# Recommendations for Securing Mid-Band Spectrum for the 6G Era

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## Introduction

Mobile communication systems have evolved over successive generations from a communication infrastructure to a foundation of daily life. The fifth-generation mobile communication system (5G), which is being deployed across various countries, is expected to be utilized in a wide range of industries and to evolve into a social infrastructure beyond the daily-life infrastructure by promoting collaboration and co-creation among industries. Furthermore, the sixth-generation mobile communication system (6G) as the next-generation technology, is anticipated to play a central role as the backbone of Society 5.0 by integrating cyberspace with the physical world.

6G is expected to be commercially available around 2030, and as of 2025, numerous projects and organizations related to 6G have been established in Europe, the United States, and other countries, advancing concept development and technical studies.

In Japan, to respond to changing needs for mobile communications, efforts are underway to promote the spread of mobile services and the expansion of mobile business. At the same time, aiming to strengthen the growth potential of the ICT industry, Japan seeks to demonstrate international leadership in the 6G era by creating innovative technologies and new use cases that break away from conventional norms. To this end, the XG Mobile Promotion Forum (XGMF) is actively engaged in these initiatives.

Within XGMF, multiple 6G-related projects have been launched, and collaborative efforts are being made to conduct research, technical studies, domestic and international cooperation, and promotional activities to ensure the early and smooth introduction of 6G.

On the other hand, the success of 6G depends on securing sufficient frequency bands in a timely manner. Since securing frequency bands requires considerable time, this white paper recommends that efforts to secure frequencies for 6G should begin as early as possible. Considering international trends and the balance between wider bandwidth and coverage, the 6–8 GHz band is indicated as a strong candidate for 6G frequencies.

This white paper consists of the following major chapters

Chapter1 Spectrum Requirements for the 6G System

This chapter explains why new frequencies are necessary for 6G systems and indicates that the 6 GHz band and the 7–8 GHz band are suitable as candidate frequencies.

Chapter2 Overseas Developments of the 6 GHz and 7–8 GHz Bands

This chapter summarizes activities, trends, and study status in other countries and regions regarding the use of the 6 GHz band and the 7–8 GHz band for mobile communication systems.

Chapter3 Frequency Status in Japan for the 6 GHz and 7–8 GHz Bands

This chapter summarizes the usage of the 6 GHz band and the 7–8 GHz band in Japan, as well as the study status regarding their consideration as 6G frequencies.

Chapter 4 Conclusion

This chapter provides recommendations for the smooth and sustainable introduction and deployment of 6G.

This white paper was prepared with the extensive cooperation of numerous participants in the Spectrum Working Group of the XGMF 6G Promotion project. We hope that this document will serve as a valuable contribution to securing the frequency resources essential for the introduction of 6G and to promoting related global activities.

# 1. SPECTRUM REQUIREMENTS FOR THE 6G SYSTEM

# 1. Spectrum Requirements for the 6G System

Mobile communication systems have undergone development and deployment of a new generation approximately every ten years. The continuous evolution of these systems has enabled the provision of high-speed, highly reliable communication services that have significantly transformed the foundations of society and industry. Today, mobile communication systems are one of the essential infrastructures supporting social life and are deeply rooted in the daily lives and economic activities of the public.

In the introduction and deployment of mobile communication systems, the selection of frequency bands is extremely important. For example, it is very difficult to meet system requirements such as capacity and coverage, as well as to support new services and applications, using only a single frequency band. In the development of mobile communication systems, multiple frequency bands have been utilized to maintain communication quality, accommodate diverse use cases, and improve user convenience.

Until now, when introducing a new generation of mobile communication systems, efforts have been made not only to migrate and utilize frequency bands used in existing generations but also to explore and secure new frequency bands in parallel. Specifically, starting from the third generation (3G), the following frequency bands have been newly utilized in Japan:

- **3G**: 2 GHz band
- **4G**: 3.5 GHz band
- **5G**: 3.7/4.5 GHz bands, 28 GHz band

Therefore, in considering 6G mobile communication system, which is expected to be introduced around 2030, it is necessary to proceed early with securing and examining new frequency bands, not only migrating existing ones, from the following perspectives.

## 1.1 Continuation of the Increasing Mobile Traffic Trend

The increase in traffic on mobile communication networks is expected to continue, and simply migrating existing frequency bands for a new generation will not be sufficient to meet the demand for new services. Therefore, examining and securing new frequency bands is essential.

Regarding mobile traffic volume, the Ministry of Internal Affairs and Communications, in cooperation with mobile network operators, collects and analyzes data every three months and publishes the results. [1] According to the figures collected in March 2025, the following growth trends have been observed:

- **Monthly average traffic:** Increased by approximately 1.2 times (+15.7%) over one year, and about 1.6 times (+63.8%) over three years
- **Peak-hour traffic:** Increased by approximately 1.2 times (+17.6%) over one year, and about 1.7 times (+67.7%) over three years
- **Average traffic per subscription:** Increased by approximately 1.1 times (+12.3%) over one year, and about 1.5 times (+45.5%) over three years

The same report also analyzes long-term trends in mobile traffic, showing that traffic has increased by approximately 9.6 times over the past 10 years and about 2.3 times in the roughly five years since the launch of 5G services in March 2020.

In the 6G era, applications providing XR (Cross Reality/Extended Reality) and various AI-related services, including generative AI, are expected to expand. Considering these and other new use cases, multiple reports indicate that mobile traffic will continue to grow significantly.[2, 3]

### 1.2 Trend Toward Wider Bandwidth to Meet Needs

From 3G to 5G, in addition to securing new frequency bands, efforts have been made to expand the bandwidth used for mobile communication systems to meet growing communication needs. Examples of bandwidth expansion for each generation in Japan are as follows:

- **3G:** 5 MHz bandwidth (W-CDMA, CDMA2000)
- **4G:** 20 MHz (LTE) to 40 MHz bandwidth (LTE-Advanced)
- **5G:** 100 MHz bandwidth (3.7/4.5 GHz bands), 400 MHz bandwidth (28 GHz band)

This trend toward wider bandwidth not only differentiates new systems from existing generations but also leads to the creation of new use cases. Therefore, it is considered necessary to continue this approach in 6G.

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[1] Ministry of Internal Affairs and Communications Information and Communications Statistics Database
Current Status of Mobile Communication Traffic in Japan

[2] Nokia Technology Strategy 2030: emerging technology trends and their impact on networks, November 2023

[3] Ericsson Mobility Report June 2025

Furthermore, studies evaluating frequency demand for 6G -taking into account the data rates required for various anticipated applications- indicate that frequency demand will expand significantly[4].

### 1.3 Necessity of Wide-Area Coverage and Seamless Connectivity

To fully realize the benefits of 6G, deploying wide-area coverage on a certain scale is essential. High-frequency bands, such as millimeter waves, are suitable for high-capacity use cases where many users gather in a small area and for providing high-speed communication. However, millimeter waves have limitations in propagation range and diffraction, making it difficult to achieve wide-area coverage. In addition, devices and equipment supporting millimeter waves are currently limited, and cost challenges remain.

In 5G, mid-band spectrum (3.7/4.5 GHz) with wide channel bandwidths of 100 MHz have enabled deployment of coverage on a certain scale. For 6G, to achieve both further capacity expansion and coverage while continuing the trend toward wider bandwidths, securing new mid-band spectrum (such as the 6–8 GHz range) will be crucial. This will allow seamless connectivity across wide areas while maximizing the benefits of high-speed, large-capacity communication.

### 1.4 Challenges and Risks of Deploying 6G Using Only Existing Frequency Bands

If 6G is deployed using only existing frequency bands, congestion and interference in bands already heavily used by previous generations may worsen, making it difficult to maintain stable service quality in mobile communication systems. Furthermore, even if existing bands are migrated to 6G, widespread adoption of 6G-compatible devices will take time, meaning that congestion relief cannot be achieved immediately.

To avoid these risks, an optimal combination of existing and new frequency bands -the “best mix”- is essential.

[4] e.g. Spectrum Needs for 6G – Next G Alliance, June 2024

### 1.5 Global Harmonization and Ecosystem Formation

By advancing early discussions on new frequency bands both domestically and internationally, regulators and industry can secure and concentrate resources for efficient R&D and standardization activities. This will help prevent fragmentation[5] in frequency allocations among countries and enable early formation of a global ecosystem.

### 1.6 Strategic Actions to Maintain and Strengthen International Competitiveness

Given that major countries are already making early efforts to examine and secure 6G frequency bands, Japan should strategically promote the acquisition of globally harmonized new frequency bands through international standardization, technological development, and regulatory frameworks to avoid falling behind. This is directly linked to maintaining the competitiveness of industries and the continued provision of advanced services in Japan.

To smoothly and sustainably introduce and deploy 6G mobile communication systems as social infrastructure, it is essential to secure new mid-band spectrum that can accommodate multiple blocks with bandwidths of approximately 200 MHz to 400 MHz -wider than the 100 MHz blocks realized in the 5G mid-band- while balancing capacity and coverage. This requires early promotion of various studies in collaboration both domestically and internationally.

In international discussions on mid-band spectrum, the ITU World Radiocommunication Conference held in 2023 (WRC-23) identified 6,425–7,125 MHz for Region 1 (Europe, Africa, and the Middle East) and some other countries, and 7,025–7,125 MHz for Region 3 (Asia-Pacific) as IMT spectrum. Furthermore, the ITU World Radiocommunication Conference in 2027 (WRC-27) is scheduled to discuss 7,125–8,400 MHz as a candidate band for IMT.

The consideration of spectrum above 100 GHz for IMT is expected as one of the future spectrum resource candidates, and studies are progressing from a research

[5] Frequency misalignment can become a barrier to the international standardization of devices and network equipment, potentially leading to increased costs.

and development perspective. While full-scale use of these high-frequency bands is considered difficult in the initial stage of 6G deployment, discussions at the ITU have included examination of frequencies above 100 GHz for IMT as a provisional agenda item for the ITU World Radiocommunication Conference in 2031 (WRC-31), raising expectations for future developments.

For the introduction of 6G around 2030, Japan should aim to secure new mid-band spectrum in the 6,425–7,125 MHz and 7,125–8,400 MHz ranges.

# 2. OVERSEAS DEVELOPMENTS OF THE 6 GHz AND 7-8 GHz BANDS

## 2. Overseas Developments of the 6 GHz and 7–8 GHz Bands

In the previous chapter, we analyzed that for the introduction of 6G around 2030, new spectrum should be secured from the ranges of 6,425–7,125 MHz (6 GHz band) and 7,125–8,400 MHz (7–8 GHz band), which allow for a balance between capacity and coverage. This chapter examines the status of international developments on these frequency bands.

### 2.1 6 GHz Band (6,425–7,125 MHz)

#### 2.1.1 Results of WRC-23

The 6,425–7,125 MHz range was considered as a candidate band for IMT identification under Agenda Item 1.2 of the ITU World Radiocommunication Conference (WRC-23) held in 2023. As a result, 6,425–7,125 MHz was identified for IMT use across the entire Region 1 and in two countries of Region 2 (Brazil and Mexico); 7,025–7,125 MHz was identified for IMT use across the entire Region 3 (Asia-Pacific); and 6,425–7,025 MHz was identified for IMT use in three countries of Region 3 (Cambodia, Laos, and Maldives). These countries collectively account for an estimated 60% of the world's population.[6]

In addition, at WRC-23, several other countries in Region 3—including China, Bangladesh, Sri Lanka, Myanmar, Thailand, Indonesia, Vietnam, and the Philippines (shown in orange in Figure 1)—also aimed to secure IMT identification for the entire 6,425–7,125 MHz range. However, due to opposition from neighboring countries, IMT identification was not achieved. It is believed that these countries remain interested in utilizing the 6 GHz band for IMT in the future.

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[6] GSMA Report : Mobile Evolution in 6 GHz, The impact of spectrum assignment options in 6.425–7.125 GHz

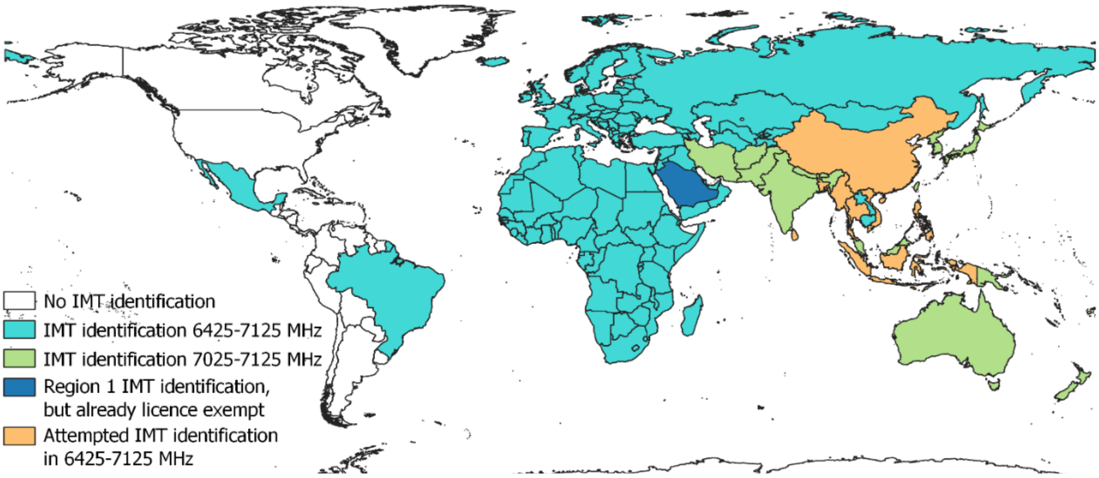


Figure 1: Results of IMT Identification for the 6 GHz Band at WRC-23

### 2.1.2 Progress in Various Countries After WRC-23

Following WRC-23, several countries have begun considering or moving toward allocating the 6 GHz band for IMT use in 5G and 6G. The figure below summarizes the progress made so far. Details of the information shown in the figure will be explained in Sections 2.1.4 through 2.1.9.

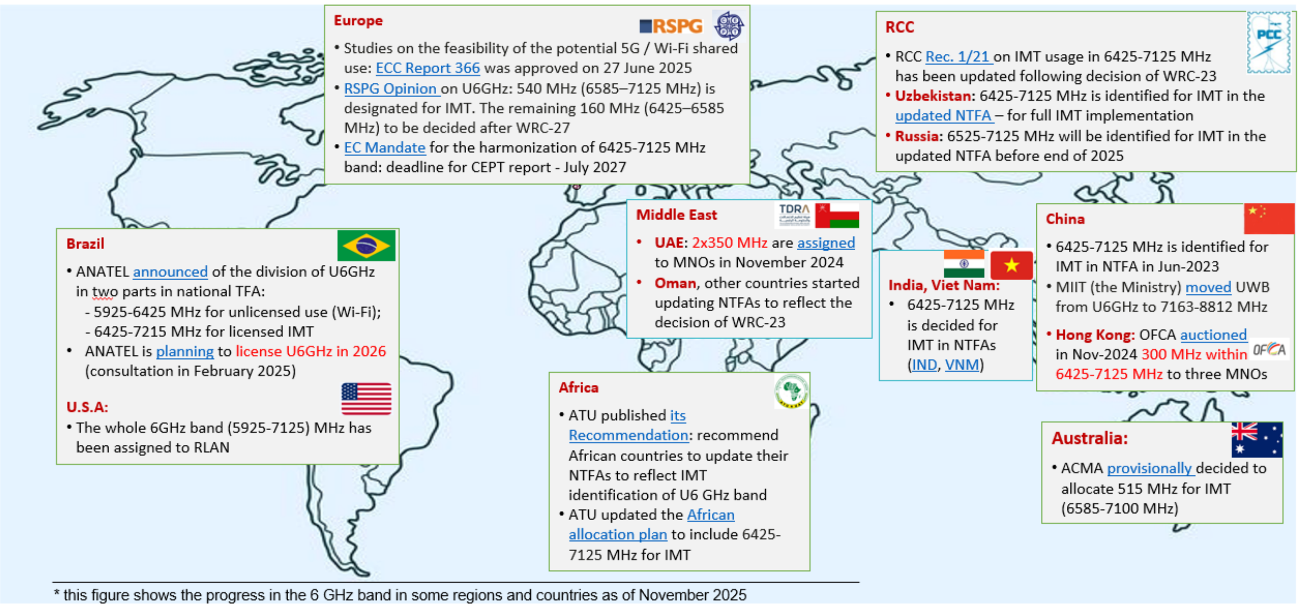


Figure 2: Progress of Considering or Allocating the 6 GHz Band for IMT Use.

### 2.1.3 Status of 3GGP and Industry Trend

(1) 3GPP

For licensed use of the 6 GHz band, NR band n104 was introduced into the 3GPP specifications in June 2022, defining technical standards such as transmission and reception characteristics for base stations and mobile stations.

Table 1:6 GHz Band Plan for Licensed Use in 3GPP

| Band Number | Lower Frequency Limit (MHz) | Upper Frequency Limit (MHz) |
|---|---|---|
| n104 | 6,425 | 7,125 |

In addition, a study on regulatory frameworks for the 5,925–7,125 MHz range across various countries and regions was completed in March 2024. Based on this, Technical Report TR 37.890 has been published as a reference for future considerations of unlicensed or licensed systems[7]。

Further, within 3GPP, to enable coexistence in the 6 GHz band between IMT and FSS (Fixed-Satellite Service) space stations, the EIRP mask requirements for NR band n104 base stations and the associated test methods were published[8] as Technical Report TR 38.908 in March 2025, based on WRC-23 Resolution 220[9]. These EIRP mask requirements and test methods have also been reflected in the technical specifications for base station transmit/receive characteristics and in the conformance test specifications.

In addition, a study item to investigate the radio interface specifications for 6G was launched in the 3GPP RAN Technical Specification Group in June 2025. For 5G terrestrial networks, the bands 410–7,125 MHz and 24,250–71,000 MHz have been defined as FR1 and FR2, respectively, while 7,125–24,250 MHz has not been defined to date[10]. In the 6G study item, taking into account that the 7–8 GHz and 14–15

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[7] TR 37.890 Feasibility Study on 6 GHz for LTE and NR in Licensed and Unlicensed Operations

[8] TR 38.908 Protection of fixed satellite service (FSS) UL within 6425 to 7125 MHz

[9] RESOLUTION 220 (WRC-23)

[10] However, in non-terrestrial radio interfaces, the Ka band and Ku band have already been introduced.

GHz ranges are candidate bands under WRC-27 Agenda Item 1.7, the previously undefined ranges are also being considered. Work is underway toward defining numerology and RF characteristics suitable for these bands, as well as examining current regulatory conditions and specifying future technical requirements.

Table 2: Frequency ranges for 3GPP terrestrial systems

| Frequency range designation | | Corresponding frequency range |
|---|---|---|
| FR1 | | 410 MHz – 7,125 MHz |
| FR2 | FR2-1 | 24,250 MHz – 52,600 MHz |
| | FR2-2 | 52,600 MHz – 71,000 MHz |

(2) Movements in the Mobile Communications Industry

The GSM Association (GSMA), an industry organization comprising mobile network operators worldwide, has published several findings regarding the 6 GHz band and emphasized the importance of using it for mobile communications[11]. Considering that most mobile traffic occurs indoors and is currently largely handled by mid-band spectrum (such as the 3.5 GHz band), GSMA notes that the 6 GHz band—with similar coverage characteristics—is well suited to accommodate the growing traffic demand. GSMA strongly supports allocating the 6,425–7,125 MHz band for efficient frequency utilization and significant economic benefits, as an extension of 5G and for future 6G.

In May 2025, twelve major European telecom operators (including Vodafone, Deutsche Telekom, Telefónica, and Orange) jointly issued a letter signed by their CTOs, urging European authorities to allocate the entire 6 GHz band (6,425–7,125 MHz) for mobile communications. This request was based on the anticipated spectrum congestion by 2030, the importance of the band as a foundational resource for 6G, and the need to maintain Europe's technological competitiveness and international leadership[12].

In addition, proof-of-concept trials for future use of the 6 GHz band have been conducted by operators in various countries. Published examples include:

- A comparison of network characteristics between the 6 GHz and 3.6 GHz

[11] The Importance of 6 GHz to Mobile Evolution

[12] Essential Action for Europe's Mobile Future

bands by Telia (Finland) in collaboration with Nokia[13]

- Video streaming tests using Massive MIMO base stations by A1 (Austria) and Nokia[14]
- Interference tests with Wi-Fi by BT (UK) and Nokia[15]
- Transmission trials by Orange (France) and Nokia[16]
- Coverage tests by Telstra (Australia) and Ericsson[17]
- Transmission tests using MediaTek chipsets supporting 200 MHz bandwidth by Vodafone (Germany) [18]
- High-speed transmission tests using 256-TRX base stations by China Mobile (China) [19]

For example, in Finland's trial, an experimental 6 GHz base station (128Tx) was installed at the same site as an existing 3.5 GHz base station (64Tx) on a suburban rooftop. Coverage and throughput were compared under equivalent EIRP conditions. Outdoors, performance was similar for both bands up to about 810 meters, and coverage and throughput were maintained up to 1,120 meters even in non-line-of-sight conditions. Indoors, at distances of 80–100 meters from the outdoor base station, throughput was slightly lower than at 3.5 GHz but still provided stable communication. These results indicate that using existing 5G base station sites could enable efficient and rapid deployment of 6G with the 6 GHz band.

### 2.1.4 Europe

According to ERC Report 25, the current allocation of the 6 GHz band in Europe includes primary allocations not only for mobile services but also for fixed services

[13] The potential of upper 6 GHz for 6G: Field insights and comparison with 3.6 GHz

[14] First pre-6G video stream in Austria: A1 and Nokia work on the progress of mobile technology

[15] Use of U6 GHz band for mobile

[16] 6 GHz Band: A New Opportunity for Future Mobile Networks Successfully Demonstrated in the Field

[17] Powering Australia's digital future with 6GHz for mobile

[18] Vodafone's world-first 6GHz spectrum test positions Europe to lead in advanced 5G and 6G

[19] Zhejiang Mobile takes the lead in completing U6G technology verification, driving a leap in network capabilities through continuous innovation

and fixed-satellite services, and it is used for various applications[20]. Introducing new systems into the 6,425–7,125 MHz range will require studies on coexistence with these incumbent services.

Table 3: Allocation status of the 6 GHz band in Europe

| | European Common Allocation and ECA Footnotes | Applications |
|---|---|---|
| 5,925-6,700 MHz | FIXED<br>FIXED-SATELLITE (EARTH-TO-SPACE) (5.457A)<br>MOBILE (5.457E)<br>Earth Exploration-Satellite (passive)<br><br>5.149 5.440 5.458 | ESV, VSAT, Fixed, ITS, Passive sensors (satellite), RLAN, Radio astronomy, TLPR, LPR, UWB applications |
| 6,700-7,075 MHz | FIXED<br>FIXED-SATELLITE (EARTH-TO-SPACE) (SPACE-TO-EARTH) (5.441)<br>MOBILE (5.457E)<br>Earth Exploration-Satellite (passive)<br><br>5.458 5.458A 5.458B | FSS Earth stations, Feeder links, Fixed, Video PMSE, Passive sensors (satellite), TLPR, LPR, UWB applications |
| 7,075-7,145 MHz | FIXED<br>MOBILE (5.457E)<br>Earth Exploration-Satellite (passive)<br><br>5.458 | Fixed, Video PMSE, Passive sensors (satellite), LPR, UWB applications |

Following the results of WRC-23, the EU Radio Spectrum Policy Group (RSPG), an advisory body to the European Commission on spectrum policy, has issued policy recommendations regarding IMT frequencies and a strategic vision for 6G toward WRC-27. In February 2025, RSPG submitted the *6G Strategic Vision*[21], outlining the direction of spectrum policy for 6G deployment and emphasizing the importance of securing frequency bands.

Furthermore, in June 2025, RSPG launched a public consultation on a draft opinion concerning the long-term outlook for the 6 GHz band (6,425–7,125 MHz), and the

[20] ERC Report 25 THE EUROPEAN TABLE OF FREQUENCY ALLOCATIONS AND APPLICATIONS IN THE FREQUENCY RANGE 8.3 kHz to 3000 GHz (ECA TABLE)

[21] 6G Strategic vision

opinion was adopted at the plenary meeting in November[22]. This band is considered critical for both mobile communications (MFCN) and wireless LAN (WAS/RLAN). Mobile operators require additional spectrum—at least 200 MHz per operator—in the 6 GHz band to support 6G use cases such as XR, IoT, and smart cities, as well as high-capacity urban deployments at lower cost. Wireless LAN also needs additional spectrum to meet growing demand for high-throughput connectivity in homes, offices, and public spaces, driven by technologies such as Wi-Fi 6E and Wi-Fi 7. Regarding coexistence between mobile communications and wireless LAN, several prioritized band split approaches were considered. However, the prevailing view favored prioritizing mobile communications. RSPG recommended allocating 6,585–7,125 MHz preferentially to mobile communications (at full power without power reduction[23]). The remaining 6,425–6,585 MHz should be left as a guard band for the time being, with a final decision deferred until after WRC-27. At that time, if 7,125–7,250 MHz is identified for IMT, there is a strong case for designating it to wireless LAN; otherwise, there is a strong case for designating it to mobile communications.

In Europe, the European Conference of Postal and Telecommunications Administrations (CEPT), which is responsible for public policy, regulatory coordination, and standardization in telecommunications, is examining frequency sharing in the 6 GHz band between mobile communications, wireless LAN, and other incumbent services such as fixed-satellite service within its ECC PT1 group, which oversees IMT studies. In December 2024, the European Commission (EC) instructed CEPT to assess the feasibility of coexistence between mobile communications and wireless LAN and to develop technical conditions[24].

The results of PT1's studies on coexistence have been approved as ECC Report 366 in June 2025[25]. Although this report was initiated before the EC mandate, it aligns with the mandate's milestones and was referenced in the RSPG opinion

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[22] Opinion on Long-term vision for the upper 6 GHz band

[23] In ECC Report 366, full power was considered in the range of EIRP 73 to 83 dBm per 100 MHz.

[24] EC MANDATE TO THE CEPT

[25] ECC Report 366 on the feasibility of a potential shared use of the 6425-7125 MHz frequency band between MFCN (5G/6G) and WAS/RLAN

mentioned above. CEPT will continue its work under the EC mandate, aiming to agree on technical conditions for the introduction of mobile communications and wireless LAN by July 2027.

### 2.1.5 North and South America

(1) Brazil

At the board meeting of Brazil's National Telecommunications Agency (ANATEL) held in December 2024, a decision was approved to partially overturn the Resolution made in 2021 and allocate the 6,425–7,125 MHz band for IMT. The plan includes launching a public consultation on auction procedures by the end of August 2025 and conducting the spectrum auction by the end of October 2026[26].

### 2.1.6 Asia-Pacific Region

(1) China-Hong Kong

In November 2024, the Hong Kong Special Administrative Region of China conducted a spectrum auction of 300 MHz in the 6 GHz band (6,570–6,770 MHz and 6,925–7,025 MHz) for 5G use, completing allocations to three mobile operators[27]. The assignments will take effect by March 31, 2025, with a validity period of 15 years. The Office of the Communications Authority (OFCA) declared that this allocation of the 6 GHz band will enable the deployment of 5G and, in the future, 6G.

(2) India

In December 2024, the Indian Cabinet approved a spectrum refarming plan that includes the 6 GHz band for 5G and future 6G deployment. Under this plan,

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[26] Conselho Diretor aprova Consulta Pública do Planejamento de Radiofrequência para Inclusão, Sustentabilidade, Modernização e Acesso – PRISMA - RF — Agência Nacional de Telecomunicações

[27] China HongKong6GHzBand "Conclusion of Auction of Radio Spectrum in 6/7 GHz Band"

6,425–7,125 MHz is allocated for mobile communications, while 5,925–6,425 MHz is designated for wireless LAN[28].

In early 2025, the Department of Telecommunications (DoT) finalized the allocation of 6,425–7,125 MHz for IMT in the National Frequency Allocation Table[29]. Furthermore, in July 2025, India expressed a preliminary position in its contribution (APG27-2-INP-36) to the second meeting of APT Conference Preparatory Group for WRC-27 (APG-27), to join the IMT footnote (RR No. 5.457D) for 6,425–7,025 MHz in Region 3[30].

In September 2025, the Telecom Regulatory Authority of India (TRAI) launched a public consultation on spectrum auctions for IMT bands, including the 6 GHz band[31].

In October 2025, the Bharat 6G Alliance (B6GA) published a white paper titled "6G Spectrum Roadmap for India" [32], describing the 6–8.4 GHz range as the "Golden Band" for 6G in India.

(3) Australia

In December 2024, Australia announced a provisional allocation of 515 MHz (6,585–7,100 MHz) in the 6 GHz band for IMT use[33].

(4) China

In July 2023, China allocated 6,425–7,125 MHz for IMT under its new revision of "Radio Frequency Allocation Regulations," aiming to promote global harmonization of spectrum for the 5G/6G era[34]. In November 2023, trial licenses

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[28] India6GHzBand Plan "Cabinet Approves Spectrum Refarming for 5G and Future 6G Services

[29] India6GHz band allocation table

[30] India6GHzBand (Accessible to registered participants of the APG meeting)

[31] IndiaIMT Call for comments on India's IMT frequency band auction

[32] Bharat 6G Alliance (B6GA) White paper on 6G-related frequency bands

[33] Australia6GHz Band ACMA "Planning options in the upper 6 GHz band"

[34] China 6 GHz Band: The Ministry of Industry and Information Technology was the first in the world to allocate the 6 GHz frequency band for 5G/6G systems.

for the 6 GHz band were issued[35], and proof-of-concept testing and domestic sharing studies are currently underway.

(5) Vietnam

In October 2025, Vietnam decided to allocate 6,425–7,125 MHz for IMT in its national frequency allocation plan[36].

### 2.1.7 Middle East

- United Arab Emirates(UAE)

In November 2024, the UAE allocated the 6,425–7,125 MHz band to two mobile operators (350 MHz per operator). Actual operations are expected to begin between 2025 and 2026. The 6 GHz band will first be used for 5G deployment, with future expansion to 6G as anticipated[37].

### 2.1.8 Africa

In August 2025, the African Telecommunications Union (ATU) published two documents related to the 6 GHz band:

- ATU-R Recommendation 008-0 (IMT Roadmap for Africa) [38]
  This recommendation provides guidance on IMT spectrum release and regulatory conditions in Africa. It advises African countries to update their national frequency allocation tables to reflect IMT identification of the 6 GHz band (6,425–7,125 MHz) as decided at WRC-23 and recommends a release timeline of 2028–2032.
- African Spectrum Allocation Plan, 2nd Edition (AfriSAP) [39]
  This plan serves as a reference for developing national radio frequency allocation plans in African countries. Annex F of the plan identifies the 6,425–

[35] China 6GHzBand "Case study - IMT frequency management with NTFA in China"

[36] Vietnam 6GHz Band

[37] UAE  6GHz Band "TDRA Announces Allocation of 600 MHz and 6 GHz Bands for IMT"

[38] Africa 6GHzBand ATU-R Recommendation 008-0

[39] Africa 6GHz Band "African Spectrum Allocation Plan (AfriSAP) 8.3 kHz to 3 000 GHz"

7,125 MHz band as one of Africa's IMT bands.

### 2.1.9 Regional Commonwealth in the Field of Communications (RCC) and Former Soviet Countries

In April 2025, the RCC provisionally updated Recommendation 1/21 regarding IMT identification in the 6 GHz band, following the decisions of WRC-23. Final approval of this recommendation is scheduled for the next meeting in September 2025[40]. In August 2025, Uzbekistan updated its national frequency allocation table to include IMT identification in the 6 GHz band[41].

## 2.2 7-8 GHz Band（7,125 – 8,400MHz）

The 7,125–8,400 MHz band is one of the candidate frequency ranges for IMT identification under Agenda Item 1.7 at the ITU World Radiocommunication Conference (WRC-27) in 2027. This section analyzes the status of international considerations for this band.

### 2.2.1 Frequency Allocation and Usage of the 7–8 GHz Band

Within the 7,125–8,400 MHz range:

In Region 1, the candidate frequencies for WRC-27 Agenda Item 1.7 are 7,125–7,250 MHz and 7,750–8,400 MHz.

In Regions 2 and 3, the entire 7,125–8,400 MHz range is a candidate.

The 7,125–8,400 MHz band, or portions of it, is allocated on a primary basis to various existing services in the Radio Regulations (RR) [42] allocation table and footnotes. Figure 4 provides an overview of the current primary allocations within the 7,125–8,400 MHz band and the candidate frequencies for each region. Additionally, the main usage status of these services is outlined below[43].

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[40] RCC 6GHz Band（Annex 1 "Приложение 1 Рекомендация 1_21_2_5G.docx"）

[41] Uzbekistan 6GHz Band

[42] Radio Regulations Articles Editon of 2024

[43] Doc. CPG(25)016 ANNEX IV-07

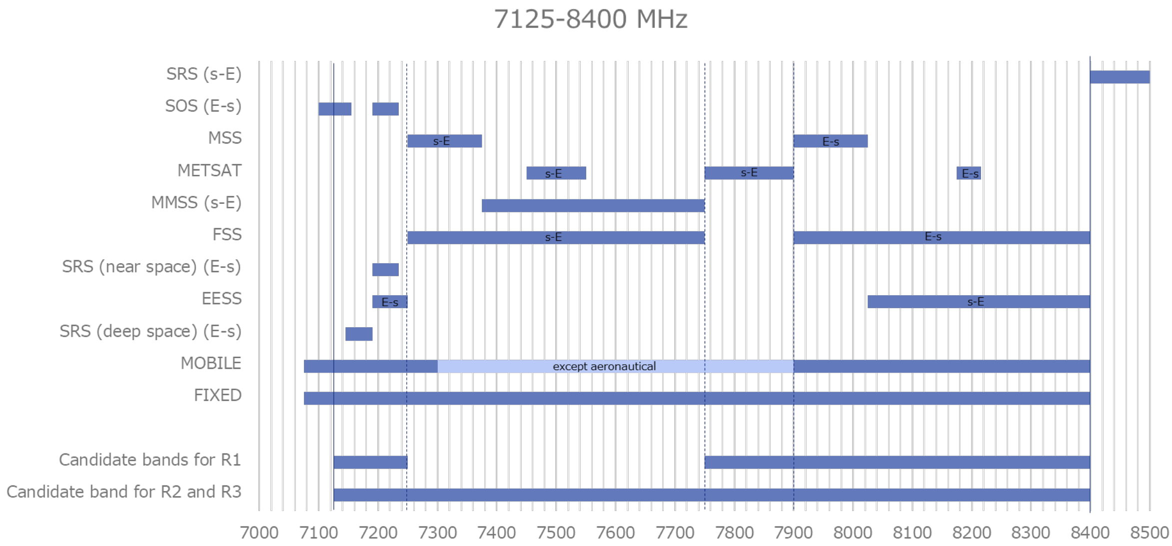


Figure 3: Allocation to Existing Primary Services in the 7,125–8,400 MHz Band

**Fixed Service: FS**

The 7,125–8,400 MHz band is globally allocated on a primary basis to the Fixed Service. This band is widely used in many countries for private or government fixed links (point-to-point communications). These fixed links support applications such as interconnections between Internet data centers, broadcasting transmission and distribution, public safety, and transportation systems.

**Mobile Service: MS**

The 7,125–7,300 MHz and 7,900–8,400 MHz ranges are globally allocated on a primary basis to the Mobile Service, while 7,300–7,900 MHz is allocated to the Mobile Service (excluding aeronautical mobile).

**Fixed Satellite Service: FSS**

The 7,250–7,750 MHz range is allocated on a primary basis to the Fixed-Satellite Service (space-to-Earth), and 7,900–8,400 MHz is allocated to the Fixed-Satellite Service (Earth-to-space) globally. This band is widely used for fixed-satellite operations, particularly in Europe, where numerous satellite systems, including constellations, are in operation. Earth stations support national security, law enforcement, and humanitarian missions. This includes maritime stations within Europe, domestic and international waters, and short-term use outside Europe without prior coordination.

**Mobile Satellite Service: MSS**

The 7,250–7,375 MHz range is allocated on a primary basis to the Mobile-Satellite Service (space-to-Earth), and 7,900–8,025 MHz is additionally allocated globally to the Mobile-Satellite Service (Earth-to-space) under RR Footnote 5.461.

**Maritime Mobile Satellite Service: MMSS**

The 7,375–7,750 MHz band is globally allocated on a primary basis to the Maritime Mobile-Satellite Service (Earth-to-space).

**Space Research Service: SRS**

7,145–7,190 MHz is globally allocated on a primary basis to the Space Research Service (deep space) (Earth-to-space). This band is used for tracking and communication with spacecraft in deep space (Earth-to-space).

7,190–7,235 MHz is globally allocated on a primary basis to the Space Research Service (near-Earth) (Earth-to-space). This band is used for tracking and communication with near-Earth spacecraft (Earth-to-space). Near-Earth research satellites operate in various orbits, including lunar orbit, highly elliptical orbit, geostationary orbit, and low Earth orbit.

**Space Operation Service: SOS**

The 7,100–7,155 MHz and 7,190–7,235 MHz bands are additionally allocated on a primary basis to the Space Operation Service (Earth-to-space) in Russia (RR Footnote 5.459).

**Earth Exploration-Satellite Service: EESS**

7,190–7,250 MHz is globally allocated on a primary basis to the Earth Exploration-Satellite Service (Earth-to-space). This band is used exclusively for tracking, telemetry, and control (TT&C) of Earth exploration satellites (RR Footnote 5.460A).

8,025–8,400 MHz is globally allocated on a primary basis to the Earth Exploration-Satellite Service (space-to-Earth). This band is used for high-speed, wideband transmission of observation data from Earth exploration satellites to Earth stations in real time, including meteorological and Earth surface data. Earth stations may be deployed anywhere within the satellite system's service area (urban, suburban, rural) and can be fixed or transportable, with exact locations sometimes unknown.

**Meteorological-Satellite Service: MetSat**

7,450–7,550 MHz is globally allocated on a primary basis to the Meteorological-Satellite Service (space-to-Earth). This band is used for high-speed, wideband transmission of observation data from geostationary meteorological satellite systems.

7,750–7,900 MHz is globally allocated on a primary basis to the Meteorological-Satellite Service (space-to-Earth). This band is used for global direct distribution of meteorological data from non-geostationary meteorological satellites to user Earth stations, which may in principle be located anywhere.

8,175–8,215 MHz is globally allocated on a primary basis to the Meteorological-Satellite Service (Earth-to-space).

Global transmission of meteorological satellite data is provided by networks operated by intergovernmental and international organizations such as EUMETSAT (European Organization for the Exploitation of Meteorological Satellites), NOAA (U.S. National Oceanic and Atmospheric Administration), and CMA (China Meteorological Administration).

**Space Research Service: SRS (Adjacent Band)**

The 8,400–8,500 MHz band adjacent to the 7,125–8,400 MHz range is globally allocated on a primary basis to the Space Research Service (space-to-Earth).

8,400–8,450 MHz is limited to deep space use (RR Footnote 5.465) and is employed for communications from deep space to Earth using highly sensitive Earth station receivers.

8,450–8,500 MHz is used for near-Earth space research (space-to-Earth).

ESA-supported missions (e.g., BepiColombo, ERO, EXOMARS, Solar Orbiter, JUICE, HERA) use the 8,400–8,450 MHz band for space-to-Earth communications. Additional missions for deep space and near-Earth research are planned. Mission operations involve cooperation among space agencies (ESA, NASA, JAXA), utilizing each other's ground networks.

### 2.2.2 ITU-R Sharing and Compatibility Studies for WRC-27 Agenda Item 1.7

Within ITU-R Working Party 5D (WP 5D), sharing and compatibility studies are underway between IMT systems in the 7,125–8,400 MHz band and incumbent primary services operating in the same and adjacent bands. Results contributed by members are compiled in the "Working Document on Sharing and Compatibility Studies under WRC-27 Agenda Item 1.7, Annex 2 (7,125–8,400 MHz) [44]". The status as of the 50th WP 5D meeting (October 7–16, 2025, Geneva) is summarized below.

(1) Fixed Service（7,125-8,400 MHz）

Contributions on co-frequency sharing were received from the United States, Japan, Saudi Arabia, Brazil, India, Croatia/Türkiye, China, and the Republic of Korea. Studies from the United States, Japan, Saudi Arabia, Brazil, and Korea

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[44] Report on the 50th meeting of Working Party 5D (Geneva, 7-16 October 2025), Document 5D/989 Annexes 4.17-4.31（ITU Account Required)

suggest that coexistence between IMT and the Fixed Service is feasible with appropriate consideration of distance and angular separation and clutter loss.

(2) Space Research Service(Earth-to-space)　(7,145-7,235 MHz)

Near-Earth (7,190–7,235 MHz): Contributions on co-frequency sharing were received from the United States, GSMA, Russia, and Japan. Studies by GSMA and Russia suggest coexistence between IMT and the near-Earth SRS is feasible.

Deep space (7,145–7,190 MHz): Contributions on co-frequency sharing were received from the United States, Japan, ESA, and Russia. Studies by the United States and Russia suggest coexistence between IMT and deep-space SRS is feasible.

(3) Space operation Service (Earth-to-space) (7,100-7,155 MHz and 7,190-7,250 MHz)

A co-frequency sharing contribution from Russia suggests coexistence between IMT and SOS is feasible.

(4) Fixed-Satellite Service　(space-to-Earth)　(7,250-7,750 MHz)

Studies on sharing within the same band were submitted by China, the United States, Germany, Canada, India, France, Qualcomm, Nokia, Brazil, and Korea. Analyses from the United States, Canada, Qualcomm, Nokia, and Brazil suggest that coexistence between IMT and the Fixed-Satellite Service is feasible with appropriate consideration of distance, antenna angle, and clutter loss.

(5) Fixed-Satellite Service(Earth -to-space) (7,900-8,400 MHz)

Studies on sharing within the same band were submitted by Australia, the United States, France–Luxembourg, Germany, Ericsson, Mexico, Korea, Brazil, India, Qualcomm, Nokia, and the United Kingdom. Analyses from the United States, Ericsson, Mexico, Korea, Brazil, Qualcomm, and Nokia suggest that coexistence between IMT and the Fixed-Satellite Service is feasible with appropriate consideration of IMT base station deployment scenarios.

(6) Mobile-Satellite Service(space-to-Earth) (7,250-7,375 MHz)

Studies on sharing within the same band were submitted by Canada, Brazil, India, and the United States. Analyses from Canada and Brazil suggest that coexistence between IMT and the Mobile-Satellite Service is possible with appropriate consideration of distance and clutter loss.

(7) Mobile-Satellite Service(Earthe-to-space) (7,900-8,025 MHz)

For Mobile-Satellite Service (Earth-to-space) (7,900–8,025 MHz), studies on sharing within the same band were submitted by the United States, France–Luxembourg, Germany, Ericsson, Brazil, India, Qualcomm, and China. Analyses from the United States, Ericsson, Brazil, and Qualcomm suggest that coexistence between IMT and the Mobile-Satellite Service is feasible with appropriate consideration of IMT base station deployment scenarios. For Maritime Mobile-Satellite Service (Earth-to-space) (7,900–8,025 MHz), studies on sharing within the same band were submitted by France–Luxembourg.

(8) Meteorological-Satellite Service (space-to-Earth)
(7,450-7,550 MHz and 7,750-7,900 MHz)
Studies on sharing within the same band were submitted by the United States, China, Brazil, GSMA, and Ericsson. Analyses from the United States, Brazil, GSMA, and Ericsson suggest that coexistence between IMT and the Meteorological-Satellite Service is possible with separation distances of 5–60 km to meet interference criteria. Conversely, China's analysis indicates that up to 210 km separation may be required for earth stations using non-geostationary satellites, suggesting careful consideration for coexistence.

(9) Meteorological-Satellite Service (Earth-to-space) (8,175-8,215 MHz)
Studies on sharing within the same band were submitted by Brazil. The analysis shows that interference levels remain well below protection criteria across multiple deployment models, indicating that coexistence between IMT and Meteorological-Satellite Service using geostationary satellites is feasible.

(10) Earth-Exploration Satellite Service (space-to-Earth) (8,025-8,400 MHz)
Studies on sharing within the same band were submitted by the United States, ESA, Germany–France, Ericsson, India, China, Brazil, Canada, and France. Analyses from the United States, ESA, Ericsson, and Canada suggest that interference can be mitigated through consideration of base station orientation and clutter loss, with relatively short separation distances (6–58 km) meeting protection criteria. Conversely, analyses from Germany–France and China indicate that up to 430 km separation may be required, highlighting interference concerns particularly for coexistence with non-geostationary Earth-Exploration satellites.

(11) Space Research Service (space-to-Earth) (8,400-8,500 MHz)
Studies on compatibility in adjacent bands were submitted by the United States, Brazil, India, China, and ESA. Analyses generally indicate that

separation distances of approximately 50–150 km can effectively suppress interference from IMT systems to earth stations of the Space Research Service (deep space) (space-to-Earth) (8,400–8,450 MHz).

(12) Earth-Exploration Satellite Service (Earth-to-space) (7,190-7,250 MHz)

Studies on sharing within the same band were submitted by Brazil. The analysis shows that interference from IMT systems to Earth-Exploration satellites can maintain sufficient margin relative to protection criteria.

### 2.2.3 Preliminary Views on WRC-27 Agenda Item 1.7 (7–8 GHz Band) by Regional Organizations

Regarding the 7,125–8,400 MHz band under WRC-27 Agenda Item 1.7, preliminary views have been presented by various regional organizations.

**European Conference of Postal and Telecommunications Administrations: CEPT**[45]

CEPT could consider an IMT identification of the frequency band 7,125–7,250 MHz if, and will oppose an IMT identification in the frequency range 7,250-8,400 MHz or parts thereof unless, the current and future operations of all existing primary allocated radiocommunication services in the frequency range 7,125-8,400 MHz and adjacent frequency bands shall be protected from harmful interference caused by IMT networks provided that:

- the continued operation of the incumbent's usage is guaranteed, especially taking into account the deployment of transportable stations in the FSS, MSS/MMSS on short notice and in any locations, within national relevant territories or in international spaces;
- communications from space stations to Earth stations of EESS (including transportable stations), SRS and METSAT can be protected globally, as this band is the main band used for collecting data from satellites;
- no additional regulatory, technical or operational restrictions are imposed on existing primary services, with special regards to those that are ensuring the implementation of space strategies and policies;
- the continued operations of FS deployed extensively in CEPT countries is

[45] CPG Chair - Presentation for Regional Groups June 2025 (version of 9 July 2025)

guaranteed.

CEPT also supports the need for measures to protect possible new primary EESS (passive) allocation in the frequency band 8.4–8.5 GHz under WRC-27 Agenda Item 1.19 in case of IMT identification.

**Regional Commonwealth in the Field of Communications: RCC**[46]

- 7,125–8,400 MHz band (Regions 1, 2, and 3):
  The RCC Administrations believe that the possibility of identifying the 7,125–8,400 MHz frequency band should be considered separately based on the Region and sub-band.
- 7,125–7,250 MHz band (Region 1):
  The RCC Administrations support ensuring the protection of existing stations of radio communication services from interference in the same and adjacent frequency bands based on the results of ITU-R compatibility studies. The identification of the frequency band 7,125–7,250 MHz or parts thereof for IMT systems shall not lead to changes in the conditions of use/allocation of the frequency bands for existing applications/services.
- 7,750–8,400 MHz band (Region 1):
  The RCC Administrations object to identification of all or part of the frequency band 7,750–8,400 MHz for IMT systems in Region 1.
- 7,125–8,400 MHz band (Regions 2 and 3):
  The RCC Administrations support ensuring protection of services to which the frequency band 7,125–8,400 MHz is allocated in Region 1. Identification of the frequency band 7,125–8,400 MHz or parts thereof for IMT systems in Region 2 and Region 3 should not lead to changes in the conditions of use/allocation of frequency bands for existing applications/services in Region 1. The RCC Administrations oppose the identification of the frequency band 7,900–8,400 MHz or parts thereof for IMT systems in Regions 2 and 3 due to the global nature of the satellite systems in this frequency band.

[46] Draft preliminary position of the RCC Administrations on the WRC-27 agenda items (version of 3 October 2025)

**African Telecommunications Union: ATU**[47]

ATU supports the studies under WRC-27 Agenda Item 1.7 with emphasis on the following:

- Ensure the protection of existing services, particularly Earth exploration-satellite systems in the 8,025–8,400 MHz band, Fixed Services in the 8,025–8,400 MHz and 14.8–15.35 GHz bands and radio altimeters in the 4,200–4,400 MHz bandas well as the worldwide Appendix 30B Plan in 4,500–4,800 MHz, without imposing any constraints or limitations on their operation.
- Consider the possibility of identifying the frequency bands under study, or parts thereof, for International Mobile Telecommunications (IMT) systems, based on the results of coexistence and compatibility studies with existing and adjacent services.

**Arab Spectrum Management Group : ASMG**[48]

Based on the results of the relevant studies, the identification of these frequency bands, or portions of them, for International Mobile Telecommunications (IMT) will be considered. This is contingent upon ensuring the protection of incumbent services, not imposing additional constraints on them, and ensuring compatibility with services in adjacent frequency bands.

**Inter-American Telecommunication Commission: CITEL**[49]

Eight administrations support the ongoing studies under WRC-27 agenda item 1.7, which aim to identify additional frequency bands for the terrestrial component of IMT. These administrations stress the need to ensure compatibility with existing services, address the growing demand for telecommunications, and promote equitable access to advanced mobile technologies, especially in developing regions.

They emphasize the importance of global and regional harmonization to lower deployment costs, foster innovation, and support a sustainable IMT ecosystem. The

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[47] Report of the 2nd ATU premaratory meeting for World Radiocommunication Conference 2027 (APM27-2)

[48] ASMG Work for WRC 27 Preparations

[49] Status of the preparation for WRC-27 after the 45th meeting of PCC.II (version of 30 June 2025)

administrations also highlight that the studies should enable the evolution of mobile broadband services and facilitate affordable, high-capacity connectivity for diverse applications and users, while respecting the requirements of incumbent services.

Progress within ITU-R WP 5D demonstrates engagement among Member States to develop sharing and compatibility studies, ensuring that any new IMT identifications balance technological advancement with the protection of existing systems and allow flexibility for national circumstances.

**Asia-Pacific Telecommunity : APT**[50]

APT Members support ITU-R sharing and compatibility studies in accordance with Resolution 256 (WRC-23).

### 2.2.4 Perspectives of Major Countries on WRC-27 Agenda Item 1.7 (7–8 GHz Band)

**Germany and the United Kingdom**[51]

Germany and the United Kingdom propose the following:

- CEPT could consider an IMT identification of the frequency band 7,125-7,250 MHz if studies can confirm the compliance to the above conditions.
- CEPT oppose an IMT identification in the frequency range 7,250 – 7,750 MHz or parts thereof – in Regions 2 and 3 - unless compliance with the above conditions can be demonstrated according to Resolution 256 (WRC-23). An IMT identification in 7,250 – 7,750 MHZ is excluded for Region 1 at WRC-27, which must be taken into account in the ITU-R studies.
- CEPT oppose an IMT identification in the frequency range 7,750-8,400 MHz or parts thereof, unless studies can confirm the above conditions.

**Finland**[52]

Finland proposes the following:

CEPT could consider an IMT identification of the frequency band 7,125-7,250 MHz if studies can confirm the compliance to the above conditions.

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[50] APT Preliminary Views on WRC-27 agenda items (as a result of APG27-2)

[51] ECC PT1(25)130_Germany_United Kingdom - Draft CEPT Brief on WRC-27 agenda item 1.7

[52] ECC PT1(25)153_Finland - Draft CEPT Brief on WRC-27 agenda item 1.7

CEPT may also develop a position for the frequency range 7,250-7,750 MHz in case sharing studies confirm that an IMT identification in 7,250-7,750 MHz in Regions 2 and 3 would jeopardize the operation of international services that are of interest for CEPT countries. An IMT identification in 7,250 – 7,750 MHz is excluded for Region 1 at WRC-27, but should be taken into account in the ITU-R studies.

CEPT would oppose an IMT identification in the frequency range 7,750-8,400 MHz or parts thereof, unless studies can confirm the above conditions.

**United States**[53]

The United States supports the sharing and compatibility studies called for in Resolution 256 (WRC-23), with a view to ensuring the protection of services to which the frequency bands are allocated on a primary basis, including in adjacent bands, as appropriate, without imposing additional regulatory or technical constraints on those services. The United States supports appropriate action at WRC-27 based on the outcome of studies.

[Reference[54]]“” On July 4, 2025, the BBB was signed into law. The bill:

– Restores the FCC’s general auction authority

– Establishes an ambitious spectrum pipeline by directing the FCC and the National Telecommunications and Information Administration (NTIA) to repurpose minimum quantities of spectrum on a specified timetable while leaving key details to the agencies themselves. In total, the bill directs the auction of no less than 800 megahertz and mandates an auction in the Upper C-band (3.98-4.2 GHz).

The OBBBA uses three mechanisms to establish a spectrum pipeline totalling at least 800 megahertz:

- Requiring NTIA and the FCC to repurpose at least 500 megahertz of federal spectrum within the 1.3-10.5 GHz range, excluding Lower 3 GHz and 7.4-8.4 GHz for the next 10 years, for full-power commercial use cases on the following timetable: Within two years of enactment, NTIA must identify at

[53] Update Report on CITEL PCC.II Activities (Document 5D/987, 15 October 2025) (ITU Account Required)

[54] Update on Activities in Region 2 (Document 5D/808, 17 September 2025) (ITU Account Required)

least 200 megahertz of federal spectrum for repurposing, which the FCC must auction within four years of enactment. Within four years of enactment, NTIA must identify any remaining frequencies to reach the 500-megahertz topline, which the FCC must auction within eight years of enactment.

- Requiring the FCC to auction at least 300 megahertz, on top of the 500 megahertz described above, before its authority expires in 2034 – including by auctioning at least 100 megahertz in the Upper C-band (3.98-4.2 GHz) within two years of enactment. Spectrum contributing to the 300-megahertz target can be federal, non-federal, or both.
- A $50 million appropriation (through FY2034) to fund NTIA's analysis of the 2.7-2.9 GHz, 4.4-4.9 GHz, and 7.25-7.4 GHz bands.

**Brazil, Colombia, Dominican Republic, Mexico, Peru**[53]

The administrations of Brazil, Colombia, Dominican Republic, Mexico and Peru support the studies under WRC-27 agenda item 1.7 on the possible identification of frequency band(s) for the terrestrial component of IMT, while ensuring compatibility with existing services, meeting emerging IMT demands, addressing the needs of developing countries, and considering the evolving landscape of technology and spectrally efficient techniques.

**India**[50]

India supports the frequency band 7,125-8,400 MHz (or parts thereof), in Region 2 and Region 3, based on the result of ITU-R studies, towards IMT identification while ensuring the protection of services to which this frequency band is allocated on a primary basis, without imposing additional regulatory or technical constraints on those services, and also on services in adjacent bands.

**China**[50]

China is of the view that the incumbent services allocated to the frequency band 7,125–8,400 MHz and adjacent frequency bands shall be fully protected, and not to be imposed additional technical and regulatory constraints.

China does not support the identification of the frequency band 7,125–8,400 MHz for the terrestrial component of IMT.

**Korea (Republic of)** [50]

The Republic of Korea supports sharing and compatibility studies in the frequency band 7,125-8,400 MHz. These studies should aim to develop necessary technical and regulatory conditions required for the operation of IMT systems, while ensuring the protection of services allocated on a primary basis in this frequency band, particularly FS, FSS and MSS. In addition, it should be ensured not to impose additional regulatory or technical constraints on the FS, FSS and MSS in these frequency bands.

The Republic of Korea suggests that APG27-2 discuss band by band (services) for potential IMT identification, considering the feasibility of sharing with other primary services across the entire 7,125–8,400 MHz band. It should be noted that WRC-23 identified for IMT in the frequency band 7,025-7,125 MHz.

**Australia**[50]

Australia supports ITU-R sharing and compatibility studies under Resolution 256 (WRC-23) to consider potential new IMT identifications. Any outcomes for this agenda item should be informed by complete and technically sound sharing and compatibility studies. Outcomes should appropriately take into account the protection requirements of primary services (both in-band and adjacent band) to ensure they are protected from interference without the impost of additional regulatory or technical constraints. This includes the protection of stations operating in international waters or airspace which cannot be registered in the MIFR.

# 3. FREQUENCY STATUS IN JAPAN FOR THE 6GHz AND 7-8 GHz BANDS

## 3. Frequency Status in Japan for the 6 GHz and 7–8 GHz Bands

This chapter presents an analysis of the usage status in Japan for the 6,425–7,125 MHz (6 GHz band) and 7,125–8,400 MHz (7–8 GHz band), as well as the status of consideration for use as 6G spectrum.

### 3.1 Usage Status of the 6 GHz Band(6,425 – 7,125 MHz)

In Japan, 6,425–7,125 MHz band is used for telecommunications, public services, general services, broadcasting services (fixed), broadcasting services (mobile), radio astronomy, and telecommunications services (fixed satellite), as shown in the figure[55].

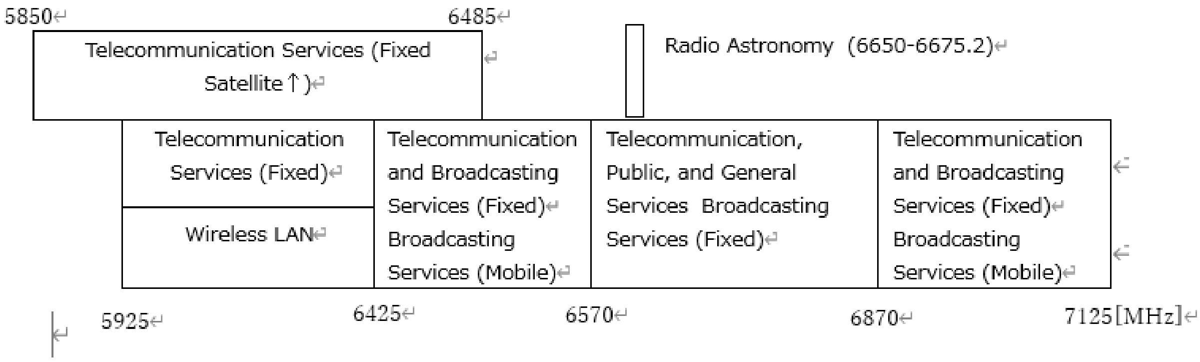


Figure 4: Usage Status of the 6 GHz Band

The fixed communication systems for telecommunications, public services, and general services (fixed) are utilized for public services (such as security, disaster prevention, and power supply) and telecommunications services (fixed communication lines), among others.

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[55] Frequency Allocation Table, Table 2（27.5MHz - 10000MHz）

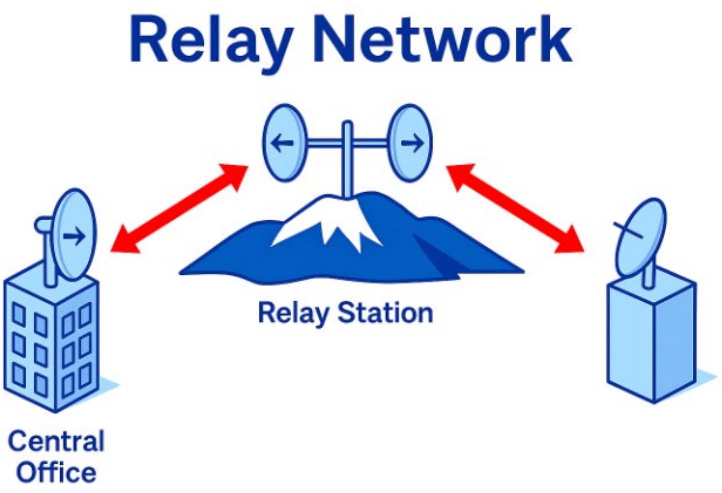



Figure 5: Fixed Communication System (Relay Network)

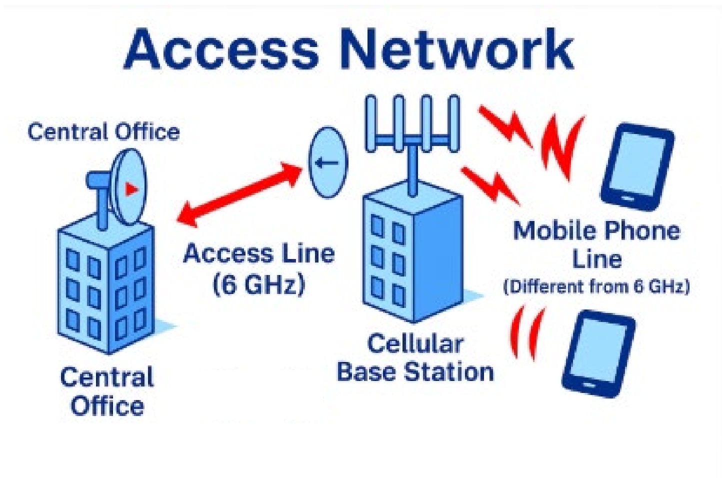
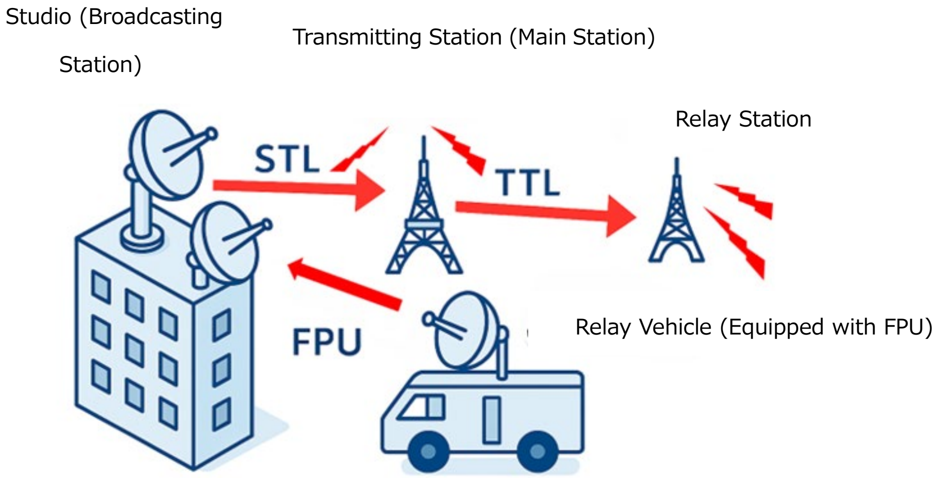



Figure 6: Fixed Communication System (Access Network)

The frequency bands for broadcasting services (fixed and mobile) are utilized in broadcast program relay systems. They are used for transmitting program contents between fixed locations such as studios (broadcast stations), transmission sites, and relay stations (fixed STL/TTL/TSL), as well as for relaying broadcast program contents from field relay vehicles to receiving base stations, including the transmission of video and audio (mobile FPU).




STL（Studio-Transmitter Link）：Fixed wireless link connecting the broadcasting studio and the transmitting station to deliver programs

TTL（Transmitter-Transmitter Link）：Fixed wireless link connecting transmitting stations to deliver programs

FPU（Field Pick-up Unit）：Broadcasting service radio station that transmits program video and audio from the reporting site (such as live news coverage) to the receiving base station

Figure 7: Broadcast Program Relay System

The satellite communication systems for telecommunications services (fixed satellite) are utilized for feeder links in mobile satellite communications, maritime applications (ESV), broadcast and communication backhaul, and other fixed satellite communications (uplink) using geostationary satellites.

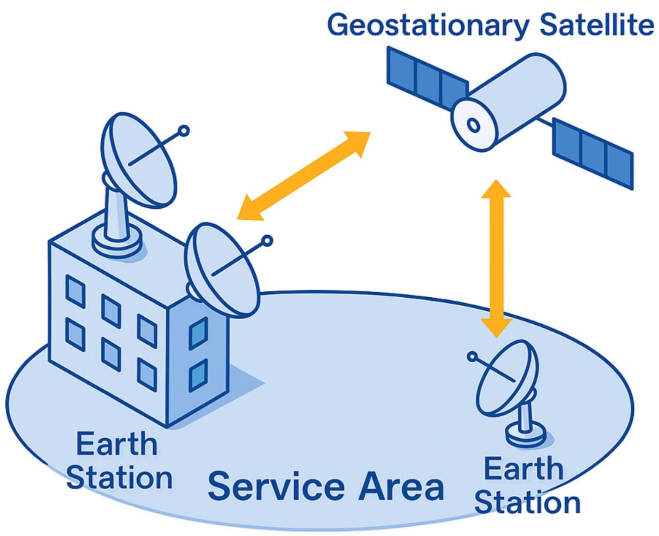



Figure 8: Satellite Communication System

The number of radio stations for each system[56] is as follows.

Table 4: Number of Radio Stations for 6 GHz Band Systems

| System | Number of Radio Stations |
|---|---|
| 6 GHz Band Fixed Radio System for Telecommunications | 126 |
| Satellite Uplink (excluding mobile satellite) (C Band, >5.85 GHz ≤6.57 GHz) | 35 |
| Video STL/TTL/TSL (C Band, 6,425–6,570 MHz) | 369 |
| Video FPU (C Band) | 2331 |
| 6.5 GHz Band Telecommunications, Public, and General Services (Relay/Entrance) | 2240 |
| 6.5 GHz Band Telecommunications, Public, and General Services (Relay/Entrance) (Public Use [Non-national]) | 77 |
| 6.5 GHz Band Telecommunications, Public, and General Services (Relay/Entrance) (Public Use [National]) | 1031 |
| Video STL/TTL/TSL (M Band, 6,570–6,870 MHz) | 122 |
| Audio STL/TTL/TSL (M Band) | 338 |
| Broadcast Monitoring and Control (M Band) | 238 |
| Video STL/TTL/TSL (D Band, 6,870–7,125 MHz) | 815 |
| Video FPU (D Band) | 2,869 |

As stated in the FY2024 Frequency Reorganization Action Plan[57] (Ministry of Internal Affairs and Communications), the technical conditions for spectrum sharing and expansion of the frequency band, including outdoor use of wireless LAN, are scheduled to be compiled by FY2025. Specifically, the use of an Automated Frequency Coordination (AFC) system is being considered to enable sharing with existing systems in 6,570–6,870 MHz band. On the other hand, for 6,425–6,570 MHz and 6,870–7,125 MHz bands, there is currently no prospect for spectrum sharing between existing systems and wireless LAN systems.

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[56] Evaluation Results on the Effective Use of Radio Waves in the FY2023 Survey on Radio Wave Utilization (Various Wireless Systems and Frequency Bands Above 714 MHz)

[57] Frequency Reallocation Action Plan

### 3.2 Usage Status of the 7–8 GHz Band (7,125 – 8,400 MHz)

In Japan, the 7,125–8,400 MHz band is used for telecommunications services, public services, general services, broadcasting services (fixed), earth exploration satellites, telecommunications and public services (fixed satellite), telecommunications and public services (mobile satellite), and ultra-wideband wireless systems (UWB), as shown in the figure[58] [59].

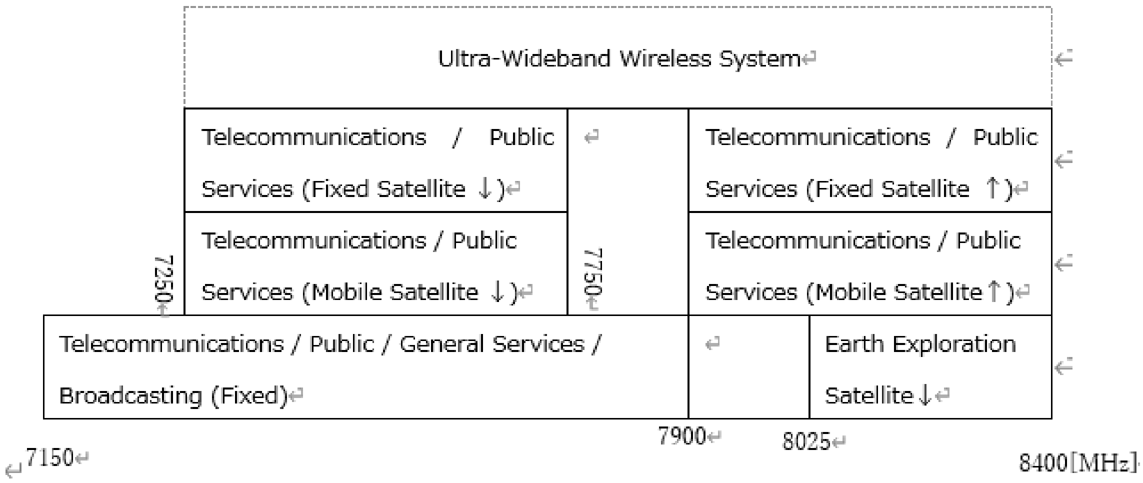


Figure 9: Usage Status of the 7–8 GHz Band

For broadcasting services (fixed), there are broadcast program relay circuits (STL/TTL). STL refers to program relay circuits connecting the broadcast station (studio) and the main station (transmitter), while TTL refers to program relay circuits connecting the main station (transmitter) or relay station (transmitter) to another relay station (transmitter). The 7,425–7,750 MHz range is used for video STL/TTL, and the 7,571–7,595 MHz and 7,731–7,743 MHz ranges are used for audio STL/TTL. This frequency band is referred to as the N band.

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[58] Frequency Allocation Table（27.5MHz - 10000MHz）
[59] Detailed Usage Status（3400～8500MHz）

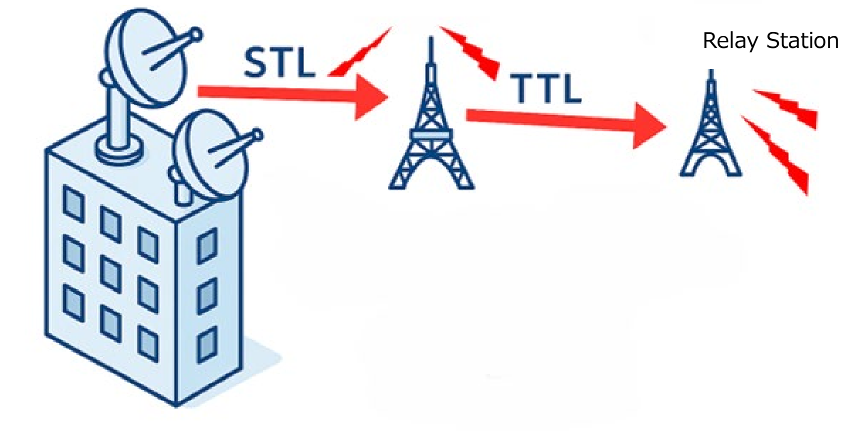


Figure 10: Broadcast Program Relay Circuits (STL/TTL)

On the other hand, the 7.5 GHz telecommunications, public, and general service systems (relay and entrance) are mainly used by national and local governments to transmit various types of information such as voice, data, and images (see Figures 5 and 6). The operating frequency band is 7,425 – 7,750 MHz, which offers excellent straight propagation, minimal attenuation due to rain or fog, and the ability to use a wide bandwidth. These characteristics make it suitable for medium- to long-distance communication. It is utilized as a backbone transmission path and as a prefectural branch transmission path for long spans of up to approximately 50 km.

The number of radio stations for each system is as follows:[60]

[60] Evaluation Results on the Effective Use of Radio Waves in the FY2023 Survey on Radio Wave Utilization (Various Wireless Systems and Frequency Bands Above 714 MHz)

Table 5: Number of Radio Stations for 7–8 GHz Band Systems

| System | Number of Radio Stations |
|---|---|
| 7.5 GHz Band – Telecommunications, Public, and General Services (Relay and Entrance) | 3369 |
| Video STL/TTL/TSL (N Band) | 59 |
| Audio STL/TTL/TSL (N Band) | 3 |

7,145–7,235 MHz is used for space research services (Earth-to-space), and earth stations exist domestically[61][62][63].

Ultra-Wideband (UWB) wireless systems are systems that transmit and receive radio waves at noise-level power by spreading extremely low power across a wide frequency band of about 500 MHz or more. In addition to high-speed data communication of several hundred Mbps, they enable high-precision positioning and object detection similar to radar by leveraging their wide bandwidth. Under the international standard for UWB systems, Channel 9 (center frequency: 7,987.2 MHz, occupied bandwidth: 499.2 MHz) is mandatory[64]. UWB systems must not cause harmful interference to other radio stations or receiving equipment operating under the frequency allocations, nor may they claim protection from harmful interference caused by other radio stations[65].

The bands allocated to telecommunications/public services (fixed satellite) and telecommunications/public services (mobile satellite) (7,250–7,750 MHz and

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61 Japan Aerospace Exploration Agency (JAXA) Misasa Deep Space Exploration Ground Station

62 Institute of Space and Astronautical Science (ISAS) Usuda Deep Space Observatory

63 Institute of Space and Astronautical Science (ISAS) Uchinoura Space Observatory

64 Report of the Land Mobile Radio Communications Committee, Information and Communications Technology Subcommittee

65 Frequency Allocation Plan – Frequency Table for Ultra-Wideband Wireless System Stations

7,900–8,400 MHz) are assumed to be used by X-band communication satellites[66][67].

8,025–8,400 MHz is used for data transmission from Earth exploration satellites to earth stations[68].

### 3.3 Status of Consideration as 6G Spectrum

SoftBank conducted outdoor trials in Tokyo using the 7,180–7,280 MHz band to verify its effectiveness as a frequency band for 6G. The results confirmed that wide-area coverage and stable, high-quality communication can be achieved even in dense urban environments[69].

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66 Ministry of Defense / Self-Defense Forces X-Band Satellite Communication Development Project

67 Basic Concept for the Next X-Band Satellite Communication Development Project

68 Detailed Usage Status (3,400–8,500 MHz) – Supplementary Explanation on Radio Wave Usage

69 SoftBank – Demonstration of the Effectiveness of Centimeter-Wave Bands in Urban Areas for 6G

# 4. CONCLUSION

## 4. Conclusion

To smoothly and sustainably introduce and deploy the sixth-generation mobile communication system (6G), which is expected to emerge around 2030, it is essential to secure new mid-band spectrum that can accommodate multiple blocks with bandwidths of approximately 200 to 400 MHz, while considering the balance of capacity and coverage.

In international discussions on mid-band spectrum, the ITU World Radiocommunication Conference in 2023 identified 6,425–7,125 MHz as an IMT band in Europe, Africa, the Middle East, and some other countries, and 7,025–7,125 MHz identified as an IMT band in the Asia-Pacific region. Furthermore, at the ITU World Radiocommunication Conference in 2027, the 7,125–8,400 MHz band is decided to be considered as a candidate band for IMT. Major overseas countries are already advancing studies to secure new IMT spectrum from among these bands. Therefore, considering global trends toward 6G introduction around 2030, the 6,425–7,125 MHz and 7,125–8,400 MHz bands are strong candidate bands for the mid-band range.

On the other hand, in Japan, the 6,425–7,125 MHz and 7,125–8,400 MHz bands are used by various existing radio systems, and there are challenges to be overcome for their use in 6G. Nevertheless, given that mobile communication systems are an indispensable infrastructure supporting social life and are deeply rooted in the daily lives and economic activities of the people, it is not desirable for the development of mobile communication systems, including 6G, in Japan to lag behind major overseas countries. It is necessary for the public and private sectors to work together to consider securing new spectrum for 6G from the 6,425–7,125 MHz and 7,125–8,400 MHz bands, taking into account the impact on existing systems, and to promptly present a roadmap for securing new mid-band spectrum.

# GLOSSARY OF ABBREVIATIONS

## Glossary of Abbreviations

| Abbreviation | Full Form |
|---|---|
| 3GPP | Third Generation Partnership Project |
| ANATEL | Agência Nacional de Telecomunicações |
| APG | APT Conference Preparatory Group |
| AfriSAP | African Spectrum Allocation Plan |
| B6GA | Bharat 6G Alliance |
| CEPT | European Conference of Postal and Telecommunications Administrations |
| DoT | Department of Telecommunications |
| EC | European Commission |
| ECA | European Common Allocation |
| ECC | Electronic Communications Committee |
| EIRP | Equivalent Isotropically Radiated Power |
| ERC | European Radiocommunications Committee |
| ERO | Earth Return Orbiter |
| ESV | Earth Stations on-board Vessels |
| EXOMARS | Exobiology on MARS |
| FCC | Federal Communications Commission |
| FR1 | Frequency Range 1 |
| FR2 | Frequency Range 2 |
| HERA | Human Exploration Research Analog |
| IMT | International Mobile Telecommunications |
| ITS | Intelligent Transport Systems |
| ITU | International Telecommunication Union |
| JUICE | JUpiter ICy moons Explorer |
| LPR | Level Probing Radar |
| MFCN | Mobile/Fixed Communications Networks |
| MIFR | Master International Frequency Register |
| MIMO | Multi-Input Multi-Output |
| NR | New Radio |
| OFCA | Office of the Communications Authority |

| Abbreviation | Full Form |
| --- | --- |
| BBB (One BBB Act) | Big Beautiful Bill |
| PT1 | Project Team 1 |
| PMSE | Programme Making and Special Events |
| RAN | Radio Access Network |
| RLAN | Radio Local Area Network |
| RSPG | Radio Spectrum Policy Group |
| TLPR | Tank Level Probing Radar |
| TRAI | Telecom Regulatory Authority of India |
| TRX | Transceiver |
| UWB | Ultra-Wideband |
| VSAT | Very Small Aperture Terminal |
| WAS | Wireless Access System |
| WRC | World Radiocommunication Conference |