. At that time, advance the necessary studies on the operation method of the AFC system required for interference avoidance with existing radio stations, and compile the technical conditions by the end of FY2025.

## III. Frequency use by drones in airspace

Regarding the use of 4G, 5G, local 5G and BWA in airspace by drones, studies on technical conditions began in July 2024, and conclusions reached early will be compiled within the same year. In addition, advance studies on expanding the use of 5 GHz band wireless LAN in airspace, and complete regulatory revisions by the end of FY2024.

AFC: Automated Frequency Coordination      V2X: Vehicle to X (everything)  
HAPS: High Altitude Platform Station      NTN: Non-Terrestrial Network

## IV. Promotion of examinations of V2X

Based on the interim report compiled by the “Study Group on ‘Next-Generation ITS Communications’ in the Autonomous Driving Era” in August 2023, advance studies on transition measures of current systems and frequency sharing to facilitate the allocation of the 5.9 GHz band to V2X by the end of FY2026.

## V. Advanced use of Non-Terrestrial Networks (NTNs)

Conduct research and development, engineering tests, and studies of technical conditions to realize NTN, including HAPS and new non-geostationary satellite constellation.

## VI. Effective use of frequencies for public services

With regard to national public service radio stations identified as “systems using frequencies for which demand has emerged in other applications” and “systems using analog formats,” surveys of utilization will continue to be carried out.

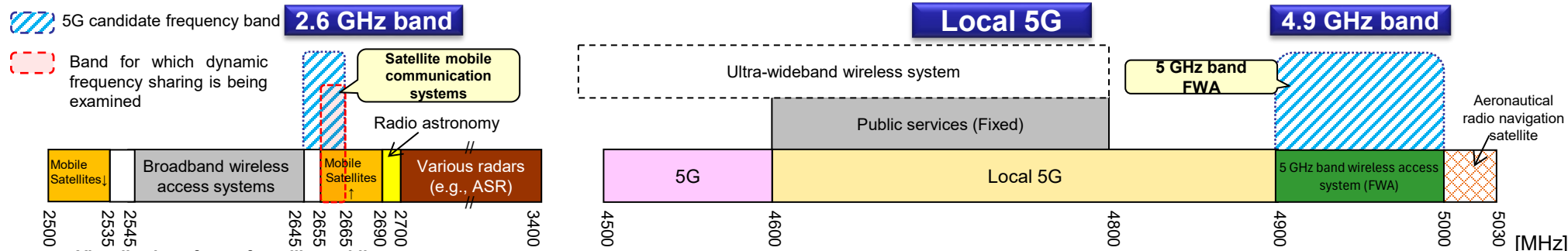
## VII. Promotion of Beyond 5G

Accelerate initiatives toward social implementation based on the “Strategy for Realizing Next-Generation Information and Communication Infrastructure to Support AI Society—Beyond 5G Promotion Strategy 2.0,” announced by MIC in August 2024.

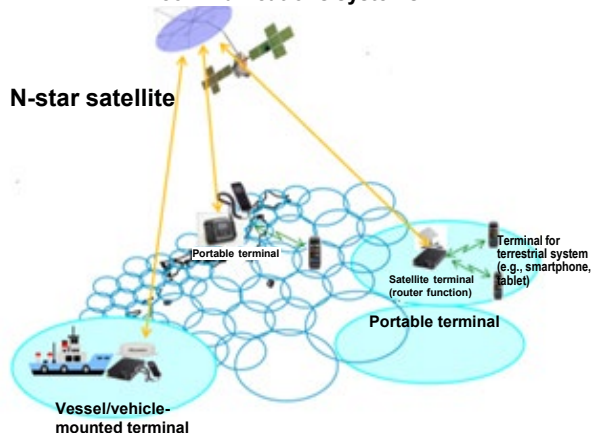
# Priority Initiatives <Securing of Frequencies Toward Widespread Adoption of 5G>

## I. Securing of frequencies toward widespread adoption of 5G

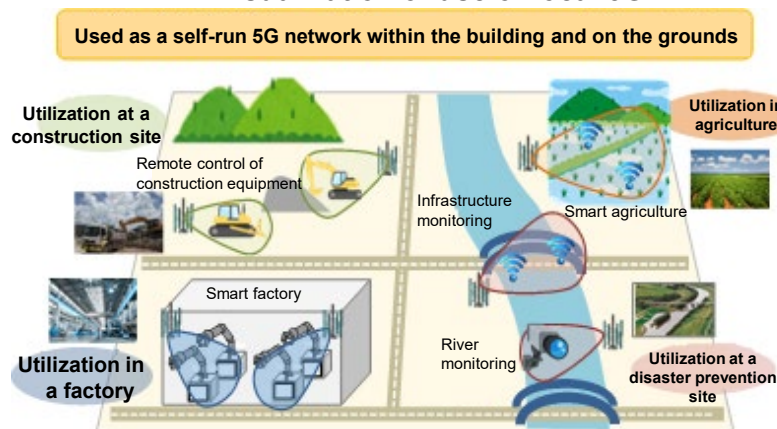
- For the 2.6 GHz band (2645 to 2665 MHz), in the light of progress in migrating existing satellite mobile communication systems to an upgraded system, **the possibility of introducing mobile communication systems, including the application of dynamic frequency sharing at ordinary times and during disasters, will be further examined**, while taking account of its impact on existing wireless systems.
- For local 5G (4.6 to 4.9 GHz and 28.2 to 29.1 GHz), **regulatory revisions will be completed by the end of FY2024** based on the compilation of some responses by the Information and Communications Council in July 2024 concerning the technical conditions for **marine usage** (limited to 4.8 to 4.9 GHz) and the **refinement of radio propagation parameters**. In addition, the **goal is to introduce an experimental test station system with simplified procedures within FY2025 and examine the introduction of a system to simplify and expedite licensing procedures using operational adjustment organizations by the end of FY2025** based on future demand trends.
- Regarding the 4.9 GHz band (4.9 to 5.0 GHz), MIC completed regulatory revisions for the introduction of 5G in September 2024. In the future, **necessary procedures** will be carried out **to facilitate the early allocation to 5G**. MIC completed regulatory revisions to allow the establishment of new 5 GHz band wireless access systems (registered stations) until the end of FY2025. Furthermore, the usage period for these systems' frequencies has been set to expire by the end of FY2035. In addition, MIC will promote **measures such as informing registrants about the transition of the relevant system**.



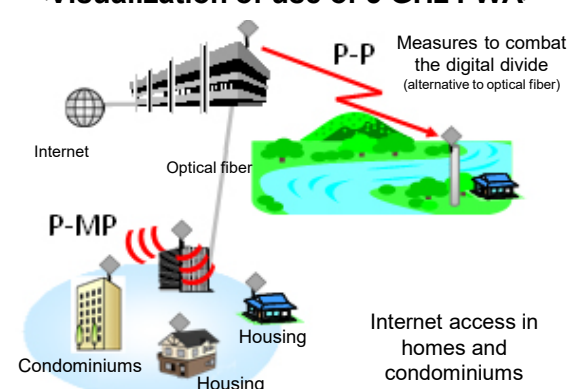
<Visualization of use of satellite mobile communications systems>



<Visualization of use of local 5G>

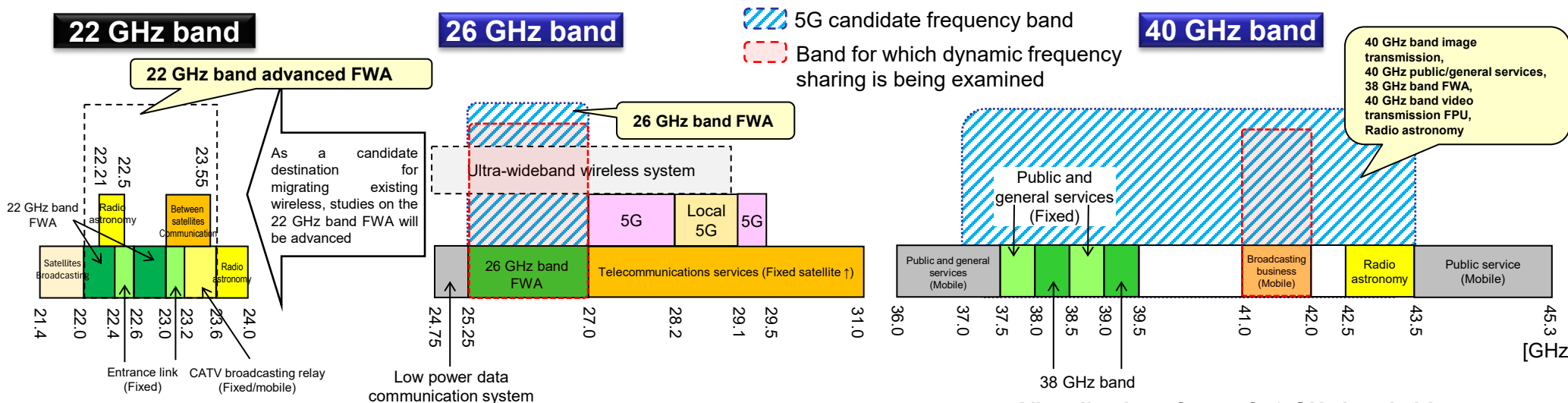


<Visualization of use of 5 GHz FWA>

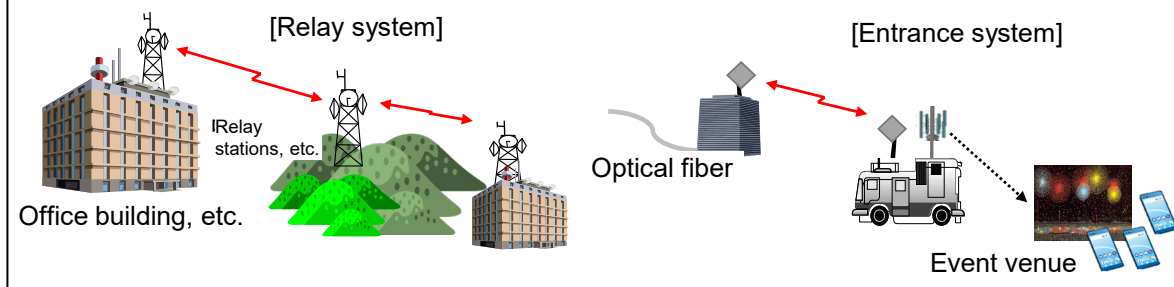


## I Securing of frequencies toward widespread adoption of 5G (continued)

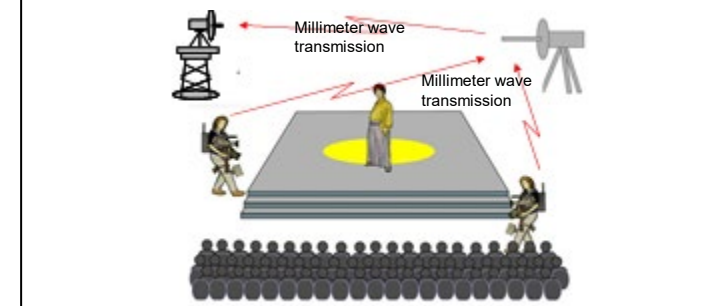
- For the 26 GHz band (25.25 to 27 GHz) and 40 GHz band (37.0 to 43.5 GHz), surveys on specific utilization needs will be conducted, taking into account the existing wireless systems in these bands and the usage status of the 28 GHz band. **A conditional auction is planned to be held by the end of FY2025 with the aim of allocating frequencies to 5G systems.** Therefore, while **appropriately reflecting the status of engineering tests related to the sharing conditions** with existing wireless systems, the requirements for the band applied to dynamic frequency sharing and the requirements of the sharing management systems, **the technical conditions will be complied by around spring 2025, and the technical standards will be formulated by around autumn 2025.**
- Engineering tests for advancing the 22 GHz band wireless access system (FWA)**, which is a candidate for migration of the existing wireless system in this frequency band, **will be promoted.** While appropriately reflecting the status of these tests, **the technical conditions will be compiled by around spring 2026, and regulatory revisions will be implemented by around summer 2026.**



### <Visualization of use of FWA, entrance links and public/general services (fixed)>



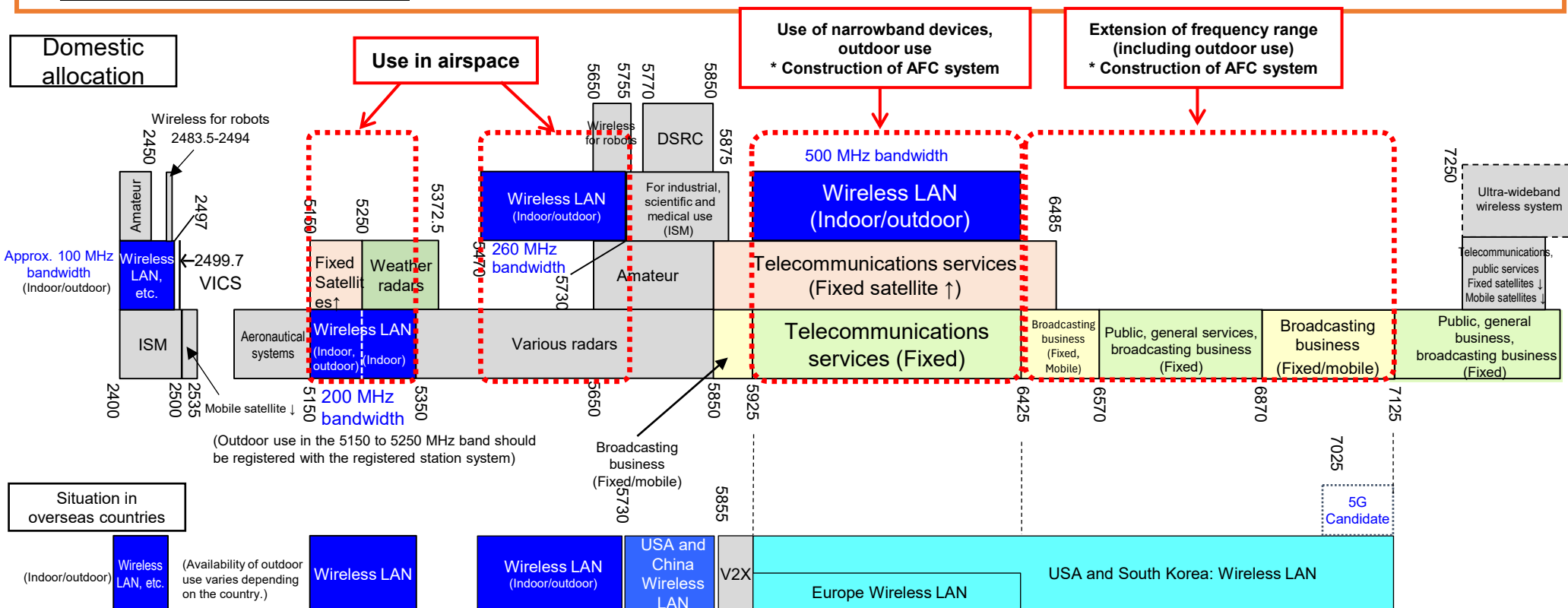
### <Visualization of use of 40 GHz band video transmission FPU>





## II. Further enhancement and frequency extension of wireless LANs

- Regarding the frequencies used by wireless LANs in the 5 GHz band (mainly in the 5.2 GHz band), measures to **further expand their use in airspace** while preventing interference with other wireless systems, etc., will be examined, and **regulatory revisions will be completed by the end of FY2024**.
- Regarding the **use of narrowband devices in the 6 GHz band** (5925 to 6425 MHz), frequency sharing will be examined with attention to trends in other countries.
- The technical conditions for the frequency sharing related to the **extension of the frequency range, including the outdoor use** of the 6 GHz band wireless LAN and the outdoor use of the 6.5 GHz band (6425 to 7125 MHz), **will be compiled by the end of FY2025**. In the compilation process, attention will be paid to the frequency band (7025 to 7125 MHz) identified for IMT at WRC-23. Studies will be conducted on the **structure and operational methods of the Automated Frequency Coordination (AFC) system necessary to prevent harmful interference with existing radio stations, etc. The conclusion will be based on these considerations**.

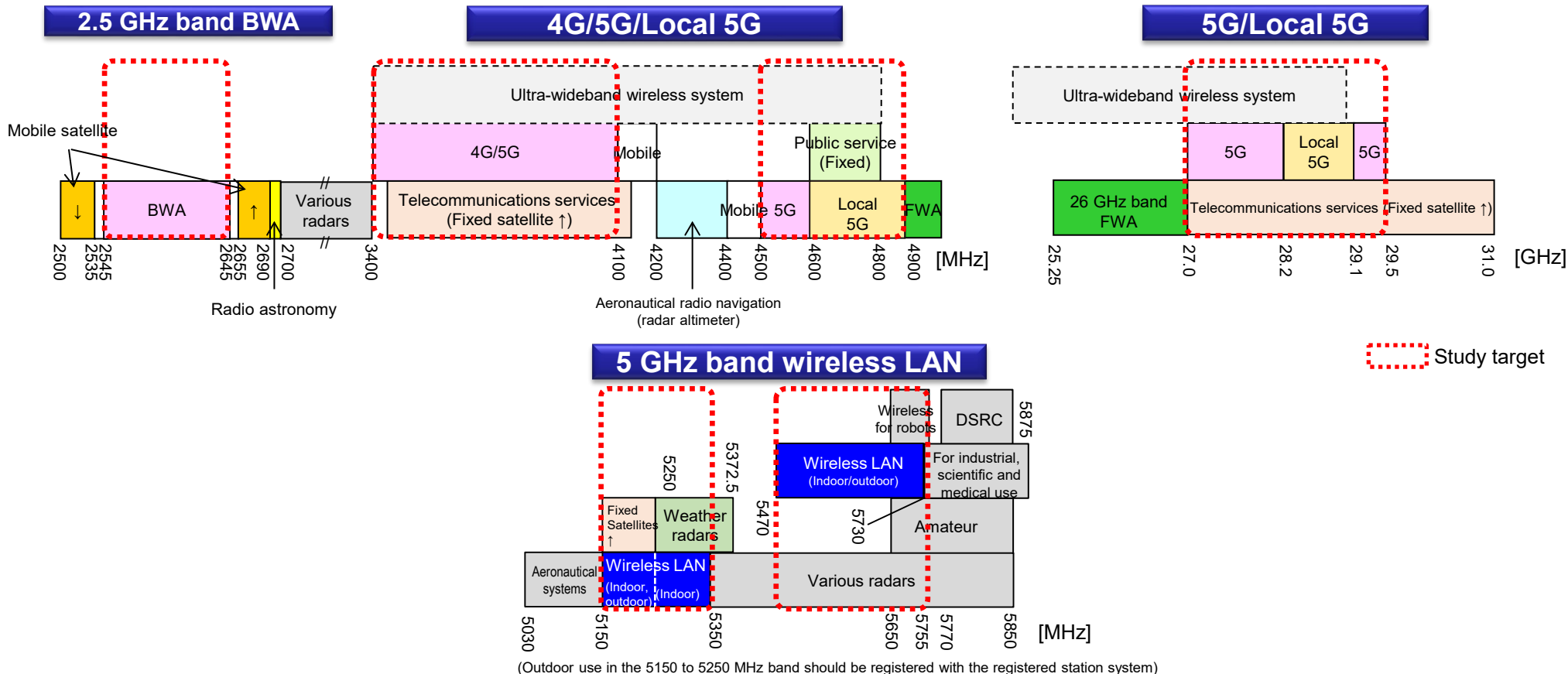


# Priority Initiatives <Frequency Use by Drones in Airspace>

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## III. Frequency use by drones in airspace

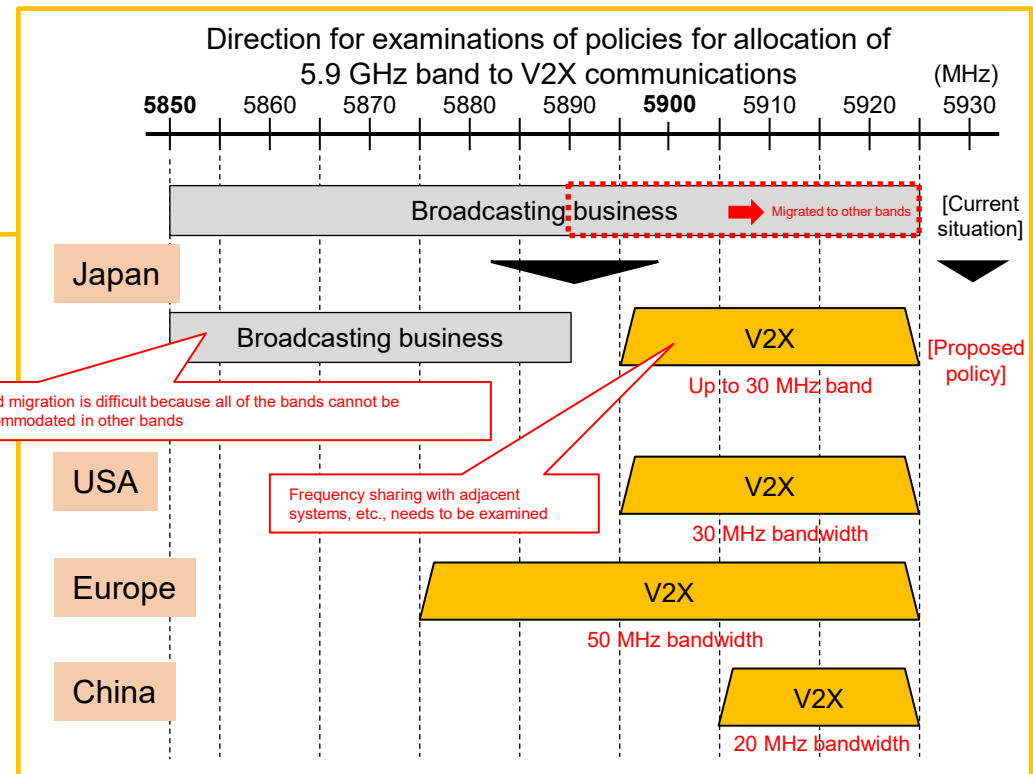
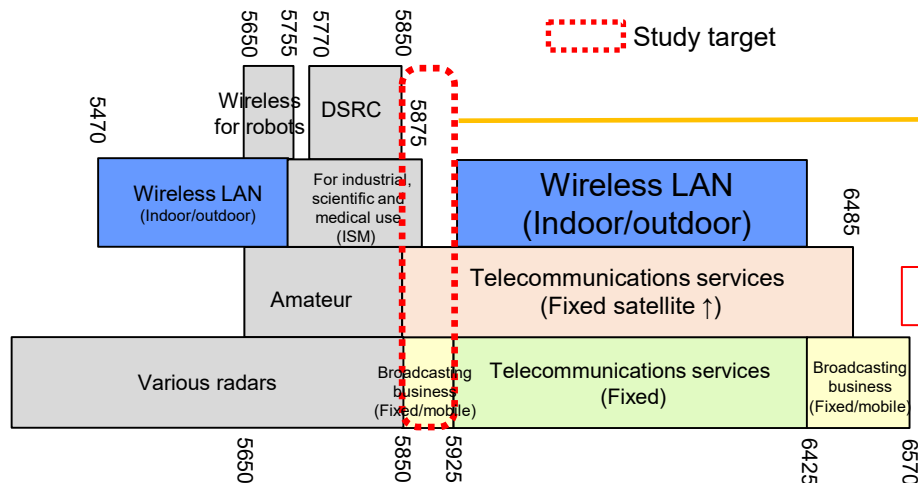
- Technical conditions are being studied for enabling the use of **4G** (3.4 and 3.5 GHz band), **5G** (3.4, 3.5, 3.7, 4.5, 4.9 and 28 GHz band), **local 5G** (4.6 to 4.9 GHz and 28.2 to 29.1 GHz band), and **broadband mobile wireless access (BWA) systems** of 2.5 GHz band (2545 to 2645 MHz) **by drones, etc., in airspace**, while preventing interference with other wireless systems, etc. These studies commenced in July 2024, and efforts will be made to compile within the same year any conclusions that reached early.
- Regarding the frequencies used by **wireless LANs** in the 5 GHz band (mainly in the 5.2 GHz band), measures to **further expand their use in airspace** while preventing interference with other wireless systems, etc., will be examined, and regulatory revisions will be completed by the end of FY2024.
- To enable experimental operation in the **5.8 GHz band** through simplified procedures, MIC compiled frequencies and locations that can be operated without affecting existing wireless systems and **announced the range of frequencies available for use as specific experimental test stations in November 2024**.





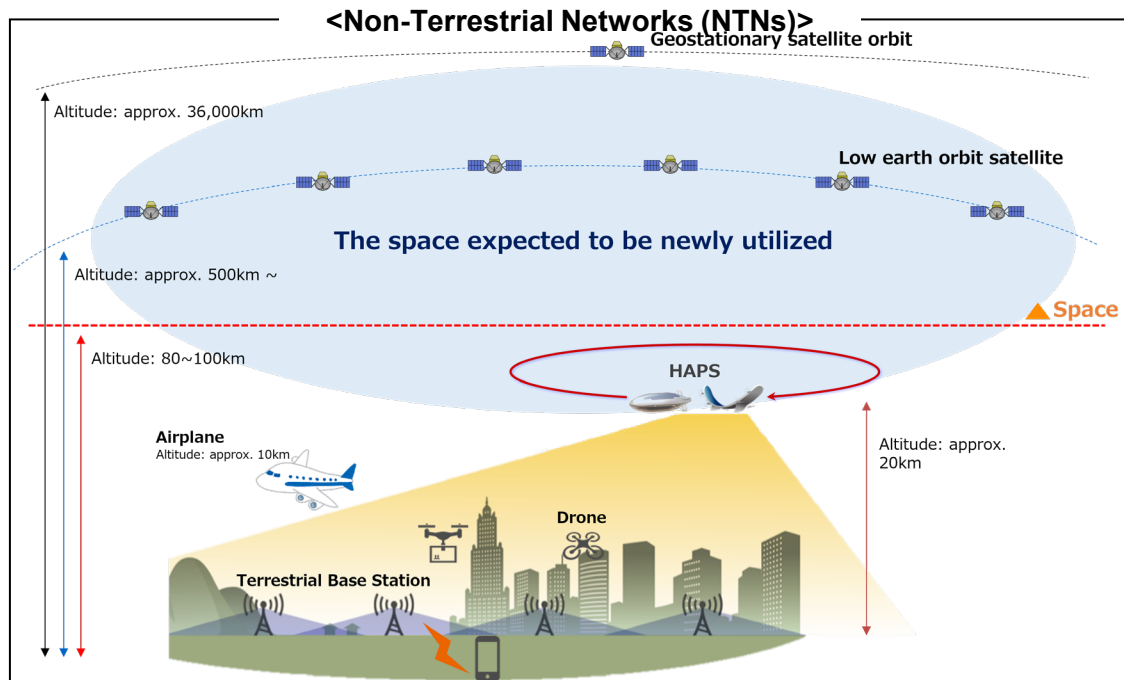
## IV. Promotion of examinations of V2X

- In light of the development and importance of autonomous driving systems (including safe driving assistance), additional allocation to the 5.9 GHz band (5850 to 5925 MHz) has been examined internationally, in addition to the existing frequency bands for ITS (such as 760 MHz band). To that end, the “Study Group on ‘Next-Generation ITS Communications’ in the Autonomous Driving Era” compiled an interim report in August 2023, stating that the **“allocation of frequencies for V2X communications with a maximum bandwidth of 30 MHz (5895 to 5925 MHz) should be considered**, taking into account international frequency harmonization, and avoiding interference with existing radio stations.” Specific examinations will proceed based on the interim report.
- Specifically, with regard to a part of the 5.9 GHz band (5888 to 5925 MHz), **measures will be taken to secure alternative frequencies for existing wireless systems and support their migration and frequency sharing with systems adjacent to 5.9 GHz band V2X systems will be examined, and based on government strategies, the pathway for the introduction and widespread adoption of 5.9 GHz band V2X systems will be clarified through the establishment of experimental environments and technical demonstrations on platforms such as the Shin-Tomei Expressway, as well as studies on new frequency migration and reorganization schemes for their introduction and practical use. Based on these efforts, frequency allocations for V2X communications will be implemented by FY2026.**



## V. Advanced use of Non-Terrestrial Networks (NTNs)

- For the purpose of introducing High-Altitude Platform Stations (HAPS) in Japan, which are expected to serve as an approach for realizing ultra-wide-area communications for smartphones, drones, and IoT devices, engineering tests are being conducted for **wireless systems related to fixed links, mobile links, and Command and Control (C2) links**, including considerations of frequency sharing with other wireless systems, to develop the necessary technical standards. Additionally, flight demonstrations and tests will be carried out at the Osaka-Kansai Expo in 2025, and the **technical conditions for HAPS communication systems will be compiled by FY2025**. Additionally, research and development will be promoted for technologies to efficiently utilize frequencies for HAPS.
- With regard to non-geostationary satellite communication systems, **for the early realization of direct connectivity with mobile phones, etc., using the frequency bands identified for IMT**, studies on technical conditions including frequency sharing, and licensing procedures for radio stations, will be carried out on the basis of the WRC-23 resolution, and **regulatory developments for the 2 GHz band will be completed by the end of 2024** while ensuring harmonization with studies in the ITU-R.
- For **the introduction of the non-geostationary satellite communication systems in the Ka-band**, which operates in orbit at an altitude of approximately 600 km, studies on the technical conditions for frequency sharing with existing radiocommunication systems will be conducted, and **regulatory developments are expected to be completed by around FY2024**.



NTN: Non-Terrestrial Network HAPS: High Altitude Platform Station  
HIBS: HAPS as IMT Base Station

### HAPS

#### Service link

Frequency bands discussed and specified as those for IMT base stations (HIBS)  
(e.g., 700 to 900 MHz, 2 GHz band, etc.)

#### Feeder link

Frequency bands specified for HAPS, which are allocated to fixed services (38 to 39.5 GHz)

#### C2 link

Under review

### Non-geostationary satellite communication system

#### Service link

- (1) Direct connectivity between satellites and mobile phones  
Frequency bands identified for IMT  
(2 GHz band, etc.)
- (2) Non-geostationary satellite communication of Ka-band  
Ka band

#### Feeder link

Ka-band

## VI. Effective use of frequencies for public services

- The Digital Transformation Era's Radio Spectrum Policy Council will carry out the **Survey of Actual Radio Spectrum Utilization on national public service radio stations every year for the time being from FY2023 onwards**. This will focus on **“systems using frequencies for which demand has apparently arisen for other purposes,”** and **“systems using an analog format”** among the national public service radio stations (which are exempt from spectrum user fees) to ensure the effective use of public-use frequencies.
- Based on the survey and evaluation results for the concerned national public service radio stations, initiatives to promote termination, frequency migration, frequency sharing, and digitalization will continue.

System name	Frequency band	Demand for other purposes	Directionality of initiatives	Progress status
(1) 5 GHz wireless access system	5 GHz band	5G	Termination or migration to another wireless system	Migration to alternative means is under consideration
(2) Weather radar (C-band)	5.3 GHz band	Wireless LAN	Frequency sharing	In FY2022, studies on sharing the frequency with wireless LAN were completed, and progress was made on updating to more efficient technologies
(3) 6.5 GHz band telecommunication, public and general services	6.5 GHz band	Wireless LAN	Frequency sharing	Studies on frequency sharing with wireless LAN systems have advanced, and technical condition studies are scheduled to commence by FY2024
(4) 40 GHz band image transmission (For public service)	37 GHz band	5G, satellite	Termination or migration to another wireless system	(Initiative completed)
(5) 40 GHz band public and general services (Relay Systems)	40 GHz band	5G, satellite	Migration to another wireless system	(Initiative completed)
(6) 38 GHz band FWA	38 GHz band	5G, satellite	Frequency sharing	Studies on frequency sharing with 5G have progressed

System name	Frequency band	Directionality of initiatives	Progress status
(1) Roadside communication	1620 kHz band	Digitalization, termination or migration to another wireless system	Other wireless systems have replaced some systems, and the future direction is scheduled to be reviewed by the end of FY2024
(2) Telemetry for public services (excluding disaster response and flood control operations)	60 MHz band	Migration to another wireless system	Termination due to replacement with other wireless systems is progressing
(3) Telemetry for public services (disaster response and flood control operations)	60/400 MHz band	Digitalization	Technical studies on digitalization will be steadily carried out up to FY2024, and usage conditions will be surveyed
(4) Flood prevention	60/150 MHz band	Digitalization	
(5) Mobile radio communication for disaster response and flood control	60 MHz band	Digitalization	
(6) Central anti-disaster mobile radio	150/400 MHz band	Digitalization, etc.	(Initiative completed)
(7) Intra-departmental communication (for communications during disasters)	150 MHz band	Digitalization, etc.	The possibility of substitution with public safety mobile systems is being evaluated
(8) Oil reserves	150 MHz band	Digitalization, etc.	Digitalization is being planned
(9) Disaster prevention intercommunication radio	150/400 MHz band	Digitalization, etc.	The possibility of substitution with public safety mobile systems is being evaluated, and partial substitution with other wireless systems is being planned
(10) Helicopter television (heli-tele) communication for public services	400 MHz band	Digitalization	Technical studies are being conducted on digital systems, and the replacement with heli-sat systems is progressing
(11) Meteorological assistance radio	400 MHz band	Digitalization	Technical studies are being conducted on digital systems, with some systems planned to be replaced by other wireless systems
(12) 15 GHz band helicopter television (heli-tele) video transmission	15 GHz band	Digitalization, etc.	Digitalization and substitution with heli-sat systems are progressing

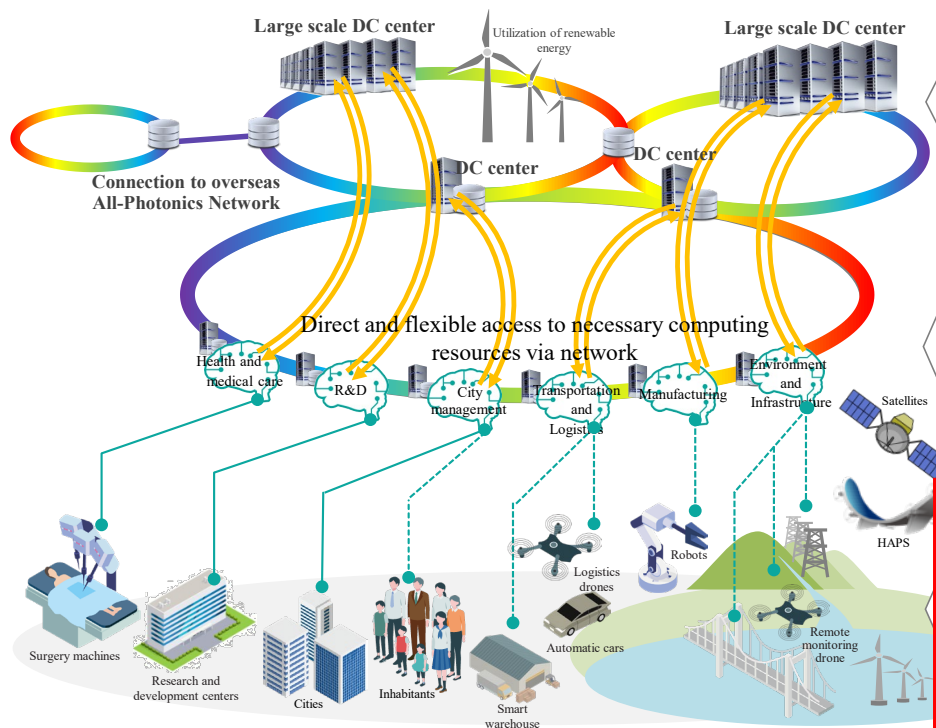
## VII. Promotion of Beyond 5G

- To realize Beyond 5G, which is expected to serve as the next-generation information and communications platform supporting an AI society, the MIC, based on the “Strategy for Realizing Next-Generation Information and Communication Infrastructure to Support AI Society - Beyond 5G Promotion Strategy 2.0,” published in August 2024, has identified (1) All-Photonics Network (APN), (2) Non-Terrestrial Network (NTN)<sup>1</sup>, and (3) Radio Access Network (RAN)<sup>2</sup> as Japan's primary strategic sectors and is promoting necessary initiatives.

<sup>1</sup> In addition to establishing systems for the introduction of HAPS in Japan, support is provided for research and development, and overseas expansion. In addition to establishing systems for the smooth introduction of a non-geostationary satellite communication services, support is provided for research and development.

<sup>2</sup> Expand the utilization of sub-6 and millimeter wave bands and Stand Alone (SA) systems. In addition to building a test environment infrastructure to promote O-RAN further, support is provided for overseas expansion. Technical development for the advancement of RAN through AI, and promotion of research and development to meet the future needs of sub-terahertz bands considering trends in other countries.

- The opportunity provided by Expo 2025 Osaka, Kansai**, to be held in FY2025, will be utilized to set up an exhibit as a “Beyond 5G Ready Showcase,” offering opportunities to experience cutting-edge technologies and accelerating efforts toward Beyond 5G.
- Regarding industry-academia-government collaboration, starting in FY2024, the 5G Mobile Promotion Forum (5GMF), which has contributed to the promotion of 5G, and the Beyond 5G Promotion Consortium, which has worked on Beyond 5G promotion, will be integrated to form the newly established **XG Mobile Promotion Forum (XGMF)**, which will promote efforts toward the social implementation of next-generation mobile communications and international collaboration.



### Computing resources such as data centers

- The computational resources of data centers, operated integrally with all-photonics network, etc., drive numerous AIs utilized in various fields
- Connecting through an all-photonics network eases distance restrictions, allowing data centers currently concentrated in metropolitan areas to be decentralized to regions where renewable energy can be utilized

### All-Photonics Network (APN)

- Positioned as a key infrastructure for the distribution of large volumes of data with low latency, high reliability, and low power consumption that are expected to grow in the future
- By linking computational resources, users, etc., and enabling direct and flexible access to the necessary computing resources, it is expected to be a game changer that will strengthen Japan's AI development capabilities and promote the utilization of AI

### Non-Terrestrial Networks (NTN)

#### Radio Access Network (RAN)

- Accelerate the “wireless-ization of industry” by making objects (automobiles, drones, robots, etc.) and sensors that monitor the environment as the primary terminals, rather than people
- Achieve connectivity everywhere, including non-residential areas, by using a multi-layered network consisting of RAN and NTN (satellite, HAPS, etc.)