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**APT REPORT ON**

**REPONSES TO THE QUESTIONNAIRE ON USAGE AND FUTURE PLAN OF FREQUENCY BANDS IN RELATION TO STUDIES ON WRC-19 AGENDA ITEM 1.13 IN ASIA-PACIFIC REGION**

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**No. APT/AWG/REP-90**

**APT REPORT ON**

**APT Report on Reponses to the Questionnaire on Usage and Future Plan of Frequency Bands in Relation to Studies on WRC-19 Agenda item 1.13 in Asia-Pacific Region**

1. **Introduction**

The World Radiocommunication Conference 2015 (WRC-15) approved WRC-19 agenda item 1.13:

***Agenda item 1.13:*** *to consider identification of frequency bands for the future development of International Mobile Telecommunications (IMT), including possible additional allocations to the mobile service on a primary basis, in accordance with Resolution****238 [COM6/20] (WRC‑15)***

***Resolution 238 [COM6/20] (WRC-15)****: Studies on frequency-related matters for International Mobile Telecommunications identification including possible additional allocations to the mobile services on a primary basis in portion(s) of the frequency range between 24.25 and 86 GHz for the future development of International Mobile Telecommunications for 2020 and beyond*

In Resolution **238 [COM6/20] (WRC-15)**, ITU-R is resolved to conduct the appropriate studies on the spectrum needs for the terrestrial component of IMT in the frequency range between 24.25 GHz and 86 GHz, and to conduct the appropriate sharing and compatibility studies[[1]](#footnote-1), taking into account the protection of services to which the band is allocated on a primary basis, for the frequency bands:

*- 24.25-27.5 GHz[[2]](#footnote-2), 37-40.5 GHz, 42.5-43.5 GHz, 45.5-47 GHz, 47.2-50.2 GHz, 50.4-52.6 GHz, 66-76 GHz and 81-86 GHz, which have allocations to the mobile service on a primary basis; and*

*- 31.8-33.4 GHz, 40.5-42.5 GHz and 47-47.2 GHz, which may require additional allocations to the mobile service on a primary basis,*

WRC-19 is resolved to consider identification of frequency bands for the terrestrial component of IMT; the bands to be considered being limited to part or all of the bands listed above.

CPM 19-1 decided to invite Study Group 5 to establish a Task Group (TG 5/1), in which all involved parties in the frequency bands and services mentioned in Resolution **238 [COM6/20] (WRC-15)** are invited to actively participate, as the responsible group for WRC-19 agenda item 1.13; and TG 5/1 is responsible for conducting the sharing and compatibility studies, in accordance with Resolution **238 [COM6/20] (WRC 15)**, based on input from ITU-R Working Party 5D, working parties of Study Group 3 and other involved working parties, and the development of draft CPM text under WRC-19 agenda item 1.13 and that it will submit such text directly to the CPM-19 process.

To facilitate the studies and developing APT positions in relation to WRC-19 agenda item 1.13 in APG, AWG-19 developed a questionnaire to collect information on usage and future plan as well as other relevant information for the following frequency bands in the Asia- Pacific Region:

24.25-27.5GHz, 31.8-33.4 GHz, 37-43.5 GHz, 45.5-50.2 GHz, 50.4-52.6 GHz, 66-76 GHz and 81-86 GHz.

It should be noted that this frequency bands list is the same as that within Resolution **238 [COM6/20] (WRC-15)**.

This questionnaire contains five questions to collect information of current spectrum usage, relative system characteristics, progress on sharing/compatibility studies in APT Members, and future plan on the concerned bands. The survey results obtained by compiling the responses from APT Members will be contributed to APG19-2, to facilitate the study in APG, and assist APT Members for their consideration on studies in relation to WRC-19 agenda item 1.13.

It should be noted that every APT Member may not respond to all the questions and/or concerned frequency bands.

1. **Summary of the respondents**

The following APT Members provided their responses to the questionnaire:

1. Japan (AWG-20/INP-18)
2. Islamic Rep. of Iran (AWG-20/INP-27)
3. Singapore (AWG-20/INP-67)
4. Korea (Republic of) (AWG-20/INP-74), and further in (AWG-21/INP-70)
5. Socialist Republic of Viet Nam (AWG-20/INP-90), and further in (AWG-23/INP-68)
6. Thailand (AWG-20/INP-97)
7. Australia (AWG-21/INP-20)
8. Malaysia (AWG-21/INP-28)
9. China Peoples Republic of (AWG-21/INP-29), and further in (AWG-22/INP-88)
10. Republic of Indonesia (AWG-21/INP-85)
11. Lao PDR (AWG-22/INP-56)
12. New Zealand (AWG-23/INP-27)
13. Philippines (AWG-23/INP-57)
14. Bangladesh (AWG-23/INP-110)
15. India (AWG-24/INP-47)
16. **List of questions**

**Question 1:** What is/are current allocation(s) (e.g. mobile service, fixed service, mobile-satellite service), application(s) (e.g. CDMA, UMTS, LTE, GMR, EGAL, etc.) and assigned/licensed in the bands listed above (or part(s) bands) in your country?

**Question 2:** Please describe technical and operational characteristics of the existing services/applications that would be necessary for consideration in sharing/compatibility studies of applications in the bands listed above (or part(s) bands). For the system characteristics, for example, relevant information based on Table X and/or reference to ITU-R Report/Recommendation or Regulation/Rule/study in your country can be provided.

**Question 3:** What are the main concerned allocation and applications to be protected including within and adjacent to this range, and the type and extent of current use?

**Question 4:** Do you have planned or potential future services and applications in the bands listed above (or part(s) bands), if YES, what is/are planned or potential future services and applications in the bands?

**Question 5**: Do you have any additional issue to be addressed for the bands listed above (or part(s) bands)? What is the issue?

1. **Summary of Questionnaire Responses**

*[Editor’s note: The following summary is further reviewed at the future AWG meetings.]*

**24.25-27.5 GHz**

The main services/applications used in this frequency band are fixed links, SRD (short range device), automotive radar, FSS (Earth-to-space) (27-27.5GHz) – nearly half of the responding administrations have these applications in at least a part of the band. Other services/applications in some countries include EESS (space-to-Earth), space research, inter-satellite links and radionavigation. Main concerned services/applications to be protected include fixed links, SRD, automotive radar, space research service, and FSS (Earth-to-space) (27-27.5GHz).

Most of the responding administrations do not have specific future plans for these frequency bands. However, some of them are considering use of satellite applications, while one administration plans to use a part of the band for 5G applications, and one administration prioritizes this band for study of AI 1.13 and is conducting the preliminary sharing studies.

**31.8-33.4 GHz**

Some of the responding administrations indicated that this frequency band has no applications. Other services/applications in some countries include space research (deep space), radionavigation, radar and FS PTP(point-to-point) system. Main concerned services/applications to be protected include fixed links and space research earth station receivers, as well as the passive services allocated in the adjacent frequency band 31.5-31.8 GHz.

Most of the responding administrations do not have specific future plans for these bands. One administration may consider the requirement of high capacity network, and deep space research (space-to-Earth) and inter-satellite link.

**37-43.5 GHz**

The main applications used in this frequency band are fixed links – half of the responding administrations report this application is used in a part of the band. Other services/applications in some countries include fixed satellite, space research and radio astronomy. Main concerned services/applications to be protected include fixed links and the passive services allocated in the adjacent frequency band.

Most of the responding administrations do not have specific future plans for these bands, while one administration has the experimental station for 5G and one administration prioritizes this band for study of AI 1.13 and is conducting the preliminary sharing studies. And one administration may consider the requirements of high capacity dense network for fixed service in the frequency bands 37-40 GHz.

**45.5-50.2 GHz and 50.4-52.6 GHz**

The main applications used in this frequency band are fixed links. Other services/applications in some countries include BWA (broadband wireless access), Amateur Radio (47-47.2 GHz), radio astronomy. Main concerned services/applications to be protected include fixed links and amateur service, as well as the passive services allocated in the adjacent frequency bands.

Most of the responding administrations do not have specific future plans for these bands.

**66-76 GHz and 81-86 GHz**

The main applications used in this frequency band are fixed links – more than half of the responding administrations report this application is used in a part of the band. Other applications used in some countries include SRD, high speed wireless transmission system in the mobile service. Main concerned services/applications to be protected include fixed links and passive services in the adjacent frequency band.

Most of the responding administrations do not have specific future plans for these bands. And one administration was recommended this spectrum for backhaul.

**Annex 1**

**24.25-27.5 GHz**

**Question 1:**

What is/are current allocation(s) (e.g. mobile service, fixed service, mobile-satellite service), application(s) (e.g. CDMA, UMTS, LTE, GMR, EGAL, etc.) and assigned/licensed in the bands listed above (or part(s) bands) in your country?

**Answer**

1. **Japan**

| **Frequency**  **Ranges (GHz)** | **Sub Ranges (GHz)** | **Service** | **Applications** | **Status** |
| --- | --- | --- | --- | --- |
| 24.25-27.5 | 24.25-24.45  FIXED  MOBILE RADIONAVIGATION | 1. FIXED  (24.25-24.75, 25.25-27GHz) |  |  |
| 2. MOBILE  (24.25-27.5GHz) |  |  |
| 3. RADIONAVIGATION  (24.25-24.65GHz) | ASDE (Airport Surface Detection Equipment) |  |
| 24.45-24.65  FIXED  MOBILE  INTER-SATELLITE  RADIONAVIGATION | 1. FIXED  (24.25-24.75, 25.25-27GHz) |  |  |
| 2. MOBILE  (24.25-27.5GHz) |  |  |
| 3. INTER-SATELLITE  (24.45-24.75, 25.25-27.5GHz) |  |  |
| 4. RADIONAVIGATION  (24.25-24.65GHz) | ASDE(Airport Surface Detection Equipment) |  |
| 24.65-24.75  FIXED  MOBILE  FIXED-SATELLITE  (Earth-to-Space)  INTER-SATELLITE | 1. FIXED  (24.25-24.75, 25.25-27GHz) |  |  |
| 2. MOBILE  (24.25-27.5GHz) |  |  |
| 3. FIXED-SATELLITE  (Earth-to-Space)  (24.65-25.25, 27-27.5GHz) |  |  |
| 4. INTER-SATELLITE  (24.45-24.75, 25.25-27.5GHz) |  |  |
| 24.75-25.25  FIXED-SATELLITE  (Earth-to-Space) MOBILE | 1. MOBILE  (24.25-27.5GHz) | Low Power Data transmission system |  |
| 2. FIXED-SATELLITE  (Earth-to-Space)  (24.65-25.25, 27-27.5GHz) |  |  |
| 25.25-25.5  FIXED  INTER-SATELLITE  MOBILE  Standard Frequency and Time Signal-Satellite (Earth-to-Space) | 1. FIXED(24.25-24.75, 25.25-27GHz) | Fixed Wireless Access System |  |
| 2. INTER-SATELLITE  (24.45-24.75, 25.25-27.5GHz) |  |  |
| 3. MOBILE  (24.25-27.5GHz) |  |  |
| 4. Standard Frequency and Time Signal-Satellite (Earth-to-Space)  (25.25-27GHz) |  |  |
| 25.5-27  FIXED  INTER-SATELLITE  MOBILE  EARTH EXPLORATION SATELLITE (Space-to-Earth)  SPACE RESARCH (Space-to-Earth)  Standard Frequency and Time Signal-Satellite (Earth-to-Space) | 1. FIXED  (24.25-24.75, 25.25-27GHz) | Fixed Wireless Access System |  |
| 2. INTER-SATELLITE  (24.45-24.75, 25.25-27.5GHz) |  |  |
| 3. MOBILE  (24.25-27.5GHz) |  |  |
| 4. EARTH EXPLORATION SATELLITE (Space-to-Earth)  (25.5-27GHz) |  |  |
| 5. SPACE RESARCH (Space-to-Earth)  (25.5-27GHz) |  |  |
| 6. Standard Frequency and Time Signal-Satellite (Earth-to-Space)  (25.25-27GHz) |  |  |
| 27-27.5  FIXED-SATELLITE  (Earth-to-Space)  INTER-SATELLITE  MOBILE | 1. FIXED-SATELLITE(Earth-to-Space)  (24.65-25.25, 27-27.5GHz) | Satellite Communications (uplink) |  |
| 2. INTER-SATELLITE  (24.45-24.75, 25.25-27.5GHz) |  |  |
| 3. MOBILE  (24.25-27.5GHz) | Low Power Data transmission system |  |

1. *The applications listed in the table above are based on “the Survey of Actual Radio Spectrum Utilization” conducted in 2015. It should be noted that other radio stations of the allocated services may be used in the respective frequency bands.*
2. *24.25-27.5GHz UWB radio system: allocated to the radiolocation service*
3. **Islamic Republic of Iran**

| **Frequency**  **Ranges (GHz)** | **Sub Ranges (GHz)** | **Service** | **Applications** | **Status** |
| --- | --- | --- | --- | --- |
| 24.25-27.5 | 24.25-27.5 | Fixed | PTP for Backhaul | Cellular Mobile & FWA Operator, etc |

1. **Singapore**

| **Frequency**  **Ranges (GHz)** | **Sub Ranges (GHz)** | **Service** | **Applications** | **Status** |
| --- | --- | --- | --- | --- |
| 24.25-27.5 | - | None | None | NA |

1. **Korea (Republic of)**

| **Frequency**  **Ranges (GHz)** | **Sub Ranges (GHz)** | **Service** | **Applications** | **Status** |
| --- | --- | --- | --- | --- |
| 24.25-27.5 | 24.25-24.45 | FIXED,  MOBILE | SRD | Unlicensed Band / Flexible Access Common Spectrum |
| The device for “Automotive radar” can be installed until 31th Dec. 2021 and this can be used until lifetime of this device. |
| 24.45-24.65 | FIXED,  MOBILE,  INTER-SATELLITE | SRD | Unlicensed Band / Flexible Access Common Spectrum |
| The device for “Automotive radar” can be installed until 31th Dec. 2021 and this can be used until lifetime of this device. |
| 24.65-24.75 | FIXED,  INTER-SATELLITE,  MOBILE,  FIXED-SATELLITE (Earth to space), | SRD | Unlicensed Band / Flexible Access Common Spectrum |
| The device for “Automotive radar” can be installed until 31th Dec. 2021 and this can be used until lifetime of this device. |
| 24.75-25.25 | FIXED,  FIXED-SATELLITE (Earth to space),  MOBILE | SRD | The device for “Automotive radar” can be installed until 31th Dec. 2021 and this can be used until lifetime of this device. |
| 25.25-25.5 | FIXED,  MOBILE,  INTER-SATELLITE | SRD | The device for “Automotive radar” can be installed until 31th Dec. 2021 and this can be used until lifetime of this device. |
| 25.5-26.5 | FIXED,  MOBILE,  INTER-SATELLITE,  EARTH EXPLORATION SATELLITE, | Broadband WLL Systems, |  |
| SRD | The device for “Automotive radar” can be installed until 31th Dec. 2021 and this can be used until lifetime of this device. |
| 26.5-27 | FIXED,  MOBILE,  INTER-SATELLITE,  EARTH EXPLORATION SATELLITE, | CATV Distribution Systems, |  |
| Experimental Station for 5G | Experimental license |
| 27-27.5 | FIXED,  MOBILE,  FIXED-SATELLITE (Earth to space),  INTER-SATELLITE | CATV Distribution Systems, |  |
| Experimental Station for 5G | Experimental license |

1. **Socialist Republic of Viet Nam**

| **Frequency**  **Ranges (GHz)** | **Sub Ranges (GHz)** | **Service** | **Applications** | **Status** |
| --- | --- | --- | --- | --- |
| 24.25-27.5 | 24.5-24.45 | 1. FIXED | Fixed links |  |
| 2. MOBILE |  |  |
| 3. RADIO NAVIGATION |  |  |
| 24.45-24.65 | 1. FIXED |  |  |
| 2. MOBILE |  |  |
| 3. INTER-SATELLITE |  |  |
| 4. RADIO NAVIGATION |  |  |
| 24.65-24.75 | 1. FIXED | Fixed links |  |
| 2. FIXED SATELLITE (earth to space) |  |  |
| 3. INTER-SATELLITE |  |  |
| 4. MOBILE |  |  |
| 24.75-25.25 | 1. FIXED | Fixed links |  |
| 2. MOBILE |  |  |
| 3. FIXED SATELLITE (earth to space) |  |  |
| 25.25-25.5 | 1. FIXED | Fixed links |  |
| 2. MOBILE |  |  |
| 3. INTER-SATELLITE |  |  |
| STANDARD FREQUENCY AND TIME SIGNAL-SATELLITE (earth to space) |  |  |
| 25.5-27 | 1. FIXED | Fixed links |  |
| 2. MOBILE |  |  |
| 3. INTER-SATELLITE |  |  |
| 4. EARTH EXPLORATION SATELLITE (space to earth) |  |  |
| 5. SPACE RESEARCH |  |  |
| STANDARD FREQUENCY AND TIME SIGNAL-SATELLITE (earth to space) |  |  |
| 27-27.5 | 1. FIXED | Fixed links |  |
| 2. FIXED SATELLITE (earth to space) |  |  |
| 3. MOBILE |  |  |
| 4. INTER-SATELLITE |  |  |

1. **Thailand**

| **Frequency**  **Ranges (GHz)** | **Sub Ranges (GHz)** | **Service** | **Applications** | **Status** |
| --- | --- | --- | --- | --- |
| 24.25-27.5 | 24.25-24.45 | RADIONAVIGATION |  |  |
| FIXED |  |  |
| MOBILE |  |  |
| 24.45-24.65 | FIXED |  |  |
| INTER-SATELLITE |  |  |
| MOBILE |  |  |
| RADIONAVIGATION |  |  |
| 24.65-24.75 | FIXED |  |  |
| FIXED-SATELLITE |  |  |
| INTER-SATELLITE |  |  |
| MOBILE |  |  |
| 24.75-25.25 | FIXED |  |  |
| FIXED-SATELLITE |  |  |
| MOBILE |  |  |
| 25.25-25.5 | FIXED |  |  |
| INTER-SATELLITE |  |  |
| MOBILE |  |  |
| Standard frequency and time signal- satellite (Earth-to-space) |  |  |
| 25.5-27 | EARTH EXPLORATION-SATELLITE (space-to-Earth) |  |  |
| FIXED |  |  |
| INTER-SATELLITE |  |  |
| MOBILE |  |  |
| SPACE RESEARCH (space-to-Earth) |  |  |
| Standard frequency and time signal- satellite |  |  |
| 27-27.5 | FIXED |  |  |
| FIXED-SATELLITE (Earth-to-space) | FSS | Commercial Operators |
| INTER-SATELLITE |  |  |
| MOBILE |  |  |

1. **Australia**

| **Frequency**  **Ranges (GHz)** | **Sub Ranges**  **(GHz)** | **Service**  **(Please indicate frequency range(s) for each service)** | **Applications** | **Status**  **(e.g. Commercial Operator/ License duration)** |
| --- | --- | --- | --- | --- |
| 24.25-27.5 | 24.25-24.45 | RADIONAVIGATION,  FIXED,  MOBILE | Short Range Devices (SRDs) incl. UWB vehicle radar, RFID, low power radio-determination, as well as body scanners\* | SRDs authorised by [*Radiocommunications (Low Interference Potential Devices) Class Licence 2015*](https://www.legislation.gov.au/Details/F2016C00432) (the LIPD Class Licence), and must comply with listed technical conditions and associated standards. LIPD devices operate on no interference and no protection basis to and from other radiocommunication services.  Body scanners\* |
| 24.45-24.65 | FIXED,  MOBILE,  INTER-SATELLITE,  RADIONAVIGATION |
| 24.65-24.75 | FIXED,  INTER-SATELLITE,  MOBILE,  FIXED-SATELLITE (Earth-to-space) | Body scanners\* | Body scanners\* |
| 24.75-25.25 | FIXED,  FIXED-SATELLITE (Earth-to-space),  MOBILE | Body scanners\* | Body scanners\* |
| 25.25-25.5 | FIXED,  MOBILE,  INTER-SATELLITE | Body scanners\* | Body scanners\* |
| 25.5-27 | FIXED,  MOBILE,  INTER-SATELLITE,  EARTH EXPLORATION SATELLITE (space-to-Earth),  SPACE RESEARCH (space-to-Earth) | Body scanners\* | Body scanners\* |
| Space research Earth station receivers | Currently limited to 2 locations, support ESA/NASA/CSIRO operations, planned long term use under treaty agreements |
| 27-27.5 | FIXED,  MOBILE,  FIXED-SATELLITE (Earth-to-space),  INTER-SATELLITE | Body scanners\* | Body scanners\* |
| Gateway Earth stations | A number of licensed satellite systems in this band: some commercial, some government owned |

**\*** Body scanners are currently authorised by individual, ongoing apparatus licences held by government agencies involved in public safety and national security. Currently limited to international airports (this is under review).

1. **Malaysia**

| **Frequency**  **Ranges** | **Sub Ranges** | **Service**  **(Please indicate frequency range(s) for each service)** | **Applications** | **Status**  **(e.g. Commercial Operator/ License duration)** |
| --- | --- | --- | --- | --- |
| 24.25-27.5 GHz | 24.25 – 24.45 GHz | RADIONAVIGATION  FIXED  MOBILE | 1. Fixed Wireless Access 2. Automotive Radar | Commercial |
| 24.45-24.65 GHz | FIXED  INTER-SATELLITE  MOBILE  RADIONAVIGATION |  |  |
| 24.65-24.75  GHz | FIXED  FIXED-SATELLITE  (Earth-to-space)  INTER-SATELLITE  MOBILE |  |  |
| 24.75-25.25  GHz | FIXED  FIXED-SATELLITE  (Earth-to-space)  MOBILE |  |  |
| 25.25-25.5  GHz | FIXED  INTER-SATELLITE  MOBILE |  |  |
| 25.5-27  GHz | EARTH EXPLORATION-SATELLITE  (space-to-Earth)  FIXED  INTER-SATELLITE  MOBILE  SPACE RESEARCH  (space-to-Earth) | 1. Fixed Wireless Access 2. Automotive Radar | Commercial |
| 27-27.5  GHz | FIXED  FIXED-SATELLITE  (Earth-to-space)  INTER-SATELLITE MOBILE | 1. Fixed Wireless Access 2. Broadband VSAT, Broadband Gateway, Backhaul, Satellite News Gathering 3. Automotive Radar | Commercial |

1. **China**

The service allocation information is based on CHINA’s National Spectrum Allocation (2014 version).

| **Frequency**  **Ranges** | **Sub Ranges** | **Service**  **(Please indicate frequency range(s) for each service)** | **Applications** | **Status**  **(e.g. Commercial Operator/ License duration)** |
| --- | --- | --- | --- | --- |
| 24.25-27.5 GHz | 24.25-24.45 | 1. RADIONAVIGATION | Radionavigation system |  |
| 2. FIXED |  |  |
| 3. MOBILE |  |  |
| 4. RADIOLOCATION | Radar |  |
| 24.45-24.65 | 1. FIXED | LMDS |  |
| 2. INTER-SATELLITE | Inter Satellite Link | NewStar etc. |
| 3. MOBILE |  |  |
| 4. RADIONAVIGATION | Radionavigation system |  |
| 5. radiolocation | Radar |  |
| 24.65-24.75 | 1. FIXED | LMDS |  |
| 2. FIXED-SATELLITE (Earth-to-space) | FIXED-SATELLITE | China Satcom |
| 3. INTER-SATELLITE | Inter Satellite Link | NewStar etc. |
| 4. MOBILE |  |  |
| 24.75-25.25 | 1. FIXED | LMDS |  |
| 2. FIXED-SATELLITE (Earth-to-space) | FIXED-SATELLITE | China Satcom  CESEC |
| 3. MOBILE |  |  |
| 25.25-25.5 | 1. FIXED | LMDS |  |
| 2. INTER-SATELLITE | Data Relay Satellite | NewStar etc. |
| 3. MOBILE |  |  |
| 4. Standard frequency and time signal-satellite (Earth-to-space) |  |  |
| 25.5-27 | 1. EARTH EXPLORATION-SATELLITE (space-to Earth) | Data Transmission | China Meteorological Administration |
| 2. FIXED | LMDS |  |
| 3. INTER-SATELLITE | Data Relay Satellite | NewStar etc. |
| 4. MOBILE |  |  |
| 5. SPACE RESEARCH (space-to-Earth) | Space Research Receiving Station | CSSAR  CNSA |
| 6. Standard frequency and time signal-satellite (Earth-to-space) |  |  |
| 27-27.5 | 1. FIXED |  |  |
| 2. FIXED-SATELLITE (Earth-to-space) | FIXED-SATELLITE | China Satcom  CESEC |
| 3. INTER-SATELLITE | Data Relay Satellite | NewStar etc. |
| 4. MOBILE |  |  |

1. **Indonesia**

| **Frequency**  **Ranges** | **Sub Ranges** | **Service**  **(Please indicate frequency range(s) for each service)** | **Applications** | **Status**  **(e.g. Commercial Operator/ License duration)** |
| --- | --- | --- | --- | --- |
| **24.25-27.5 GHz** | 24.25–24.45 GHz | RADIONAVIGATION  FIXED  MOBILE |  |  |
|  | 24.45–24.65 GHz | FIXED  INTER-SATELLITE  MOBILE  RADIONAVIGATION |  |  |
|  | 24.65–24.75 GHz | FIXED  FIXED SATELLITE (Earth to space)  INTER-SATELLITE  MOBILE |  |  |
|  | 24.75–25.25 GHz | FIXED  FIXED SATELLITE  (Earth to space)  MOBILE |  |  |
|  | 25.25–25.5 GHz | FIXED  INTER-SATELLITE  MOBILE  Standard frequency and time signal-satellite (Earth-to-space) |  |  |
|  | 25,5–27GHz | EARTH EXPLORATION-SATELLITE (space-to Earth)  FIXED  INTER-SATELLITE  MOBILE  SPACE RESEARCH (space-to-Earth)  Standard frequency and time signal-satellite (Earth-to-space) |  |  |
|  | 27–27.5GHz | FIXED  FIXED-SATELLITE (Earth-to-space)  INTER-SATELLITE  MOBILE |  |  |

1. **Lao PDR**

| **Frequency**  **Ranges** | **Sub Ranges** | **Service**  **(Please indicate frequency range(s) for each service)** | **Applications** | **Status**  **(e.g. Commercial Operator/ License duration)** |
| --- | --- | --- | --- | --- |
| 24.25-27.5 GHz | 24.25-24.45 | 1. RADIONAVIGATION | None | - |
| 2. FIXED | None | - |
| 3. MOBILE | None | - |
|  | None | - |
| 24.45-24.65 | 1. FIXED | None | - |
| 2. INTER-SATELLITE | None | - |
| 3. MOBILE | None | - |
| 4. RADIONAVIGATION | None | - |
|  | None | - |
| 24.65-24.75 | 1. FIXED | None | - |
| 2. FIXED-SATELLITE (Earth-to-space) | None | - |
| 3. INTER-SATELLITE | None | - |
| 4. MOBILE | None | - |
| 24.75-25.25 | 1. FIXED | None | - |
| 2. FIXED-SATELLITE (Earth-to-space) | None | - |
| 3. MOBILE | None | - |
| 25.25-25.5 | 1. FIXED | None | - |
| 2. INTER-SATELLITE | None | - |
| 3. MOBILE | None | - |
| 4. Standard frequency and time signal-satellite (Earth-to-space) | None | - |
| 25.5-27 | 1. EARTH EXPLORATION-SATELLITE (space-to Earth) | None | - |
| 2. FIXED | None | - |
| 3. INTER-SATELLITE | None | - |
| 4. MOBILE | None | - |
| 5. SPACE RESEARCH (space-to-Earth) | None | - |
| 6. Standard frequency and time signal-satellite (Earth-to-space) | None | - |
| 27-27.5 | 1. FIXED | None | - |
| 2. FIXED-SATELLITE (Earth-to-space) | None | - |
| 3. INTER-SATELLITE | None | - |
| 4. MOBILE | None | - |

1. **New Zealand**

| **Frequency**  **Ranges** | **Sub Ranges** | **Service**  **(Please indicate frequency range(s) for each service** | **Applications** | **Status(e.g. Commercial Operator/ License duration)** |
| --- | --- | --- | --- | --- |
| 24.25-27.5 GHz | 24.25-24.65 GHz | FIXED  MOBILE  RADIONAVIGATION | 24.549-25.392 GHz Private Management Rights – planned for Local Multipoint Distribution Services (LMDS) and fixed services  22-26.625 GHz Short Range Vehicular Radar | Private management right ([Radio Spectrum Auctions](https://www.rsm.govt.nz/projects-auctions/spectrum-auctions) )  [[General User Radio Licence for Vehicular Radar Short Range Devices](http://www.rsm.govt.nz/about-rsm/spectrum-policy/gazette/gurl/vehicular-radar-short-range-devices)](http://www.rsm.govt.nz/about-rsm/spectrum-policy/gazette/gurl/vehicular-radar-short-range-devices) |
| 24.65-24.75 GHz | FIXED  FIXED-SATELLITE (Earth-to-space)  MOBILE |
| 24.75-25.25 GHz | FIXED  FIXED-SATELLITE (Earth-to-space)  MOBILE |
| 25.25-25.5 GHz | FIXED  MOBILE |
| 25.5-27 GHz | EARTH EXPLORATION-  SATELLITE(space-to-Earth)  FIXED  MOBILE | 25.557-26.4 GHz Private Management Rights  26.4-28.35 GHz Private Management Rights (expired since 14 January 2018)  27-29.5 GHz Fixed satellite “Ka” band – uplink | Private management right ([Radio Spectrum Auctions](https://www.rsm.govt.nz/projects-auctions/spectrum-auctions))  Administrative radio licensing ([PIB 58: Radio Licence Policy Rules](http://www.rsm.govt.nz/online-services-resources/publications/pibs/58)) |

1. **Philippines**

| **Frequency**  **Ranges** | **Sub Ranges** | **Service**  **(Please indicate frequency range(s) for each service)** | **Applications** | **Status**  **(e.g. CommercialOperator/ License duration)** |
| --- | --- | --- | --- | --- |
| 24.25-27.5 GHz | 25.35 - 28.35 GHz | Local Multipoint Distribution System (LMDS) | Broadcast / Wireless Cable |  |

1. **Bangladesh**

| **Frequency Ranges** | **Sub Ranges** | **Service (Please indicate frequency range(s) for each service)** | **Applications** | **Status (e.g. Commercial Operator/ License duration)** |
| --- | --- | --- | --- | --- |
| 24.25-27.5 GHz | 24.25-24.45 GHz | 1. FIXED | Fixed Links | Commercial Operator |
| 2. MOBILE |
| 24.45-24.50 GHz | 1. FIXED |
| 2. MOBILE |
| 3. RADIONAVIGATION |
| 24.50-24.65 GHz | 1. FIXED |
| 2. RADIONAVIGAION |
| 24.65-24.75 GHz | 1. FIXED |
| 24.75-25.25 GHz | 1. FIXED |
| 25.25-25.50 GHz | 1. FIXED |
| 2. MOBILE |
| 3. INTER SATELLITE |
| 25.50-26.50 GHz | 1. FIXED |
| 2. INTER SATELLITE |
| 3. MOBILE |
| 4. SPACE RESERCH (S/E) |
| 5. Earth exploration satellite (S/E) |
| 26.50-27.00 GHz | 1. FIXED |
| 2. INTER SATELLITE |
| 3. MOBILE |
| 4. SPACE RESERCH (S/E) |
| 5. Earth exploration satellite (S/E) |
| 27.00-27.50 GHz | 1. FIXED | FSS |
| 2. INTER SATELLITE |

1. **India**

| **Frequency**  **Ranges** | **Sub Ranges** | **Service**  **(Please indicate frequency range(s) for each service)** | **Applications** | **Status**  **(e.g. Commercial Operator/ License duration)** |
| --- | --- | --- | --- | --- |
| 24.25-27.5 GHz | 24.25-24.45 GHz | FIXED  MOBILE  RADIONAVIGATION | Requirements of  EESS Earth Station downlink operation in 25.5.-27.0 GHz at few locations may be protected. |  |
| 24.45-24.65 GHz | FIXED  MOBILE  RADIONAVIGATION  INTER-SATELLITE |
| 24.65-24.75 GHz | FIXED  INTER-SATELLITE  MOBILE |
| 24.75-25.25 GHz | FIXED  FIXED-SATELLITE  MOBILE |
| 25.25-25.5 GHz | FIXED  INTER-SATELLITE  MOBILE |
| 25.5-27 GHz | EARTH EXPLORATION- SATELLITE(space-to-Earth)  FIXED  MOBILE  INTER-SATELLITE  SPACE RESEARCH  Standard Frequency and Time Signal-Satellite (Earth-to-space) | Metrological Satellites deployed |
| 27-27.5 GHz | FIXED  FIXED-SATELLITE (Earth-to-space)  INTER-SATELLITE  MOBILE | 27 -29.5 GHz Fixed satellite “Ka” band – uplink | “Ka” Band uplink feeders |

**Question 2:**

Please describe technical and operational characteristics of the existing services/applications that would be necessary for consideration in sharing/compatibility studies of applications in the bands listed above (or part(s) bands). For the system characteristics, for example, relevant information based on Table X and/or reference to ITU-R Report/Recommendation or Regulation/Rule/study in your country can be provided.

**Answer**

| **Country** | **Sub**  **Ranges (GHz)** | **Applications** | **System Characteristics** |
| --- | --- | --- | --- |
| Japan | 24.25-27.5 |  |  |
| Islamic Rep. of Iran | 24.25-27.5 | Fixed (PTP for Backhaul) | ITU-R F.748  R.R Appendices 2&3 |
| Singapore | None | None | None |
| Korea | 24.25-26.65 | SRD for Automotive Radar | Transmitter Power (EIRP) :  -41.3dBm/MHz (Average)  -24.44 dBm/3MHz (Peak)  Occupied Bandwidth : 2.4 GHz or less |
| 24-26.6 | SRD | Transmitter Power (power transferred to the antenna) :  100mW and 6dBm/MHz (Average)  Antenna Gain : 16dBi or less  Occupied Bandwidth : 2.5 GHz or less |
| Socialist Republic of Viet Nam | 24.25-27.5 |  | Circular 13/2013/TT-BTTTT of Ministry of Information and Communications on frequency arrangements for fixed and mobile service in the frequency range (30-30000) MHz.  National technical regulation on point-to-point radio equipment  QCVN 53:2017/BTTTT  ITU-R Recommendation  ITU-R F. 748 |
| Thailand | 24.25-27.5 |  | Thailand is in the process of creating a regulation for spectrum sharing between FSS and FS, and between FSS and MS. This question is therefore to be answered when the regulation is adopted. |
| Australia | 24.25-24.45 | SRDs | Body scanner details available from [ACMA website](http://web.acma.gov.au/pls/radcom/assignment_search.lookup?pEFL_ID=1060579)  Other SRDs operate on a no interference and no protection basis and must comply with the [LIPD](https://www.legislation.gov.au/Details/F2016C00432) Class Licence |
| 24.45-24.65 | SRDs | See response for 24.25-24.45 GHz frequency range |
| 24.65-24.75 | SRDs | See response for 24.25-24.45 GHz frequency range |
| 24.75-25.25 | SRDs | See response for 24.25-24.45 GHz frequency range |
| 25.25-25.5 | SRDs | See response for 24.25-24.45 GHz frequency range |
| 25.5-27 | SRDs | See response for 24.25-24.45 GHz frequency range |
| Space research Earth station receivers | * Interference criteria: -156 dB(W/MHz), p(%) = 0.05% * Minimum earth station elevation angles is 5° * Earth station antenna pattern in RR Appendix 7, Annex 3, Section 3   See [RALI MS 43](http://www.acma.gov.au/~/media/Spectrum%20Engineering/Information/pdf/RALI%20MS43%20pdf.pdf) for details |
| 27-27.5 | SRDs | See response for 24.25-24.45 GHz frequency range |
| Satellite Receivers and Gateway Earth stations | It is recommended that AWG consider any contributions from ITU-R WP4A to TG5/1 regarding system characteristics for FSS. |
| Malaysia | 24.25-27.5 GHz | Automotive Radar | Max. mean EIRP:  -41.3 dBm/MHz |
| Philippines |  |  |  |
| Bangladesh |  |  |  |
| India |  |  |  |

**Question 3:**

What are the main concerned allocation and applications to be protected including within and adjacent to this range, and the type and extent of current use?

**Answer**

| **Country** | **Sub**  **Range (GHz)** | **Main concerned allocation and application** |
| --- | --- | --- |
| Japan | 24.25-27.5 |  |
| Islamic Rep. of Iran | 24.25-27.5 | Fixed (PTP for Backhaul) |
| Singapore | 24.25-27.5 | Adjacent band coexistence - Short range device and low powered applications from 24 to 24.25GHz |
| Korea | 24-26.5 | SRD |
| 24.25-26.65 | SRD for Automotive Radar |
| Socialist Republic of Viet Nam | 24.25-27.5 | In some bands, fixed links have been deployed to provide backhauling for public mobile networks. Coexistence and compatibility between new and incumbent systems in those bands should be ensured. |
| Thailand | 24.25-27.5 | No particular allocation in the listed bands is to be protected. However, protection criteria for the Radio Astronomy stated in ITU Recommendation RA.769 are used for the 42.5-43.5 GHz and 81-86 GHz bands. |
| Australia\* | 25.5-27 GHz | Space Research (space-to-Earth) Service \*\*, with increasing long term usage across the band |
| 27-30 GHz | Fixed Satellite (Earth-to-space) Service \*\*\* |
| Malaysia | 24.25 – 27.5 GHz | Automotive radar |
| 27-27.5 GHz | Fixed Satellite Service (Broadband VSAT, Broadband Gateway, Backhaul, Satellite News  Gathering) |
| Indonesia |  | Since those bands are assigned for the point-to-point telecommunicatios it is therefore importantto maintain and ensure the compatibility between new and existing systems |
| Philippines | 25.35 - 28.35 GHz | LMDS |
| Bangladesh | 24.25-24.45 GHz | FIXED LINKS |
| 24.45-24.50 GHz |
| 24.50-24.65 GHz |
| 24.65-24.75 GHz |
| 24.75-25.25 GHz |
| 25.25-25.50 GHz |
| 25.50-26.50 GHz |
| 26.50-27.00 GHz |
| 27.00-27.50 GHz | FSS |
| India |  |  |

\* Refer also to Australia’s response to question 1.

\*\* Noting that RR No. 5.536A states that *“Administrations operating earth stations in the Earth exploration-satellite service or the space research service shall not claim protection from stations in the fixed and mobile services operated by other administrations”*.

\*\*\* Main issue is the impact of aggregate interference from IMT-2020 terminal emissions into FSS satellite receivers from areas of the earth visible from the satellite

**Question 4:**

Do you have planned or potential future services and applications in the bands listed above (or part(s) bands), if YES, what is/are planned or potential future services and applications in the bands?

**Answer**

| **Country** | **Sub**  **Ranges (GHz)** | **Planned/Future services and applications** | **Timeline** |
| --- | --- | --- | --- |
| Japan | 24.25-27.5 |  |  |
| Islamic Rep. of Iran | 24.25-27.5 | FIXED & Mobile  These frequency bands are probably candidates for Cellular Mobile with geographical separation based on the results of WRC-19. | After WRC-19 |
| Singapore | 24.25-27.5 | None – pending WRC19 outcome | NA |
| Korea | 24.25-26.65 |  |  |
| 24.65-25.25 | FSS (Earth-to-space) for BSS using 21.4-22 GHz | TBD |
| 26.5-29.5 | 5G Service | The Republic of Korea plans to provide 4 GHz of bandwidth for 5G service in the band above 24.25 GHz: 3 GHz in the band 26.5-29.5 GHz by 2018 when 5G systems are available, at latest by 2021 and additional 1 GHz by 2026 taking into account WRC-19 results |
| Socialist Republic of Viet Nam | 24.25-27.5 |  | Under consideration |
| Thailand | 24.25-27.5 |  | No immediate amendment is planned. |
| Australia | 27.0 - 27.5 GHz | FSS services and applications and TT&C. Broadband use and feeder links | Ongoing |
| Malaysia | 24.25-27.5 GHz | Under consideration | None |
| Indonesia |  | No at the moment, will be updated later on. |  |
| New Zealand | 24.25-27.5 GHz | Planned for future 5G networks | TBD |
| Philippines |  |  |  |
| Bangladesh | 24.25-27.5 GHz | IMT | Depends on WRC-19 and Development of ECO system. |
| India |  |  |  |

**Question 5:**

Do you have any additional issue to be addressed for the bands listed above (or part(s) bands)? What is the issue?

**Answer**

| **Country** | **Any additional issue** |
| --- | --- |
| Japan | None |
| Islamic Rep. of Iran | None |
| Singapore | None |
| Korea (Republic of) | K-ICT Plan in Korea  On January 19, 2017, the Ministry of Science, ICT and Future Planning (MSIP) issued ‘K-ICT Spectrum Plan’ which is an official roadmap for pioneering domain of future frequencies in Korea including 5G spectrum. According to the K-ICT Spectrum Plan, the Republic of Korea also considers 28GHz frequency ranges for the 5G spectra. The Korean regulator plans to provide 3 GHz bandwidth in the band 26.5-29.5 GHz by 2018 when 5G systems are available, at the latest by 2021. Moreover, additional 1 GHz bandwidth in the band above 24.25 GHz will be allocated by 2026 taking into account WRC-19 results.  The Korean operators already submitted contribution about the K-ICT Spectrum Plan to the last RAN4 #82 and 3GPP TSG RAN#74 meeting (1). And the Korean government provided the updated spectrum needs for IMT under WRC-19 agenda item 1.13 in ITU-R WP 5D 26th meeting (2).  (1) R4-1702200, NR spectrum for Korea, KT, SK Telecom, LG Uplus, RAN4 #82  (2) R15-WP5D-C-0485, Further updates for Answers to question on spectrum needs for IMT under WRC-19 Agenda Item 1.13, Republic of Korea, ITU-R WP5D #26 |
| Socialist Republic of Viet Nam | Not yet, so far. |
| Thailand | No additional issue. |
| Australia | None |
| Malaysia | None |
| China | China promotes global/regional harmonization under WRC-19 AI.1.13, prioritizing bands below 43.5GHz. China is currently conducting preliminary sharing and compatibility studies on 24.25-27.5GHz and 37-43.5GHz. On June 8th 2017, China issued the spectrum consultation to the public on use of the fifth generation international mobile communication system (5G) in the millimeter-wave band , seeking the opinions on 5G system frequency planning on 24.75-27.5GHz, 37-42.5GHz or other millimeter-wave band[[3]](#footnote-3). China also granted 24.75-27.5GHz and 37-42.5GHz for 5G Trial. |
| Indonesia | No. |
| New Zealand | No specific issue |
| Philippines |  |
| Bangladesh | No |
| India |  |

**Annex 2**

**31.8-33.4 GHz**

**Question 1:**

What is/are current allocation(s) (e.g. mobile service, fixed service, mobile-satellite service), application(s) (e.g. CDMA, UMTS, LTE, GMR, EGAL, etc.) and assigned/licensed in the bands listed above (or part(s) bands) in your country?

**Answer**

1. **Japan**

| **Frequency**  **Ranges (GHz)** | **Sub Ranges (GHz)** | **Service** | **Applications** | **Status** |
| --- | --- | --- | --- | --- |
| 31.8-33.4 | 31.8-32  FIXED  RADIONAVIGATION  SPACE RESARCH (deep space), (space-to-Earth) | 1. FIXED  (31.8-33.4GHz) |  |  |
| 2. RADIONAVIGATION  (31.8-33.4GHz) |  |  |
| 3. SPACE RESARCH (deep space), (space-to-Earth)  (31.8-32.3GHz) |  |  |
| 32-32.3  FIXED  RADIONAVIGATION  SPACE RESARCH(deep space), (space-to-Earth) | 1. FIXED  (31.8-33.4GHz) |  |  |
| 2. RADIONAVIGATION  (31.8-33.4GHz) |  |  |
| 3. SPACE RESARCH(deep space), (space-to-Earth)  (31.8-32.3GHz) |  |  |
| 32.3-33  FIXED  INTER-SATELLITE  RADIONAVIGATION | 1. FIXED  (31.8-33.4GHz) |  |  |
| 2. INTER-SATELLITE  (32.3-33GHz) |  |  |
| 3. RADIONAVIGATION  (31.8-33.4GHz) |  |  |
| 33-33.4  FIXED  RADIONAVIGATION | 1. FIXED  (31.8-33.4GHz) |  |  |
| 2. RADIONAVIGATION  (31.8-33.4GHz) |  |  |

1. *The applications listed in the table above are based on “the Survey of Actual Radio Spectrum Utilization” conducted in 2015. It should be noted that other radio stations of the allocated services may be used in the respective frequency bands.*
2. **Islamic Rep. of Iran**

| **Frequency**  **Ranges (GHz)** | **Sub Ranges (GHz)** | **Service** | **Applications** | **Status** |
| --- | --- | --- | --- | --- |
| 31.8-33.4 | - | - | None | - |

1. **Singapore**

| **Frequency**  **Ranges (GHz)** | **Sub Ranges (GHz)** | **Service** | **Applications** | **Status** |
| --- | --- | --- | --- | --- |
| 31.8-33.4 | - | None | None | NA |

1. **Korea (Republic of)**

| **Frequency**  **Ranges (GHz)** | **Sub Ranges (GHz)** | **Service** | **Applications** | **Status** |
| --- | --- | --- | --- | --- |
| 31.8-33.4 | 31.8-32 | FIXED, RADIONAVIGATION, SPACE RESEARCH (Deep space, Space to Earth) |  |  |
| 32-32.3 | FIXED,  INTER-SATELLITE,  RADIONAVIGATION, SPACE RESEARCH (Deep space, Space to Earth) |  |  |
| 32.3-33 | FIXED, INTER-SATELLITE, RADIO-NAVIGATION |  |  |
| 33-33.4 | FIXED, RADIO-NAVIGATION |  |  |

1. **Socialist Republic of Viet Nam**

| **Frequency**  **Ranges (GHz)** | **Sub Ranges (GHz)** | **Service** | **Applications** | **Status** |
| --- | --- | --- | --- | --- |
| 31.8-33.4 | 31.8-32 | 1. FIXED |  |  |
| 2. RADIO NAVIGATION |  |  |
| 3. SPACE RESEARCH (deep space) (space to earth) |  |  |
| 32-32.3 | 1. FIXED |  |  |
| 2. RADIO NAVIGATION |  |  |
| 3. SPACE RESEARCH (deep space) (space to earth) |  |  |
| 32.3-33 | 1. FIXED |  |  |
| 2. INTER-SATELLITE |  |  |
| 3. RADIO NAVIGATION |  |  |
| 33-33.4 | 1. FIXED |  |  |
| 2. RADIO NAVIGATION |  |  |

1. **Thailand**

| **Frequency**  **Ranges (GHz)** | **Sub Ranges (GHz)** | **Service** | **Applications** | **Status** |
| --- | --- | --- | --- | --- |
| 31.8-33.4 | 31.8-32 | FIXED SPACE |  |  |
| RADIONAVIGATION |  |  |
| RESEARCH |  |  |
| 32-32.3 | FIXED SPACE |  |  |
| RADIONAVIGATION |  |  |
| RESEARCH |  |  |
| 32.3-33 | FIXED |  |  |
| INTER-SATELLITE |  |  |
| RADIONAVIGATION |  |  |
| 33-33.4 | FIXED |  |  |
| RADIONAVIGATION |  |  |

1. **Australia**

| **Frequency**  **Ranges (GHz)** | **Sub Ranges**  **(GHz)** | **Service**  **(Please indicate frequency range(s) for each service)** | **Applications** | **Status**  **(e.g. Commercial Operator/ License duration)** |
| --- | --- | --- | --- | --- |
| 31.8-33.4 | 31.8-32 | FIXED, RADIONAVIGATION, SPACE RESEARCH (Deep space, Space-to-Earth) | Space research (deep space) Earth station receivers | Currently limited to 2 locations, support ESA/NASA/CSIRO operations, planned long term use under Treaty agreements |
| 32-32.3 | FIXED,  INTER-SATELLITE,  RADIONAVIGATION, SPACE RESEARCH (Deep space, Space-to-Earth) | Space research (deep space) Earth station receivers | Currently limited to 3 locations, support ESA/NASA/CSIRO operations, planned long term use under Treaty agreements |
| 32.3-33 | FIXED, INTER-SATELLITE, RADIO-NAVIGATION | - | - |
| 33-33.4 | FIXED, RADIO-NAVIGATION | - | - |

1. **Malaysia**

| **Frequency**  **Ranges** | **Sub Ranges** | **Service**  **(Please indicate frequency range(s) for each service)** | **Applications** | **Status**  **(e.g. Commercial Operator/ License duration)** |
| --- | --- | --- | --- | --- |
| 31.8-33.4 GHz | 31.8-32 GHz | FIXED  RADIONAVIGATION  SPACE RESEARCH | Not Applicable (“N/A”) | N/A |
| 32-32.3 GHz | FIXED 5.547A  RADIONAVIGATION  SPACE RESEARCH | N/A | N/A |
| 32.3-33 GHz | FIXED 5.547A  INTER-SATELLITE  RADIONAVIGATION | N/A | N/A |
| 33-33.4 GHz | FIXED 5.547A  RADIONAVIGATION | N/A | N/A |

1. **China**

The service allocation information is based on CHINA’s National Spectrum Allocation (2014 version).

| **Frequency**  **Ranges** | **Sub Ranges** | **Service**  **(Please indicate frequency range(s) for each service)** | **Applications** | **Status**  **(e.g. Commercial Operator/ License duration)** |
| --- | --- | --- | --- | --- |
| 31.8-33.4 GHz | 31.8-32 | 1. FIXED |  |  |
| 2. RADIONAVIGATION | Radionavigation system |  |
| 3. SPACE RESEARCH (deep space) (space-to-Earth) | Space Research Receiving Station | CSSAR  CNSA |
| 4. RADIOLOCATION | Radar |  |
| 32-32.3 | 1. FIXED |  |  |
| 2. RADIONAVIGATION | Radionavigation system |  |
| 3. SPACE RESEARCH (deep space) (space-to-Earth) | Space Research Receiving Station | CSSAR  CNSA |
| 4. RADIOLOCATION | Radar |  |
| 32.3-33 | 1. FIXED |  |  |
| 2. INTER-SATELLITE | Inter-satellite Link | NewStar etc. |
| 3. RADIONAVIGATION | Radionavigation system |  |
| 4. RADIOLOCATION | Radar |  |
| 33-33.4 | 1. FIXED |  |  |
| 2. RADIONAVIGATION | Radionavigation system |  |
| 3. RADIOLOCATION | Radar |  |

1. **Indonesia**

| **Frequency**  **Ranges** | **Sub Ranges** | **Service**  **(Please indicate frequency range(s) for each service)** | **Applications** | **Status**  **(e.g. Commercial Operator/ License duration)** |
| --- | --- | --- | --- | --- |
| **31.8-33.4 GHz** | 31.8–32GHz | FIXED  RADIONAVIGATION  SPACE RESEARCH (deep space) (space-to-Earth) | Point-to-point telecommunication | Radio station license  renewed yearly |
| 32–32.3GHz | FIXED 5.547A  RADIONAVIGATION  SPACE RESEARCH (deep space) (space-to-Earth) | Point-to-point telecommunication | Radio station license  Duration 10 years |
| 32.3–33GHz | FIXED 5.547A  INTER-SATELLITE  RADIONAVIGATION | Point-to-point telecommunication | Radio station license  Duration 10 years |
| 33–33.4GHz | FIXED RADIONAVIGATION | Point-to-point telecommunication | Radio station license  Duration 10 years |

1. **Lao PDR**

| **Frequency**  **Ranges** | **Sub Ranges** | **Service**  **(Please indicate frequency range(s) for each service)** | **Applications** | **Status**  **(e.g. Commercial Operator/ License duration)** |
| --- | --- | --- | --- | --- |
| 31.8-33.4 GHz | 31.8-32 | 1. FIXED | None | - |
| 2. RADIONAVIGATION | None | - |
| 3. SPACE RESEARCH (deep space) (space-to-Earth) | None | - |
|  | None | - |
| 32-32.3 | 1. FIXED | None | - |
| 2. RADIONAVIGATION | None | - |
| 3. SPACE RESEARCH (deep space) (space-to-Earth) | None | - |
|  | None | - |
| 32.3-33 | 1. FIXED | None | - |
| 2. INTER-SATELLITE | None | - |
| 3. RADIONAVIGATION | None | - |
|  | None | - |
| 33-33.4 | 1. FIXED | None | - |
| 2. RADIONAVIGATION | None | - |
|  | None | - |

1. **New Zealand**

| **Frequency**  **Ranges** | **Sub Ranges** | **Service**  **(Please indicate frequency range(s) for each service** | **Applications** | **Status(e.g. Commercial Operator/ License duration)** |
| --- | --- | --- | --- | --- |
| **31.8-33.4 GHz** | **31.8-33.4 GHz** | **FIXED**  **RADIONAVIGATION** | **Unused** |  |

1. **Philippines**

| **Frequency**  **Ranges** | **Sub Ranges** | **Service**  **(Please indicate frequency range(s) for each service)** | **Applications** | **Status**  **(e.g. Commercial Operator/ License duration)** |
| --- | --- | --- | --- | --- |
| 31.8-33.4 GHz |  |  |  |  |

1. **Bangladesh**

| **Frequency Ranges** | **Sub Ranges** | **Service (Please indicate frequency range(s) for each service)** | **Applications** | **Status (e.g. Commercial Operator/ License duration)** |
| --- | --- | --- | --- | --- |
| 31.8-33.4 GHz | 31.80-32.00 GHz | 1. FIXED | Fixed Links | Commercial Operator |
| 2. RADIONAVIGATION |
| 3. SPACE RESEARCH (S/E) |
| 32.00-32.30 GHz | 1. FIXED |
| 2. RADIONAVIGATION |
| 3. INTER SATELLITE |
| 4. SPACE RESEARCH (S/E) |
| 32.30-33.00 GHz | 1. FIXED |
| 2. INTER SATELLITE |
| 3. RADIONAVIGATION |
| 33.00-33.40 GHz | 1. FIXED |
| 2. RADIONAVIGATION |
| 3. INTER SATELLITE |

1. **India**

| **Frequency Ranges** | **Sub Ranges** | **Service (Please indicate frequency range(s) for each service)** | **Applications** | **Status (e.g. Commercial Operator/ License duration)** |
| --- | --- | --- | --- | --- |
| 31.8-33.4 GHz | 31.8-32 GHz | FIXED  RADIONAVIGATION  SPACE RESEARCH (deep space) (space-to-Earth) | High capacity dense network may be considered in the  frequency bands 31.8-33.4 | Requirements of high capacity dense network may be considered in the  frequency bands 31.8-33.4 |
| 32-32.3 GHz | FIXED  RADIONAVIGATION  SPACE RESEARCH (deep space) (space-to-Earth) | Requirements of Deep Space Research (Space-to-Earth) in the band 31.8-32.3 GHz and protection of the same may be considered at a few locations. |
| 32.3-33 GHz | FIXED  INTER-SATELLITE  RADIONAVIGATION | Requirements of inter-satellite link in the band 32.3-33.0 GHz may be considered. |
| 33-33.4 GHz | FIXED  RADIONAVIGATION |  |

**Question 2:**

Please describe technical and operational characteristics of the existing services/applications that would be necessary for consideration in sharing/compatibility studies of applications in the bands listed above (or part(s) bands). For the system characteristics, for example, relevant information based on Table X and/or reference to ITU-R Report/Recommendation or Regulation/Rule/study in your country can be provided.

**Answer**

| **Country** | **Sub**  **Ranges (GHz)** | **Applications** | **System Characteristics** |
| --- | --- | --- | --- |
| Japan | 31.8-33.4 |  |  |
| Islamic Rep. of Iran | 31.8-33.4 | None | None |
| Singapore | 31.8-33.4 | NA | NA |
| Korea | 31.8-33.4 |  |  |
| Socialist Republic of Viet Nam | 31.8-33.4 |  | Decision 860/2002/QĐ-TCBĐ of Ministry of Information and Communications on frequency arrangements for fixed service in the frequency range (30-60) GHz  National technical regulation on point-to-point radio equipment  QCVN 53:2017/BTTTT  ITU-R Recommendation  ITU-R F. 1520 |
| Thailand | 31.8-33.4 |  | Thailand is in the process of creating a regulation for spectrum sharing between FSS and FS, and between FSS and MS. This question is therefore to be answered when the regulation is adopted. |
| Australia | 31.8-32 | Space research Earth station receivers | Protection criteria used is same as defined in ITU Radio Regulations Appendix 7, Annex 7 Table 8d  Minimum earth station elevation angles is 10°  Earth station antenna pattern in RR Appendix 7, Annex 3, Section 3  See [RALI MS 43](http://www.acma.gov.au/~/media/Spectrum%20Engineering/Information/pdf/RALI%20MS43%20pdf.pdf) for details |
| 32-32.3 | Space research Earth station receivers | See response for 31.8-32 GHz frequency range |
| Indonesia | 31.8 – 33.4 GHz | Point-to-point telecommunication | ITU-R F. 1520  Regulation No. 33 year 2015 of Ministry Communication and Informatics of the Republic of Indonesia on Usage Plan of Radio Frequency Band Point to Point Microwave Link. |
| Philippines |  |  |  |
| Bangladesh |  |  |  |
| India |  |  |  |

**Question 3:**

What are the main concerned allocation and applications to be protected including within and adjacent to this range, and the type and extent of current use?

**Answer**

| **Country** | **Sub**  **Range (GHz)** | **Main concerned allocation and application** |
| --- | --- | --- |
| Japan | 31.8-33.4 |  |
| Islamic Rep. of Iran | 31.8-33.4 |  |
| Singapore | 31.8-33.4 |  |
| Korea | 31.8-33.4 | SRD |
| Socialist Republic of Viet Nam | 31.8-33.4 | In some bands, fixed links have been deployed to provide backhauling for public mobile networks. Coexistence and compatibility between new and incumbent systems in those bands should be ensured. |
| Thailand | 31.8-33.4 | No particular allocation in the listed bands is to be protected. However, protection criteria for the Radio Astronomy stated in ITU Recommendation RA.769 are used for the 42.5-43.5 GHz and 81-86 GHz bands. |
| Australia\* | 31.5-31.8 GHz | Earth Exploration Satellite (passive) Service  Space Research (passive) Service  Radio Astronomy Service |
| 31.8-32.3 GHz | Space Research (space-to-Earth) Service, with increasing long term usage across the band |
| Malaysia | 31.8-33.4 | None |
| Indonesia |  | Since those bands are assigned for the point-to-point telecommunications it is therefore important to maintain and ensure the compatibility between new and existing systems |
| Philippines |  |  |
| Bangladesh | 31.80-32.00 GHz | FIXED LINKS |
| 32.00-32.30 GHz |
| 32.30-33.00 GHz |
| 33.00-33.40 GHz |
| India |  |  |

\* Refer also to Australia’s response to question 1.

**Question 4:**

Do you have planned or potential future services and applications in the bands listed above (or part(s) bands), if YES, what is/are planned or potential future services and applications in the bands?

**Answer**

| **Country** | **Sub**  **Ranges (GHz)** | **Planned/Future services and applications** | **Timeline** |
| --- | --- | --- | --- |
| Japan | 31.8-33.4 |  |  |
| Islamic Rep. of Iran | 31.8-33.4 | Mobile  These frequency bands are probably candidates for Cellular Mobile with geographical separation based on the results of WRC-19. | After WRC-19 |
| Singapore | 31.8-33.4 | None – pending WRC19 outcome | NA |
| Korea | 31.8-33.4 |  |  |
| Socialist Republic of Viet Nam | 31.8-33.4 |  | Under consideration |
| Thailand | 31.8-33.4 |  | No immediate amendment is planned. |
| Australia | 31.8-32.3 GHz | Space Research Service (deep space) (space-to-Earth) | Expanded usage over the long term. |
| Malaysia | 31.8-33.4 | Under consideration | None |
| Indonesia |  | No at the moment, will be updated later on. |  |
| New Zealand | 31.8-33.4 GHz | Potential to be used for future 5G network | TBD |
| Philippines |  |  |  |
| Bangladesh | 31.8-33.4 GHz | IMT | Depends on WRC-19 and Development of ECO system. |
| India |  |  |  |

**Question 5:**

Do you have any additional issue to be addressed for the bands listed above (or part(s) bands)? What is the issue?

**Answer**

| **Country** | **Any additional issue** |
| --- | --- |
| Japan | None |
| Islamic Rep. of Iran | None |
| Singapore | None |
| Korea (Republic of) | K-ICT Plan in Korea  On January 19, 2017, the Ministry of Science, ICT and Future Planning (MSIP) issued ‘K-ICT Spectrum Plan’ which is an official roadmap for pioneering domain of future frequencies in Korea including 5G spectrum. According to the K-ICT Spectrum Plan, the Republic of Korea also considers 28GHz frequency ranges for the 5G spectra. The Korean regulator plans to provide 3 GHz bandwidth in the band 26.5-29.5 GHz by 2018 when 5G systems are available, at the latest by 2021. Moreover, additional 1 GHz bandwidth in the band above 24.25 GHz will be allocated by 2026 taking into account WRC-19 results.  The Korean operators already submitted contribution about the K-ICT Spectrum Plan to the last RAN4 #82 and 3GPP TSG RAN#74 meeting (1). And the Korean government provided the updated spectrum needs for IMT under WRC-19 agenda item 1.13 in ITU-R WP 5D 26th meeting (2).  (1) R4-1702200, NR spectrum for Korea, KT, SK Telecom, LG Uplus, RAN4 #82  (2) R15-WP5D-C-0485, Further updates for Answers to question on spectrum needs for IMT under WRC-19 Agenda Item 1.13, Republic of Korea, ITU-R WP5D #26 |
| Socialist Republic of Viet Nam | Not yet, so far. |
| Thailand | No additional issue. |
| Australia | None |
| Malaysia | None |
| China | China promote global/regional harmonization under WRC-19 AI.1.13, prioritizing bands below 43.5GHz. China is currently conducting preliminary sharing and compatibility studies on 24.25-27.5GHz and 37-43.5GHz. |
| Indonesia | No. |
| New Zealand | No specific issue |
| Philippines |  |
| Bangladesh | No |
| India |  |

**Annex 3**

**37-43.5 GHz**

**Question 1:**

What is/are current allocation(s) (e.g. mobile service, fixed service, mobile-satellite service), application(s) (e.g. CDMA, UMTS, LTE, GMR, EGAL, etc.) and assigned/licensed in the bands listed above (or part(s) bands) in your country?

**Answer**

1. **Japan**

| **Frequency**  **Ranges (GHz)** | **Sub Ranges (GHz)** | **Service** | **Applications** | **Status** |
| --- | --- | --- | --- | --- |
| 37-43.5 | 37-37.5  FIXED  MOBILE(except aeronautical mobile)  SPACE RESEARCH(Space-to-Earth) | 1. FIXED  (37-40, 40.5-43.5GHz) |  |  |
| 2. MOBILE(except aeronautical mobile) (37-40, 40.5-42.5GHz) |  |  |
| 3. SPACE RESEARCH(Space-to-Earth)  (37-38GHz) |  |  |
| 37.5-38  FIXED  FIXED-SATELLITE (Space-to-Earth)  MOBILE(except aeronautical mobile)  SPACE RESEARCH (Space-to-Earth)  Earth Exploration-Satellite(Space to Earth) | 1. FIXED  (37-40, 40.5-43.5GHz) | Public and General Service (relay) |  |
| 2. FIXED-SATELLITE (Space-to-Earth)  (37.5-43.5GHz) |  |  |
| 3. MOBILE(except aeronautical mobile) (37-40, 40.5-42.5GHz) |  |  |
| 4. SPACE RESEARCH (Space-to-Earth) (37-38GHz) |  |  |
| 5. Earth Exploration-Satellite(Space to Earth) (37.5-40.5GHz) |  |  |
| 38-39.5  FIXED  FIXED-SATELLITE (Space-to-Earth）  MOBILE  Earth Exploration-Satellite(Space to Earth) | 1. FIXED(37-40, 40.5-43.5GHz) | Public and General Service (relay) |  |
| Fixed Wireless Access System |  |
| 2. FIXED-SATELLITE (Space-to-Earth）(37.5-43.5GHz) |  |  |
| 3. MOBILE(37-40, 40.5-42.5GHz) |  |  |
| 4. Earth Exploration-Satellite(Space to Earth) (37.5-40.5GHz) |  |  |
| 39.5-40  FIXED  MOBILE  FIXED-SATELLITE (Space-to-Earth）  MOBILE-SATELLITE (Space to Earth)  Earth Exploration-Satellite(Space to Earth) | 1. FIXED(37-40, 40.5-43.5GHz) |  |  |
| 2. MOBILE(37-40, 40.5-42.5GHz) |  |  |
| 3. FIXED-SATELLITE (Space-to-Earth）(37.5-43.5GHz) |  |  |
| 4. MOBILE-SATELLITE (Space to Earth)  (39.5-40.5GHz) |  |  |
| 5. Earth Exploration-Satellite(Space to Earth)  (37.5-40.5GHz) |  |  |
| 40-40.5  FIXED-SATELLITE (Space-to-Earth）  MOBILE-SATELLITE (Space to Earth)  EARTH EXPLORATION-SATELLITE(Earth to Space)  SPACE RESEARCH (Earth-to-Space)  Earth Exploration-Satellite (Space to Earth) | 1. FIXED-SATELLITE (Space-to-Earth）  (37.5-43.5GHz) |  |  |
| 2. MOBILE-SATELLITE (Space to Earth)  (39.5-40.5GHz) |  |  |
| 3. EARTH EXPLORATION-SATELLITE(Earth to Space) (37.5-40.5GHz) |  |  |
| 4. SPACE RESEARCH (Earth-to-Space)  (40-40.5GHz) |  |  |
| 5. Earth Exploration-Satellite (Space to Earth)  (37.5-40.5GHz) |  |  |
| 40.5-41  FIXED  FIXED-SATELLITE (Space-to-Earth）  BROADCASTING  BROADCASTING-SATELLITE  Mobile | 1. FIXED  (37-40, 40.5-43.5GHz) |  |  |
| 2. FIXED-SATELLITE (Space-to-Earth）  (37.5-43.5GHz) |  |  |
| 3. BROADCASTING  (40.5-42.5GHz) |  |  |
| 4. BROADCASTING-SATELLITE  (40.5-42.5GHz) |  |  |
| 5. Mobile  (37-40, 40.5-42.5GHz) |  |  |
| 41-41.5  FIXED  FIXED-SATELLITE (Space-to-Earth）  BROADCASTING  BROADCASTING-SATELLITE  Mobile | 1. FIXED  (37-40, 40.5-43.5GHz) | TVOB |  |
| 2. FIXED-SATELLITE (Space-to-Earth）  (37.5-43.5GHz) |  |  |
| 3. BROADCASTING  (40.5-42.5GHz) |  |  |
| 4. BROADCASTING-SATELLITE  (40.5-42.5GHz) |  |  |
| 5. Mobile  (37-40, 40.5-42.5GHz) |  |  |
| 41.5-42  FIXED  FIXED-SATELLITE (Space-to-Earth）  MOBILE  BROADCASTING  BROADCASTING-SATELLITE | 1. FIXED  (37-40, 40.5-43.5GHz) | TVOB |  |
| 2. FIXED-SATELLITE (Space-to-Earth）  (37.5-43.5GHz) |  |  |
| 3. MOBILE  (37-40, 40.5-42.5GHz) |  |  |
| 4. BROADCASTING  (40.5-42.5GHz) |  |  |
| 5. BROADCASTING-SATELLITE  (40.5-42.5GHz) |  |  |
| 42-42.5  FIXED  FIXED-SATELLITE (Space-to-Earth）  MOBILE  BROADCASTING  BROADCASTING-SATELLITE | 1. FIXED  (37-40, 40.5-43.5GHz) |  |  |
| 2. FIXED-SATELLITE (Space-to-Earth）  (37.5-43.5GHz) |  |  |
| 3. MOBILE  (37-40, 40.5-42.5GHz) |  |  |
| 4. BROADCASTING  (40.5-42.5GHz) |  |  |
| 5. BROADCASTING-SATELLITE  (40.5-42.5GHz) |  |  |
| 42.5-43.5  FIXED  FIXED-SATELLITE(Earth-to-Space)  RADIO ASTRONOMY | 1. FIXED  (37-40, 40.5-43.5GHz) |  |  |
| 2. FIXED-SATELLITE(Earth-to-Space)  (37.5-43.5GHz) |  |  |
| 3. RADIO ASTRONOMY  (42.5-43.5GHz) |  |  |

1. *The applications listed in the table above are based on “the Survey of Actual Radio Spectrum Utilization” conducted in 2015. It should be noted that other radio stations of the allocated services may be used in the respective frequency bands.*
2. **Islamic Rep. of Iran**

| **Frequency**  **Ranges (GHz)** | **Sub Ranges (GHz)** | **Service** | **Applications** | **Status** |
| --- | --- | --- | --- | --- |
| 37-43.5 | 37-39.5 | Fixed | PTP for  Backhaul | Cellular Mobile & FWA Operator & etc |
| 39.5-40.5 | - | None | None |
| 40.5-43.5 | - | None | None |

1. **Singapore**

| **Frequency**  **Ranges (GHz)** | **Sub Ranges (GHz)** | **Service** | **Applications** | **Status** |
| --- | --- | --- | --- | --- |
| 37-43.5 | - | None | None | NA |

1. **Korea (Republic of)**

| **Frequency**  **Ranges (GHz)** | **Sub Ranges (GHz)** | **Service** | **Applications** | **Status** |
| --- | --- | --- | --- | --- |
| 37-43.5 | 37-37.5 | FIXED  MOBILE except aeronautical mobile,  SPACE RESEARCH  (space-to-Earth) | Fixed Local Relay Systems, |  |
| Experimental Station for 5G | Experimental license |
| 37.5-38 | FIXED  FIXED SATELLITE  (space-to-Earth)  MOBILE except aeronautical mobile  SPACE RESEARCH  (space-to-Earth) | Fixed Local Relay Systems, |  |
| Experimental Station for 5G | Experimental license |
| 38-39.5 | FIXED  FIXED SATELLITE  (space-to-Earth)  MOBILE | Fixed Local Relay Systems, |  |
| Experimental Station for 5G | Experimental license |
| 39.5-40 | FIXED  FIXED SATELLITE  (space-to-Earth)  MOBILE  MOBILE SATELLITE  (space-to-Earth) | Fixed Local Relay Systems |  |
| Experimental Station for 5G | Experimental license |
| 40-40.5 | EARTH EXPLORATION  SATELLITE (Earth-to-space)  FIXED  FIXED SATELLITE  (space-to-Earth)  MOBILE  MOBILE SATELLITE  (space-to-Earth)  SPACE RESEARCH  (Earth-to-space) |  |  |
| 40.5-41 | BROADCASTING  BROADCASTING SATELLITE  FIXED  FIXED SATELLITE  (space-to-Earth) |  |  |
| 41-42.5 | BROADCASTING  BROADCASTING -SATELLITE  FIXED  FIXED SATELLITE  (space-to-Earth) |  |  |
| 42.5-43.5 | FIXED  FIXED SATELLITE  (Earth-to-space)  MOBILE except aeronautical  mobile  RADIO ASTRONOMY |  |  |

1. **Socialist Republic of Viet Nam**

| **Frequency**  **Ranges (GHz)** | **Sub Ranges (GHz)** | **Service** | **Applications** | **Status** |
| --- | --- | --- | --- | --- |
| 37-43.5 | 37-37.5 | 1. FIXED |  |  |
| 2. MOBILE except Aeronautical mobile |  |  |
| 3. SPACE RESEARCH (space to earth) |  |  |
| 37.5-37.8 | 1. FIXED |  |  |
| 2. FIXED SATELLITE (space to earth) |  |  |
| 3. MOBILE except Aeronautical mobile |  |  |
| 4. SPACE RESEARCH (space to earth) |  |  |
| 5. Earth exploration satellite (space to earth) |  |  |
| 38-39.5 | 1. FIXED |  |  |
| 2. FIXED SATELLITE (space to earth) |  |  |
| 3. MOBILE |  |  |
| 4. Earth exploration satellite (space to earth) |  |  |
| 39.5-40 | 1. FIXED |  |  |
| 2. FIXED SATELLITE (space to earth) |  |  |
| 3. MOBILE |  |  |
| 4. MOBILE SATELLITE (space to earth) |  |  |
| 5. Earth exploration satellite (space to earth) |  |  |
| 40-40.5 | 1. FIXED |  |  |
| 2. FIXED SATELLITE (space to earth) |  |  |
| 3. MOBILE |  |  |
| 4. MOBILE SATELLITE (space to earth) |  |  |
| 5. EARTH EXPLORATION SATELLITE (space to earth) |  |  |
| 6. SPACE RESEARCH |  |  |
| 40.5-41 | 1. FIXED |  |  |
| 2. FIXED SATELLITE (space to earth) |  |  |
| 3. BROADCASTING |  |  |
| 4. BROADCASTING SATELLITE |  |  |
| 5. Mobile |  |  |
| 41-42.5 | 1. FIXED |  |  |
| 2. FIXED SATELLITE (space to earth) |  |  |
| 3. BROADCASTING |  |  |
| 4. BROADCASTING SATELLITE |  |  |
| 5. Mobile |  |  |
| 42.5-43.5 | 1. FIXED |  |  |
| 2. FIXED SATELLITE (earth to space) |  |  |
| 3. MOBILE except aeronautical mobile |  |  |
| 4. RADIO ASTRONOMY |  |  |

1. **Thailand**

| **Frequency**  **Ranges (GHz)** | **Sub Ranges (GHz)** | **Service** | **Applications** | **Status** |
| --- | --- | --- | --- | --- |
| 37-43.5 | 37-37.5 | FIXED SPACE |  |  |
| MOBILE except aeronautical mobile |  |  |
| RESEARCH |  |  |
| 37.5-38 | FIXED |  |  |
| FIXED-SATELLITE (space-to-Earth) |  |  |
| MOBILE except aeronautical mobile |  |  |
| SPACE RESEARCH (space-to-Earth) Earth |  |  |
| exploration-satellite (space-to-Earth) |  |  |
| 38-39.5 | FIXED |  |  |
| FIXED-SATELLITE (space-to-Earth) |  |  |
| MOBILE |  |  |
| Earth exploration-satellite (space-to-Earth) |  |  |
| 39.5-40 | FIXED |  |  |
| FIXED-SATELLITE |  |  |
| MOBILE |  |  |
| MOBILE-SATELLITE (space-to-Earth) |  |  |
| Earth exploration-satellite (space-to-Earth) |  |  |
| 40-40.5 | EARTH EXPLORATION-SATELLITE (Earth-to-space) |  |  |
| FIXED |  |  |
| FIXED-SATELLITE (space-to-Earth) |  |  |
| MOBILE |  |  |
| MOBILE-SATELLITE (space-to-Earth) |  |  |
| SPACE RESEARCH (Earth-to-space) |  |  |
| Earth exploration-satellite (space-to-Earth) |  |  |
| 40.5-41 | FIXED |  |  |
| FIXED-SATELLITE (space-to-Earth) |  |  |
| BROADCASTING |  |  |
| BROADCASTING-SATELLITE |  |  |
| Mobile |  |  |
| 41-42.5 | FIXED |  |  |
| FIXED-SATELLITE (space-to-Earth) |  |  |
| BROADCASTING |  |  |
| BROADCASTING-SATELLITE |  |  |
| Mobile |  |  |
| 42.5-43.5 | FIXED |  |  |
| FIXED-SATELLITE (Earth-to-space) |  |  |
| MOBILE except aeronautical mobile |  |  |
| RADIO ASTRONOMY |  |  |

1. **Australia**

| **Frequency**  **Ranges (GHz)** | **Sub Ranges**  **(GHz)** | **Service**  **(Please indicate frequency range(s) for each service)** | **Applications** | **Status**  **(e.g. Commercial Operator/ License duration)** |
| --- | --- | --- | --- | --- |
| 37-43.5 | 37-37.5 | FIXED  MOBILE except aeronautical mobile,  SPACE RESEARCH  (space-to-Earth) | - | - |
| 37.5-38 | FIXED  FIXED SATELLITE  (space-to-Earth)  MOBILE except aeronautical mobile  SPACE RESEARCH  (space-to-Earth) | 37.506-38.178 / 38.766-39.438 GHz (“38 GHz band”), Point-to-point links | Commercial use, in the order of 600 licences issued as of August 2016 |
| 38-39.5 | FIXED  FIXED SATELLITE  (space-to-Earth)  MOBILE | 37.506-38.178 / 38.766-39.438 GHz (“38 GHz band”), Point-to-point links | Commercial use, in the order of 600 licences issued as of August 2016 |
| 39.5-40 | FIXED  FIXED SATELLITE  (space-to-Earth)  MOBILE  MOBILE SATELLITE  (space-to-Earth) | - | - |
| 40-40.5 | EARTH EXPLORATION  SATELLITE (Earth-to-space)  FIXED  FIXED SATELLITE  (space-to-Earth)  MOBILE  MOBILE SATELLITE  (space-to-Earth)  SPACE RESEARCH  (Earth-to-space) | - | - |
| 40.5-41 | BROADCASTING  BROADCASTING SATELLITE  FIXED  FIXED SATELLITE  (space-to-Earth) | - | - |
| 41-42.5 | BROADCASTING  BROADCASTING -SATELLITE  FIXED  FIXED SATELLITE  (space-to-Earth) | - | - |
| 42.5-43.5 | FIXED  FIXED SATELLITE  (Earth-to-space)  MOBILE except aeronautical  mobile  RADIO ASTRONOMY | - | - |

1. **Malaysia**

| **Frequency**  **Ranges** | **Sub Ranges** | **Service**  **(Please indicate frequency range(s) for each service)** | **Applications** | **Status**  **(e.g. Commercial Operator/ License duration)** |
| --- | --- | --- | --- | --- |
| 37-43.5 GHz | 37-37.5 GHz | FIXED  MOBILE except  aeronautical mobile  SPACE RESEARCH | N/A | N/A |
| 37.5-38 GHz | FIXED  FIXED-SATELLITE  (space-to-Earth)  MOBILE except  aeronautical mobile  SPACE RESEARCH | N/A | N/A |
| 38-39.5 GHz | FIXED  FIXED-SATELLITE  (space-to-Earth)  MOBILE | N/A | N/A |
| 39.5-40 GHz | FIXED  FIXED-SATELLITE  (space-to-Earth)  MOBILE  MOBILE-SATELLITE | N/A | N/A |
| 40-40.5 GHz | EARTH EXPLORATIONSATELLITE  (Earth-to-space)  FIXED  FIXED-SATELLITE  (space-to-Earth)  MOBILE  MOBILE-SATELLITE  (space-to-Earth)  SPACE RESEARCH | N/A | N/A |
| 40.5-42.5 GHz | FIXED  FIXED -SATELLITE  (space-to-Earth)  BROADCASTING  BROADCASTING-SATELLITE | N/A | N/A |
| 42.5-43.5 GHz | FIXED  FIXED-SATELLITE  (Earth-to-space)  MOBILE except  aeronautical mobile  RADIO ASTRONOMY | N/A | N/A |

1. **China**

| **Frequency**  **Ranges** | **Sub Ranges** | **Service**  **(Please indicate frequency range(s) for each service)** | **Applications** | **Status**  **(e.g. Commercial Operator/ License duration)** |
| --- | --- | --- | --- | --- |
| 37-43.5 GHz | 37-37.5 | 1. FIXED |  |  |
| 2. MOBILE except aeronautical mobile |  |  |
| 3. SPACE RESEARCH (space-to-Earth) | Space Research Receiving Station | CSSAR  CNSA |
| 37.5-38 | 1. FIXED |  |  |
| 2. FIXED-SATELLITE (space-to-Earth) | FIXED-SATELLITE | CESEC |
| 3. MOBILE except aeronautical mobile |  |  |
| 4. SPACE RESEARCH (space-to-Earth) | Space Research Receiving Station | CSSAR  CNSA |
| 5. Earth exploration-satellite (space-to-Earth) | Space Research Receiving Station | CSSAR  CNSA |
| 38-39.5 | 1. FIXED |  |  |
| 2. FIXED-SATELLITE (space-to-Earth) | FIXED-SATELLITE |  |
| 3. MOBILE |  |  |
| 4. Earth exploration-satellite (space-to-Earth) |  |  |
| 39.5-40 | 1. FIXED |  |  |
| 2. FIXED-SATELLITE (space-to-Earth) | FIXED-SATELLITE |  |
| 3. MOBILE |  |  |
| 4. MOBILE-SATELLITE (space-to-Earth) |  |  |
| 5. Earth exploration-satellite (space-to-Earth) |  |  |
| 40-40.5 | 1. EARTH EXPLORATION-SATELLITE (Earth-to space) |  |  |
| 2. FIXED |  |  |
| 3. MOBILE |  |  |
| 4. MOBILE-SATELLITE (space-to-Earth) |  |  |
| 5. SPACE RESEARCH (Earth-to-space) |  |  |
| 6. FIXED-SATELLITE  (space-to-Earth) | FIXED-SATELLITE |  |
| 7. RADIOLOCATION |  |  |
| 8. Earth exploration-satellite (space-to-Earth) |  |  |
| 40.5-41 | 1. FIXED | Fixed Wireless Access (Light License) |  |
| 2. FIXED-SATELLITE  (space-to-Earth) |  |  |
| 3. BROADCASTING |  |  |
| 4. BROADCASTING-SATELLITE |  |  |
| 5. Mobile |  |  |
| 41-42.5 | 1. FIXED | Fixed Wireless Access(41-42.3GHz)  (Light License) |  |
| 2. FIXED-SATELLITE (space-to-Earth) |  |  |
| 3. BROADCASTING |  |  |
| 4. BROADCASTING-SATELLITE |  |  |
| 5. Mobile | Broadband Wireless Access (42.3-42.5GHz)  (Unlicensed) |  |
| 42.5-43.5 | 1. FIXED |  |  |
| 2. FIXED-SATELLITE (Earth-to-space) | FIXED-SATELLITE | CESEC etc. |
| 3. MOBILE except aeronautical mobile | Broadband Wireless Access (Unlicensed) |  |
| 4. RADIO ASTRONOMY | VLBI, etc. |  |

1. **Indonesia**

| **Frequency**  **Ranges** | **Sub Ranges** | **Service**  **(Please indicate frequency range(s) for each service)** | **Applications** | **Status**  **(e.g. Commercial Operator/ License duration)** |
| --- | --- | --- | --- | --- |
| **37-43.5 GHz** | 37–37.5GHz | FIXED  MOBILE except aeronautical mobile  SPACE RESEARCH (space-to-Earth) | Point-to-point telecommunication | Radio station license  Duration 10 years |
|  | 37.5–38GHz | FIXED  FIXED-SATELLITE (space-to-Earth)  MOBILE except aeronautical mobile  SPACE RESEARCH (space-to-Earth)  Earth exploration-satellite (space-to-Earth) | Point-to-point telecommunication | Radio station license  Duration 10 years |
|  | 38–39.5GHz | FIXED  FIXED-SATELLITE (space-to-Earth)  MOBILE  Earth exploration-satellite (space-to-Earth) | Point-to-point telecommunication | Radio station license  Duration 10 years |
|  | 39.5–40GHz | FIXED  FIXED-SATELLITE (space-to-Earth)  MOBILE  MOBILE-SATELLITE (space-to-Earth)  Earth exploration-satellite (space-to-Earth) |  |  |
|  | 40–40.5GHz | EARTH EXPLORATION-SATELLITE (Earth-to-space)  FIXED  FIXED-SATELLITE (space-to-Earth)  MOBILE  MOBILE-SATELLITE (space-to-Earth)  SPACE RESEARCH (Earth-to-space)  Earth exploration-satellite (space-to-Earth) |  |  |
|  | 40.5–41GHz | FIXED  FIXED-SATELLITE  (space-to-Earth)  BROADCASTING  BROADCASTING-SATELLITE  Mobile |  |  |
|  | 41–42.5GHz | FIXED  FIXED-SATELLITE (space-to-Earth)  BROADCASTING  BROADCASTING-SATELLITE  Mobile |  |  |
|  | 42.5–43.5  GHz | FIXED  FIXED-SATELLITE (Earth-to-space)  MOBILE except aeronautical mobile  RADIO ASTRONOMY |  |  |

1. **Lao PDR**

| **Frequency**  **Ranges** | **Sub Ranges** | **Service**  **(Please indicate frequency range(s) for each service)** | **Applications** | **Status**  **(e.g. Commercial Operator/ License duration)** |
| --- | --- | --- | --- | --- |
| 37-43.5 GHz | 37-37.5 | 1. FIXED | None | - |
| 2. MOBILE except aeronautical mobile | None | - |
| 3. SPACE RESEARCH (space-to-Earth) | None | - |
| 37.5-38 | 1. FIXED | None | - |
| 2. FIXED-SATELLITE (space-to-Earth) | None | - |
| 3. MOBILE except aeronautical mobile | None | - |
| 4. SPACE RESEARCH (space-to-Earth) | None | - |
| 5. Earth exploration-satellite (space-to-Earth) | None | - |
| 38-39.5 | 1. FIXED | None | - |
| 2. FIXED-SATELLITE (space-to-Earth) | None | - |
| 3. MOBILE | None | - |
| 4. Earth exploration-satellite (space-to-Earth) | None | - |
| 39.5-40 | 1. FIXED | None | - |
| 2. FIXED-SATELLITE (space-to-Earth) | None | - |
| 3. MOBILE | None | - |
| 4. MOBILE-SATELLITE (space-to-Earth) | None | - |
| 5. Earth exploration-satellite (space-to-Earth) | None | - |
| 40-40.5 | 1. EARTH EXPLORATION-SATELLITE (Earth-to space) | None | - |
| 2. FIXED | None | - |
| 3.FIXED – SATELLITE | None | - |
| 4. MOBILE | None | - |
| 5. MOBILE-SATELLITE (space-to-Earth) | None | - |
| 6. SPACE RESEARCH (Earth-to-space) | None | - |
| 7. Earth exploration-satellite (space-to-Earth) | None | - |
|  | None | - |
|  | None | - |
| 40.5-41 | 1. FIXED | None | - |
| 2. FIXED-SATELLITE  (space-to-Earth) | None | - |
| 3. BROADCASTING | None | - |
| 4. BROADCASTING-SATELLITE | None | - |
| 5. Mobile | None | - |
| 41-42.5 | 1. FIXED | None | - |
| 2. FIXED-SATELLITE (space-to-Earth) | None | - |
| 3. BROADCASTING | None | - |
| 4. BROADCASTING-SATELLITE | None | - |
| 5. Mobile | None | - |
| 42.5-43.5 | 1. FIXED | None | - |
| 2. FIXED-SATELLITE (Earth-to-space) | None | - |
| 3. MOBILE except aeronautical mobile | None | - |
| 4. RADIO ASTRONOMY | None | - |

1. **New Zealand**

| **Frequency**  **Ranges** | **Sub Ranges** | **Service**  **(Please indicate frequency range(s) for each service** | **Applications** | **Status(e.g. Commercial Operator/ License duration)** |
| --- | --- | --- | --- | --- |
| 37-43.5 GHz | 37-40 GHz | FIXED | 37-39.5 GHz Fixed “38 GHz” band | Administrative radio licensing ([[PIB 22: Fixed Service Bands in New Zealand](http://www.rsm.govt.nz/online-services-resources/publications/pibs/22)](http://www.rsm.govt.nz/online-services-resources/publications/pibs/22)  [PIB 58: Radio Licence Policy Rules](http://www.rsm.govt.nz/online-services-resources/publications/pibs/58)) |
| 40-43.5 GHz | UNALLOCATED |  |  |

1. **Philippines**

| **Frequency**  **Ranges** | **Sub Ranges** | **Service**  **(Please indicate frequency range(s) for each service)** | **Applications** | **Status**  **(e.g. Commercial Operator/ License duration)** |
| --- | --- | --- | --- | --- |
| 37-43.5 GHz | 37.0 - 39.5 GHz | Fixed Relays  Point –to- Point Microwave Radio System | Microwave links |  |
| 38.5 - 42.5 GHz | Local Multipoint Distribution System (LMDS) MC 8-10-97  Allocation shall be shared by voice, data, image and other services. | Broadcast / Wireless Cable |  |

1. **Bangladesh**

| **Frequency Ranges** | **Sub Ranges** | **Service (Please indicate frequency range(s) for each service)** | **Applications** | **Status (e.g. Commercial Operator/ License duration)** |
| --- | --- | --- | --- | --- |
| 37-43.5 GHz | 37-37.50 GHz | 1. FIXED | Fixed Links | Commercial Operator |
| 2. SPACE RESEARCH (S/E) |
| 37.50-38 GHz | 1. FIXED |
| 2. FIXED SATELLITE |
| 3. SPACE RESEARCH (S/E) |
| 4. Earth Exploration Satellite (S/E) |
| 38-39.50 GHz | 1. FIXED |
| 2. FIXED SATELLITE (S/E) |
| 3. Earth Exploration Satellite (S/E) |
| 39.5-40 GHz | 1. FIXED |
| 2. FIXED SATELLITE (S/E) |
| 3. MOBILE |
| 4. MOBILE SATELLITE (S/E) |
| 5. Earth Exploration Satellite (S/E) |
| 40-40.5 GHz | 1. FIXED |
| 2. FIXED SATELLITE (S/E) |
| 3. MOBILE |
| 4. MOBILE SATELLITE (S/E) |
| 5.SPACE RESEARCH (E/S) |
| 6. Earth Exploration Satellite (S/E) |
| 40.50-41.00 GHz | 1. BROADCASTING |
| 2. BROADCASTING SATELLITE |
| 3. FIXED |
| 41.00-42.00 GHz | 1. FIXED |
| 2. BROADCASTING |
| 3. BROADCASTING SATELLITE |
| 42.00-42.50 GHz | 1. FIXED |
| 2. BROADCASTING |
| 3. BROADCASTING SATELLITE |
| 42.50-43.50 GHz | 1. FIXED |
| 2. FIXED SATELLITE |
| 3. MOBILE except aeronautical mobile |
| 4. RADIO ASTRONOMY |

1. **India**

| **Frequency Ranges** | **Sub Ranges** | **Service (Please indicate frequency range(s) for each service)** | **Applications** | **Status (e.g. Commercial Operator/ License duration)** |
| --- | --- | --- | --- | --- |
| 37-43.5 GHz | 37-37.5 GHz | FIXED  MOBILE  SPACE RESEARCH (space-to-Earth) | Requirements of high capacity dense network may be considered in the  frequency bands 37-40 GHz |  |
| 37.5-38 GHz | FIXED  FIXED-SATELLITE (space-to-Earth)  MOBILE  SPACE RESEARCH (space-to-Earth)  Earth exploration-satellite (space-to-Earth) |
| 38-39.5 GHz | FIXED  FIXED-SATELLITE (space-to-Earth)  MOBILE  Earth exploration-satellite (space-to-Earth) |
| 39.5-40 GHz | FIXED  FIXED-SATELLITE (space-to-Earth)  MOBILE  MOBILE-SATELLITE (space-to-Earth)  Earth exploration-satellite (space-to-Earth) |
| 40-40.5 GHz | EARTH EXPLORATION-SATELLITE (Earth-to-space)  FIXED  FIXED-SATELLITE (space-to-Earth)  MOBILE  MOBILE-SATELLITE (space-to-Earth)  SPACE RESEARCH (Earth-to-space)  Earth exploration-satellite (space-to-Earth) |  |
| 40.5-42.5 GHz | FIXED  FIXED SATELLITE (space-to-Earth)  BROADCASTING  BROADCASTING-SATELLITE  Mobile |  |
| 42.5-43.5 GHz | FIXED  FIXED-SATELLITE (Earth-to-space)  MOBILE except aeronautical mobile  RADIO ASTRONOMY |  |  |

**Question 2:**

Please describe technical and operational characteristics of the existing services/applications that would be necessary for consideration in sharing/compatibility studies of applications in the bands listed above (or part(s) bands). For the system characteristics, for example, relevant information based on Table X and/or reference to ITU-R Report/Recommendation or Regulation/Rule/study in your country can be provided.

**Answer**

| **Country** | **Sub**  **Ranges (GHz)** | **Applications** | **System Characteristics** |
| --- | --- | --- | --- |
| Japan | 37-43.5 |  |  |
| Islamic Rep. of Iran | 37-39.5 | Fixed (PTP for Backhaul) | ITU-R F.749  R.R Appendices 2&3 |
| 39.5-43.5 | None | None |
| Singapore | 37-43.5 | NA | NA |
| Korea | 37-37.5 | Experimental Station for 5G | See Table 1-1 in Annex 6 |
| 37.5-38 | Experimental Station for 5G | See Table 1-2 in Annex 6 |
| 38-39.5 | Experimental Station for 5G | See Table 1-3 in Annex 6 |
| 43.5-47 |  |  |
| Socialist Republic of Viet Nam | 37-40,5 |  | National technical regulation on point-to-point radio equipment  QCVN 53:2017/BTTTT  Decision 860/2002/QĐ-TCBĐ of Ministry of Information and Communications on frequency arrangements for fixed service in the frequency range (30-60) GHz  ITU-R Recommendation  ITU-R F. 749 |
| Thailand | 37-43.5 |  | Thailand is in the process of creating a regulation for spectrum sharing between FSS and FS, and between FSS and MS. This question is therefore to be answered when the regulation is adopted. |
| Australia | 37.5-38 | 37.506-38.178 / 38.766-39.438 GHz, Point-to-point links | See Table 2-1 in Annex 6 |
| 38-39.5 | 37.506-38.178 / 38.766-39.438 GHz, Point-to-point links | See Table 2-1 in Annex 6 |
| Indonesia | 37-40.5 GHz | Point-to-point telecommunication | ITU-R F. 749  Regulation No. 33 year 2015 of Ministry Communication and Informatics of the Republic of Indonesia on Usage Plan of Radio Frequency Band Point to Point Microwave Link. |
| New Zealand | 37-40 GHz | 37-39.5 GHz Fixed “38 GHz” band | Recommendation [ITU-R F.749-3](http://www.itu.int/dms_pubrec/itu-r/rec/f/R-REC-F.749-3-201203-I!!PDF-E.pdf) |
| Philippines |  |  |  |
| Bangladesh |  |  |  |
| India |  |  |  |

**Question 3:**

What are the main concerned allocation and applications to be protected including within and adjacent to this range, and the type and extent of current use?

**Answer**

| **Country** | **Sub Range (GHz)** | **Main concerned allocation and application** |
| --- | --- | --- |
| Japan | 37-43.5 |  |
| Islamic Rep. of Iran | 37-39.5 | Fixed (PTP for Backhaul) |
| 39.5-43.5 | None |
| Singapore | 37-43.5 |  |
| Korea | 37-43.5 |  |
| Socialist Republic of Viet Nam | 37-43.5 | In some bands, fixed links have been deployed to provide backhauling for public mobile networks. Coexistence and compatibility between new and incumbent systems in those bands should be ensured. |
| Thailand | 37-43.5 | No particular allocation in the listed bands is to be protected. However, protection criteria for the Radio Astronomy stated in ITU Recommendation RA.769 are used for the 42.5-43.5 GHz and 81-86 GHz bands. |
| Australia\* | 36-37 GHz | Earth Exploration Satellite (passive) Service  Space Research (passive) Service |
| 37.506-38.178 / 38.766-39.438 GHz | Fixed Service |
| Malaysia | 31.8-33.4 | None |
| Indonesia |  | Since those bands are assigned for the point-to-point telecommunications it is therefore important to maintain and ensure the compatibility between new and existing systems |
| New Zealand | 37-40 GHz | 37-39.5 GHz Fixed “38 GHz” band |
| Philippines |  |  |
| Bangladesh | 37-37.50 GHz | FIXED LINKS |
| 37.50-38 GHz |
| 38-39.50 GHz |
| 39.5-40 GHz |
| 40-40.5 GHz |
| 40.50-41.00 GHz |
| 41.00-42.00 GHz |
| 42.00-42.50 GHz |
| 42.50-43.50 GHz |
| India |  |  |

\* Refer also to Australia’s response to question 1.

**Question 4:**

Do you have planned or potential future services and applications in the bands listed above (or part(s) bands), if YES, what is/are planned or potential future services and applications in the bands?

**Answer**

| **Country** | **Sub**  **Ranges (GHz)** | **Planned/Future services and applications** | **Timeline** |
| --- | --- | --- | --- |
| Japan | 37-43.5 |  |  |
| Islamic Rep. of Iran | 37-39.5 | FIXED & Mobile  These frequency bands are probably candidates for Cellular Mobile with geographical separation based on the results of WRC-19. | After WRC-19 |
| 39.5-43.5 | FIXED & Mobile  These frequency bands are probably candidates for Cellular Mobile with geographical separation based on the results of WRC-19. | After WRC-19 |
| Singapore | 37-43.5 | None – pending WRC19 outcome | NA |
| Korea | 37-43.5 |  |  |
| Socialist Republic of Viet Nam | 37-43.5 |  | Under consideration |
| Thailand | 37-43.5 |  | No immediate amendment is planned. |
| Australia | 37-43.5 GHz | Possible future satellite deployments planned\* |  |
| 37-38 GHz | Space Research (space-to-Earth) | Planned future use of this band in the longer term |
| 40-40.5 GHz | Space Research (Earth-to-space) | Planned future use of this band in the longer term |
| Malaysia | 37-43.5 | Under consideration | None |
| Indonesia |  | No at the moment, will be updated later on. |  |
| New Zealand | 40-43.5 GHz | Potential to be used for future 5G network | TBD |
| Philippines |  |  |  |
| Bangladesh |  |  | Depends on WRC-19 and Development of ECO system. |
| India |  |  |  |

**\* Note:** Australia supports the study of this frequency range for possible future IMT-2020 services. As such, and at this point in time, Australia clarifies that the inclusion of possible future satellite deployments in this table is for information and does not imply priority of such services over possible future IMT-2020 services.

**Question 5:**

Do you have any additional issue to be addressed for the bands listed above (or part(s) bands)? What is the issue?

**Answer**

| **Country** | **Any additional issue** |
| --- | --- |
| Japan | None |
| Islamic Rep. of Iran | None |
| Singapore | None |
| Korea (Republic of) | K-ICT Plan in Korea  On January 19, 2017, the Ministry of Science, ICT and Future Planning (MSIP) issued ‘K-ICT Spectrum Plan’ which is an official roadmap for pioneering domain of future frequencies in Korea including 5G spectrum. According to the K-ICT Spectrum Plan, the Republic of Korea also considers 28GHz frequency ranges for the 5G spectra. The Korean regulator plans to provide 3 GHz bandwidth in the band 26.5-29.5 GHz by 2018 when 5G systems are available, at the latest by 2021. Moreover, additional 1 GHz bandwidth in the band above 24.25 GHz will be allocated by 2026 taking into account WRC-19 results.  The Korean operators already submitted contribution about the K-ICT Spectrum Plan to the last RAN4 #82 and 3GPP TSG RAN#74 meeting (1). And the Korean government provided the updated spectrum needs for IMT under WRC-19 agenda item 1.13 in ITU-R WP 5D 26th meeting (2).  (1) R4-1702200, NR spectrum for Korea, KT, SK Telecom, LG Uplus, RAN4 #82  (2) R15-WP5D-C-0485, Further updates for Answers to question on spectrum needs for IMT under WRC-19 Agenda Item 1.13, Republic of Korea, ITU-R WP5D #26 |
| Socialist Republic of Viet Nam | Not yet, so far. |
| Thailand | No additional issue. |
| Australia | None |
| Malaysia | None |
| China | China promotes global/regional harmonization under WRC-19 AI.1.13, prioritizing bands below 43.5GHz. China is currently conducting preliminary sharing and compatibility studies on 24.25-27.5GHz and 37-43.5GHz. |
| Indonesia | No. |
| New Zealand | No specific issue |
| Philippines |  |
| Bangladesh | No |
| India |  |

**Annex 4**

**45.5-50.2 GHz and 50.4-52.6 GHz**

**Question 1:**

What is/are current allocation(s) (e.g. mobile service, fixed service, mobile-satellite service), application(s) (e.g. CDMA, UMTS, LTE, GMR, EGAL, etc.) and assigned/licensed in the bands listed above (or part(s) bands) in your country?

**Answer**

1. **Japan**

| **Frequency**  **Ranges (GHz)** | **Sub Ranges (GHz)** | **Service** | **Applications** | **Status** |
| --- | --- | --- | --- | --- |
| 45.5-50.2  50.4-52.6 | 43.5-47  MOBILE  MOBILE-SATELLITE  RADIONAVIGATION  RADIONAVIGATION-SATELLITE | 1. MOBILE  (43.5-47GHz) |  |  |
| 2. MOBILE-SATELLITE  (43.5-47GHz) |  |  |
| 3. RADIONAVIGATION  (43.5-47GHz) |  |  |
| 4. RADIONAVIGATION-SATELLITE  (43.5-47GHz) |  |  |
| 47-47.2  AMATEUR  AMATEUR-SATELLITE | 1. AMATEUR  (47-47.2GHz) | Amateur Radio |  |
| 2. AMATEUR-SATELLITE  (47-47.2GHz) |  |  |
| 47.2-47.5  FIXED  FIXED-SATELLITE (Earth-to-Space) | 1. FIXED  (47.2-50.2GHz) |  |  |
| 2. FIXED-SATELLITE (Earth-to-Space)  (47.2-50.2GHz) |  |  |
| 47.5-47.9  FIXED  FIXED-SATELLITE (Earth-to-Space) | 1. FIXED  (47.2-50.2GHz) |  |  |
| 2. FIXED-SATELLITE (Earth-to-Space)  (47.2-50.2GHz) |  |  |
| 47.9-48.2  FIXED  FIXED-SATELLITE (Earth-to-Space) | 1. FIXED  (47.2-50.2GHz) |  |  |
| 2. FIXED-SATELLITE (Earth-to-Space)  (47.2-50.2GHz) |  |  |
| 48.2-50.2  FIXED  FIXED-SATELLITE (Earth-to-Space) | 1. FIXED  (47.2-50.2GHz) |  |  |
| 2. FIXED-SATELLITE (Earth-to-Space)  (47.2-50.2GHz) |  |  |
|  |  |  |  |
| 50.4-51.4  FIXED  MOBILE  FIXED-SATELLITE (Earth-to-Space)  Mobile-Satellite (Earth-to-Space) | 1. FIXED  (50.4-52.6GHz) | Convenience Radio system |  |
| 2. MOBILE  (50.4-52.6GHz) | Convenience Radio system |  |
| 3. FIXED-SATELLITE (Earth-to-Space)  (50.4-51.4GHz) |  |  |
| 4. Mobile-Satellite (Earth-to-Space)  (50.4-51.4GHz) |  |  |
| 51.4-52.6  FIXED  MOBILE | 1. FIXED  (50.4-52.6GHz) |  |  |
| 2. MOBILE  (50.4-52.6GHz) |  |  |

1. *The applications listed in the table above are based on “the Survey of Actual Radio Spectrum Utilization” conducted in 2015. It should be noted that other radio stations of the allocated services may be used in the respective frequency bands.*
2. **Islamic Rep. of Iran**

| **Frequency**  **Ranges (GHz)** | **Sub Ranges (GHz)** | **Service** | **Applications** | **Status** |
| --- | --- | --- | --- | --- |
| 45.5-50.2  50.4-52.6 | 45.5-50.2  50.4-52.6 | - | None | None |

1. **Singapore**

| **Frequency**  **Ranges (GHz)** | **Sub Ranges (GHz)** | **Service** | **Applications** | **Status** |
| --- | --- | --- | --- | --- |
| 45.5-50.2  50.4-52.6 | - | None | None | NA |

1. **Korea (Republic of)**

| **Frequency**  **Ranges (GHz)** | **Sub Ranges (GHz)** | **Service** | **Applications** | **Status** |
| --- | --- | --- | --- | --- |
| 45.5-50.2  50.4-52.6 | 43.5-47 | MOBILE  MOBILE SATELLITE  RADIONAVIGATION  RADIONAVIGATION  SATELLITE |  |  |
| 47-47.2 | AMATEUR  AMATEUR SATELLITE |  |  |
| 47.2-50.2 | FIXED  FIXED SATELLITE  (Earth-to-space)  MOBILE |  |  |
| 50.4-51.4 | FIXED  FIXED SATELLITE  (Earth-to-space)  MOBILE |  |  |
| 51.4-52.6 | FIXED  MOBILE |  |  |

1. **Socialist Republic of Viet Nam**

| **Frequency**  **Ranges (GHz)** | **Sub Ranges (GHz)** | **Service** | **Applications** | **Status** |
| --- | --- | --- | --- | --- |
| 45.5-50.2 | 45.5-47 | 1. MOBILE |  |  |
| 2. MOBILE SATELLITE |  |  |
| 3. RADIO NAVIGATION |  |  |
| 4. RADIO NAVIGATION SATELLITE |  |  |
| 47-47.2 | 1. AMATEUR |  |  |
| 2. AMATEUR SATELLITE |  |  |
| 47.2-47.5 | 1. FIXED |  |  |
| 2. FIXED SATELLITE (earth to space) |  |  |
| 3. MOBILE |  |  |
| 47.5-47.9 | 1. FIXED |  |  |
| 2. FIXED SATELLITE (earth to space) |  |  |
| 3. MOBILE |  |  |
| 47.9-48.2 | 1. FIXED |  |  |
| 2. FIXED SATELLITE (earth to space) |  |  |
| 3. MOBILE |  |  |
| 48.2-50.2 | 1. FIXED |  |  |
| 2. FIXED SATELLITE (earth to space) |  |  |
| 3. MOBILE |  |  |
| 50.4-52.6 | 50.4-51.4 | 1. FIXED |  |  |
| 2. FIXED SATELLITE (earth to space) |  |  |
| 3. MOBILE |  |  |
| 4. Mobile Satellite (earth to space) |  |  |
| 51.4-52.6 | 1. FIXED |  |  |
| 2. MOBILE |  |  |

1. **Thailand**

| **Frequency**  **Ranges (GHz)** | **Sub Ranges (GHz)** | **Service** | **Applications** | **Status** |
| --- | --- | --- | --- | --- |
| 45.5-50.2  50.4-52.6 | 45.5-47 | MOBILE |  |  |
| MOBILE-SATELLITE |  |  |
| RADIONAVIGATION |  |  |
| RADIONAVIGATION-SATELLITE |  |  |
| 47-47.2 | AMATEUR |  |  |
| AMATEUR-SATELLITE |  |  |
| 47.2-47.5 | FIXED |  |  |
| FIXED-SATELLITE (Earth-to-space) |  |  |
| MOBILE |  |  |
| 47.5-47.9 | FIXED |  |  |
| FIXED-SATELLITE (Earth-to-space) |  |  |
| MOBIL |  |  |
| 47.9-48.2 | FIXED |  |  |
| FIXED-SATELLITE (Earth-to-space) |  |  |
| MOBILE |  |  |
| 48.2-50.2 | FIXED |  |  |
| FIXED-SATELLITE (Earth-to-space) |  |  |
| MOBILE |  |  |
| 50.4-51.4 | FIXED |  |  |
| FIXED-SATELLITE (Earth-to-space) |  |  |
| MOBILE |  |  |
| Mobile-satellite (Earth-to-space) |  |  |
| 51-4-52.6 | FIXED |  |  |
| MOBILE |  |  |

1. **Australia**

| **Frequency**  **Ranges (GHz)** | **Sub Ranges**  **(GHz)** | **Service**  **(Please indicate frequency range(s) for each service)** | **Applications** | **Status**  **(e.g. Commercial Operator/ License duration)** |
| --- | --- | --- | --- | --- |
| 45.5-50.2 &  50.4-52.6 | 43.5-47 | MOBILE  MOBILE SATELLITE  RADIONAVIGATION  RADIONAVIGATION  SATELLITE | - | - |
| 47-47.2 | AMATEUR  AMATEUR SATELLITE | Experimental development and regular communications incl. Earth-Moon-Earth (EME) | Used by advanced amateur operators |
| 47.2-50.2 | FIXED  FIXED SATELLITE  (Earth-to-space)  MOBILE | 49.22-49.42 / 49.72-49.92 GHz (“49 GHz band”), Point-to-point links | Available for licensing of temporary links associated with TV outside broadcasting applications |
| 50.4-51.4 | FIXED  FIXED SATELLITE  (Earth-to-space)  MOBILE | 50.42-50.62 / 50.92-51.12 GHz (“50 GHz band”), Point-to-point links | Commercial use, 18 licences issued as of August 2016 |
| 51.4-52.6 | FIXED  MOBILE | - | - |

1. **Malaysia**

| **Frequency**  **Ranges** | **Sub Ranges** | **Service**  **(Please indicate frequency range(s) for each service)** | **Applications** | **Status**  **(e.g. Commercial Operator/ License duration)** |
| --- | --- | --- | --- | --- |
| 45.5-50.2GHz  50.4-52.6GHz | 45.5-47 GHz | MOBILE  MOBILE-SATELLITE  RADIONAVIGATION  RADIONAVIGATION-SATELLITE | N/A | N/A |
| 47-47.2 GHz | AMATEUR  AMATEUR-SATELLITE | N/A | N/A |
| 47.2-50 GHz | FIXED  FIXED-SATELLITE  (Earth-to-space)  MOBILE | N/A | N/A |
| 50.2-50.4 GHz | EARTH EXPLORATION-SATELLITE  (passive)  SPACE RESEARCH | N/A | N/A |
| 50.4-51.4 GHz | FIXED  FIXED-SATELLITE  (Earth-to-space)  MOBILE | N/A | N/A |
| 51.4-52.6 GHz | FIXED  MOBILE | N/A | N/A |

1. **China**

| **Frequency**  **Ranges** | **Sub Ranges** | **Service**  **(Please indicate frequency range(s) for each service)** | **Applications** | **Status**  **(e.g. Commercial Operator/ License duration)** |
| --- | --- | --- | --- | --- |
| 45.5-50.2 GHz | 45.5-47 | 1. MOBILE | Broadband Wireless Access (Unlicensed) |  |
| 2. MOBILE-SATELLITE |  |  |
| 3. RADIONAVIGATION |  |  |
| 4. RADIONAVIGATION-SATELLITE |  |  |
| 47-47.2 | 1. AMATEUR |  |  |
| 2. AMATEUR-SATELLITE |  |  |
| 47.2-47.5 | 1. FIXED |  |  |
| 2. FIXED-SATELLITE (Earth-to-space) |  |  |
| 3. MOBILE | Broadband Wireless Access (Unlicensed) |  |
| 47.5-47.9 | 1. FIXED |  |  |
| 2. FIXED-SATELLITE (Earth-to-space) |  |  |
| 3. MOBILE | Broadband Wireless Access (Unlicensed) |  |
| 47.9-48.2 | 1. FIXED |  |  |
| 2. FIXED-SATELLITE (Earth-to-space) |  |  |
| 3. MOBILE | Broadband Wireless Access (Unlicensed) |  |
| 48.2-50.2 | 1. FIXED | Fixed Wireless Access(48.4-50.2GHz)  (Light License) |  |
| 2. FIXED-SATELLITE (Earth-to-space) |  |  |
| 3. MOBILE | Broadband Wireless Access(48.2-48.4GHz)  (Unlicensed) |  |
| 50.4-52.6 GHz | 50.4-51.4 | 1. FIXED |  |  |
| 2. FIXED-SATELLITE (Earth-to-space) |  |  |
| 3. MOBILE |  |  |
| 4. Mobile-satellite (Earth-to-space) |  |  |
| 51.4-52.6 | 1. FIXED |  |  |
| 2. MOBILE |  |  |
| 3. RADIO ASTRONOMY | VLBI, etc. |  |

1. **Indonesia**

| **Frequency**  **Ranges** | **Sub Ranges** | **Service**  **(Please indicate frequency range(s) for each service)** | **Applications** | **Status**  **(e.g. Commercial Operator/ License duration)** |
| --- | --- | --- | --- | --- |
| **45.5-50.2 GHz** | 47–47.2GHz | AMATEUR  AMATEUR-SATELLITE |  |  |
|  | 47.2–47.5  GHz | FIXED  FIXED-SATELLITE (Earth-to-space)  MOBILE |  |  |
| 47.5–47.9  GHz | FIXED  FIXED-SATELLITE (Earth-to-space)  MOBILE |  |  |
| 47.9–48.2  GHz | FIXED  FIXED-SATELLITE (Earth-to-space)  MOBILE |  |  |
| 48.2–50.2  GHz | FIXED  FIXED-SATELLITE (Earth-to-space)  MOBILE |  |  |
| **50.4-52.6 GHz** | 50.4–51.4  GHz | FIXED  FIXED-SATELLITE (Earth-to-space)  MOBILE  Mobile-satellite (Earth-to-space) |  |  |
| 51.4–52.6  GHz | FIXED  MOBILE |  |  |

1. **Lao PDR**

| **Frequency**  **Ranges** | **Sub Ranges** | **Service**  **(Please indicate frequency range(s) for each service)** | **Applications** | **Status**  **(e.g. Commercial Operator/ License duration)** |
| --- | --- | --- | --- | --- |
| 45.5-50.2 GHz | 45.5-47 | 1. MOBILE | None | - |
| 2. MOBILE-SATELLITE | None | - |
| 3. RADIONAVIGATION | None | - |
| 4. RADIONAVIGATION-SATELLITE | None | - |
| 47-47.2 | 1. AMATEUR | None | - |
| 2. AMATEUR-SATELLITE | None | - |
| 47.2-47.5 | 1. FIXED | None | - |
| 2. FIXED-SATELLITE (Earth-to-space) | None | - |
| 3. MOBILE | None | - |
| 47.5-47.9 | 1. FIXED | None | - |
| 2. FIXED-SATELLITE (Earth-to-space) | None | - |
| 3. MOBILE | None | - |
| 47.9-48.2 | 1. FIXED | None | - |
| 2. FIXED-SATELLITE (Earth-to-space) | None | - |
| 3. MOBILE | None | - |
| 48.2-50.2 | 1. FIXED | None | - |
| 2. FIXED-SATELLITE (Earth-to-space) | None | - |
| 3. MOBILE | None | - |
| 50.4-52.6 GHz | 50.4-51.4 | 1. FIXED | None | - |
| 2. FIXED-SATELLITE (Earth-to-space) | None | - |
| 3. MOBILE | None | - |
| 4. Mobile-satellite (Earth-to-space) | None | - |
| 51.4-52.6 | 1. FIXED | None | - |
| 2. MOBILE | None | - |
|  | None | - |

1. **New Zealand**

| Frequency  Ranges | Sub Ranges | Service  (Please indicate frequency range(s) for each service | Applications | Status(e.g. Commercial Operator/ License duration) |
| --- | --- | --- | --- | --- |
| 45.5-50.2  GHz  and  50.4-52.6  GHz | 45.5-47 GHz | RADIONAVIGATION | 46.7-46.9 GHz Short Range Devices – limited to field disturbance sensors | [General User Radio Licence for Short Range Devices](http://www.rsm.govt.nz/about-rsm/spectrum-policy/gazette/gurl/short-range-devices) |
| 47-47.2 GHz | AMATEUR  AMATEUR-SATELLITE | 47-47.2 GHz Amateur usage | [General User Radio Licence for Amateur Radio Operators](http://www.rsm.govt.nz/about-rsm/spectrum-policy/gazette/gurl/amateur-radio-operators) |
| 47.2-50.2 GHz | UNALLOCATED |  |  |
| 50.4-51.4 GHz | FIXED | 50.4-51.2 GHz Fixed "50 GHz” band | Administrative radio licensing (P[[IB 22: Fixed Service Bands in New Zealand](http://www.rsm.govt.nz/online-services-resources/publications/pibs/22)](http://www.rsm.govt.nz/online-services-resources/publications/pibs/22)  [PIB 58: Radio Licence Policy Rules](http://www.rsm.govt.nz/online-services-resources/publications/pibs/58)) |
| 51.4-52.6 GHz | UNALLOCATED |  |  |

1. **Philippines**

| **Frequency**  **Ranges** | **Sub Ranges** | **Service**  **(Please indicate frequency range(s) for each service)** | **Applications** | **Status**  **(e.g. CommercialOperator/ License duration)** |
| --- | --- | --- | --- | --- |
| 45.5-50.2GHz  50.4-52.6GHz | 43.5 - 47 GHz |  |  |  |

1. **Bangladesh**

| **Frequency Ranges** | **Sub Ranges** | **Service (Please indicate frequency range(s) for each service)** | **Applications** | **Status (e.g. Commercial Operator/ License duration)** |
| --- | --- | --- | --- | --- |
| 45.5-50.2GHz  50.4-52.6GHz | 45.50-47.00 GHz | 1. MIBILE | Fixed Links | Commercial Operator |
| 2. MOBILE SATELLITE |
| 3. RADIONAVIGATION |
| 4. RADIONAVIGATION-SATELLITE |
| 47.00-47.20 GHz | 1. AMATEUR |
| 2. AMATEUR -SATELLITE |
| 47.20-47.50 GHz | 1. FIXED |
| 2. FIXED SATELLITE (E/S) |
| 3. MOBILE |
| 47.50-47.90 GHz | 1. FIXED |
| 2. FIXED SATELLITE (E/S) |
| 3. MOBILE |
| 47.90-48.20 GHz | 1. FIXED |
| 2. FIXED SATELLITE (E/S) |
| 3. MOBILE |
| 48.20-48.94 GHz | 1. FIXED |
| 2. FIXED SATELLITE (E/S) |
| 3. MOBILE |
| 47.94-49.04 GHz | 1. FIXED |
| 2. FIXED SATELLITE (E/S) |
| 3. MOBILE |
| 4. RADIO ASTRONOMY |
| 49.04-50.20 GHz | 1. FIXED |
| 2. FIXED SATELLITE (E/S) |
| 3. MOBILE |
| 50.40-51.40 GHz | 1. FIXED |
| 2. FIXED SATELLITE (E/S) |
| 3. MOBILE |
| 4. Mobile-Satellite |
| 51.40-52.60 GHz | 1. FIXED |
| 2. MOBILE |
| 3. RADIO ASTRONOMY |

1. **India**

| **Frequency Ranges** | **Sub Ranges** | **Service (Please indicate frequency range(s) for each service)** | **Applications** | **Status (e.g. Commercial Operator/ License duration)** |
| --- | --- | --- | --- | --- |
| 45.5-50.2 GHz and 50.4-52.6 GHz | 45.5-47 GHz | MOBILE  MOBILE-SATELLITE  RADIONAVIGATION  RADIONAVIGATION-SATELLITE |  |  |
| 47-47.2 GHz | AMATEUR  AMATEUR-SATELLITE |  |  |
| 47.2-47.5 GHz | FIXED  FIXED-SATELLITE (Earth-to-space)  MOBILE |  |  |
| 47.5-50.2 GHz | FIXED  FIXED-SATELLITE (Earth-to-space)  MOBILE |  |  |
| 50.4-51.4 GHz | FIXED  FIXED-SATELLITE (Earth-to-space)  MOBILE  Mobile-satellite (Earth-to-space) |  |  |
| 51.4-52.6 GHz | FIXED  MOBILE |  |  |

**Question 2:**

Please describe technical and operational characteristics of the existing services/applications that would be necessary for consideration in sharing/compatibility studies of applications in the bands listed above (or part(s) bands). For the system characteristics, for example, relevant information based on Table X and/or reference to ITU-R Report/Recommendation or Regulation/Rule/study in your country can be provided.

**Answer**

| **Country** | **Sub**  **Ranges (GHz)** | **Applications** | **System Characteristics** |
| --- | --- | --- | --- |
| Japan | 45.5-50.2  50.4-52.6 |  |  |
| Islamic Rep. of Iran | 45.5-50.2  50.4-52.6 |  |  |
| Singapore | 45.5-50.2  50.4-52.6 | NA | NA |
| Korea | 45.5-50.2GHz  50.4-52.6GHz |  |  |
| Socialist Republic of Viet Nam | 51,4-52,6 |  | National technical regulation on point-to-point radio equipment  QCVN 53:2017/BTTTT  Decision 860/2002/QĐ-TCBĐ of Ministry of Information and Communications on frequency arrangements for fixed service in the frequency range (30-60) GHz  ITU-R Recommendation  ITU-R F. 1496 |
| Thailand | 45.5-50.2GHz  50.4-52.6GHz |  | Thailand is in the process of creating a regulation for spectrum sharing between FSS and FS, and between FSS and MS. This question is therefore to be answered when the regulation is adopted. |
| Australia | 47-47.2 | Amateur use for data, voice and multimedia, communications, EME & satellite | Rec ITU-R M.1732-1 gives characteristics of transmission modes likely to be used in this band. Refer also to Table 2-4 in Annex 6. |
| 47.2-50.2 | 49.22-49.42 / 49.72-49.92 GHz, Point-to-point links | See Table 2-2 in Annex 6 |
| 50.4-51.4 | 50.42-50.62 / 50.92-51.12 GHz, Point-to-point links | See Table 2-2 in Annex 6 |
| New Zealand | 50.4-51.4 GHz | 50.4-51.2 GHz Fixed “50 GHz” band | Administrative radio licensing (PIB 22: Fixed Service Bands in New Zealand  PIB 58: Radio Licence Policy Rules) |
| Philippines |  |  |  |
| Bangladesh |  |  |  |
| India |  |  |  |

**Question 3:**

What are the main concerned allocation and applications to be protected including within and adjacent to this range, and the type and extent of current use?

**Answer**

| **Country** | **Sub**  **Range (GHz)** | **Main concerned allocation and application** |
| --- | --- | --- |
| Japan | 45.5-50.2  50.4-52.6 |  |
| Islamic Rep. of Iran | 45.5-50.2  50.4-52.6 |  |
| Singapore | 45.5-50.2  50.4-52.6 |  |
| Korea | 45.5-50.2  50.4-52.6 |  |
| Socialist Republic of Viet Nam | 45.5-50.2  50.4-52.6 | In some bands, fixed links have been deployed to provide backhauling for public mobile networks. Coexistence and compatibility between new and incumbent systems in those bands should be ensured. |
| Thailand | 45.5-50.2  50.4-52.6 | No particular allocation in the listed bands is to be protected. However, protection criteria for the Radio Astronomy stated in ITU Recommendation RA.769 are used for the 42.5-43.5 GHz and 81-86 GHz bands. |
| Australia\* | 47-47.2 GHz | Amateur and Amateur-Satellite Service. Current usage varies from area to area with increasing usage expected due to more readily available equipment from commercial sources. |
| 49.22-49.42 / 49.72-49.92 GHz | Fixed Service |
| 50.42-50.62 / 50.92-51.12 GHz |  |
| 50.2-50.4 GHz, 52.6-54.25 GHz | Earth Exploration Satellite (passive) Service  Space Research (passive) Service |
| Malaysia | 45.5-50.2GHz  50.4-52.6GHz | None |
| Indonesia |  | Since those bands are assigned for the point-to-point telecommunications it is therefore important to maintain and ensure the compatibility between new and existing systems |
| New Zealand | 50.4-51.4 GHz | 50.4-51.2 GHz Fixed “50 GHz” band |
| Philippines |  |  |
| Bangladesh | 45.50-47.00 GHz | FIXED LINKS |
| 47.00-47.20 GHz |
| 47.20-47.50 GHz |
| 47.50-47.90 GHz |
| 47.90-48.20 GHz |
| 48.20-48.94 GHz |
| 47.94-49.04 GHz |
| 49.04-50.20 GHz |
| 50.40-51.40 GHz |
| 51.40-52.60 GHz |
| India |  |  |

\* Refer also to Australia’s response to question 1.

**Question 4:**

Do you have planned or potential future services and applications in the bands listed above (or part(s) bands), if YES, what is/are planned or potential future services and applications in the bands?

**Answer**

| **Country** | **Sub**  **Ranges (GHz)** | **Planned/Future services and applications** | **Timeline** |
| --- | --- | --- | --- |
| Japan | 45.5-50.2  50.4-52.6 |  |  |
| Islamic Rep. of Iran | 45.5-50.2  50.4-52.6 | Mobile  These frequency bands are probably candidates for Cellular Mobile with geographical separation based on the results of WRC-19. | After WRC-19 |
| Singapore | 45.5-50.2GHz  50.4-52.6GHz | None – pending WRC19 outcome | NA |
| Korea | 45.5-50.2 GHz  50.4-52.6 GHz |  |  |
| Socialist Republic of Viet Nam | 45.5-50.2 GHz  50.4-52.6 GHz |  | Under consideration |
| Thailand | 45.5-50.2 GHz  50.4-52.6 GHz |  | No immediate amendment is planned. |
| Australia | 45.5-50.2GHz  50.4-52.6GHz | Possible future satellite deployments planned\* |  |
| Malaysia | 45.5-50.2GHz  50.4-52.6GHz | Under consideration | None |
| Indonesia |  | No at the moment, will be updated later on. |  |
| Philippines |  |  |  |
| Bangladesh |  |  | Depends on WRC-19 and Development of ECO system. |
| India |  |  |  |

**\* Note:** Australia supports the study of this frequency range for possible future IMT-2020 services. As such, and at this point in time, Australia clarifies that the inclusion of possible future satellite deployments in this table is for information and does not imply priority of such services over possible future IMT-2020 services.

**Question 5:**

Do you have any additional issue to be addressed for the bands listed above (or part(s) bands)? What is the issue?

**Answer**

| **Country** | **Any additional issue** |
| --- | --- |
| Japan | None |
| Islamic Rep. of Iran | None |
| Singapore | None |
| Korea (Republic of) | K-ICT Plan in Korea  On January 19, 2017, the Ministry of Science, ICT and Future Planning (MSIP) issued ‘K-ICT Spectrum Plan’ which is an official roadmap for pioneering domain of future frequencies in Korea including 5G spectrum. According to the K-ICT Spectrum Plan, the Republic of Korea also considers 28GHz frequency ranges for the 5G spectra. The Korean regulator plans to provide 3 GHz bandwidth in the band 26.5-29.5 GHz by 2018 when 5G systems are available, at the latest by 2021. Moreover, additional 1 GHz bandwidth in the band above 24.25 GHz will be allocated by 2026 taking into account WRC-19 results.  The Korean operators already submitted contribution about the K-ICT Spectrum Plan to the last RAN4 #82 and 3GPP TSG RAN#74 meeting (1). And the Korean government provided the updated spectrum needs for IMT under WRC-19 agenda item 1.13 in ITU-R WP 5D 26th meeting (2).  (1) R4-1702200, NR spectrum for Korea, KT, SK Telecom, LG Uplus, RAN4 #82  (2) R15-WP5D-C-0485, Further updates for Answers to question on spectrum needs for IMT under WRC-19 Agenda Item 1.13, Republic of Korea, ITU-R WP5D #26 |
| Socialist Republic of Viet Nam | Not yet, so far. |
| Thailand | No additional issue. |
| Australia | None |
| Malaysia | None |
| China | China promotes global/regional harmonization under WRC-19 AI.1.13, prioritizing bands below 43.5GHz. China is currently conducting preliminary sharing and compatibility studies on 24.25-27.5GHz and 37-43.5GHz. On June 8th 2017, China issued the spectrum consultation to the public on use of the fifth generation international mobile communication system (5G) in the millimeter-wave band , seeking the opinions on 5G system frequency planning on 24.75-27.5GHz, 37-42.5GHz or other millimeter-wave band. China also granted 24.75-27.5GHz and 37-42.5GHz for 5G Trial. |
| Indonesia | No. |
| New Zealand | No specific issue |
| Philippines |  |
| Bangladesh | No |
| India |  |

**Annex 5**

**66-76 GHz and 81-86 GHz**

**Question 1:**

What is/are current allocation(s) (e.g. mobile service, fixed service, mobile-satellite service), application(s) (e.g. CDMA, UMTS, LTE, GMR, EGAL, etc.) and assigned/licensed in the bands listed above (or part(s) bands) in your country?

**Answer**

1. **Japan**

| **Frequency**  **Ranges (GHz)** | **Sub Ranges (GHz)** | **Service** | **Applications** | **Status** |
| --- | --- | --- | --- | --- |
| 66-76  81-86 | 66-71  INTER-SATELLITE  MOBILE-SATELLITE  MOBILE  RADIONAVIGATION  RADIONAVIGATIO-SATELLITE | 1. INTER-SATELLITE  (66-71GHz) |  |  |
| 2. MOBILE-SATELLITE  (66-74GHz) |  |  |
| 3. MOBILE  (66-76GHz) |  |  |
| 4. RADIONAVIGATION  (66-71GHz) |  |  |
| 5. RADIONAVIGATIO-SATELLITE  (66-71GHz) |  |  |
| 71-74  FIXED  MOBILE  FIXED-SATELLITE  (Space-to-Earth)  MOBILE SATELLITE  (Space-to-Earth) | 1. FIXED  (71-76GHz) |  |  |
| 2. MOBILE  (66-76GHz) | High speed wireless transmission system |  |
| 3. FIXED-SATELLITE  (Space-to-Earth)  (71-76GHz) |  |  |
| 4. MOBILE SATELLITE  (Space-to-Earth)  (66-74GHz) |  |  |
| 74-76  FIXED  MOBILE  FIXED-SATELLITE (Space-to-Earth）  BROADCASTING  BROADCASTING-SATELLITE  Space Research (Space-to-Earth) | 1. FIXED  (71-76GHz) |  |  |
| 2. MOBILE  (66-76GHz) | High speed wireless transmission system |  |
| 3. FIXED-SATELLITE (Space-to-Earth）  (71-76GHz) |  |  |
| 4. BROADCASTING  (74-76GHz) |  |  |
| 5. BROADCASTING-SATELLITE  (74-76GHz) |  |  |
| 6. Space Research (Space-to-Earth)  (74-76GHz) |  |  |
|  |  |  |  |
| 81-84  FIXED  MOBILE  FIXED-SATELLITE (Earth-to-Space)  MOBILE-SATELLITE (Earth-to-Space)  RADIO ASTRONOMY  Space Research (Space-to-Earth) | 1. FIXED  (81-86GHz) |  |  |
| 2. MOBILE  (81-86GHz) | High speed wireless transmission system |  |
| 3. FIXED-SATELLITE (Earth-to-Space)  (81-86GHz) |  |  |
| 4. MOBILE-SATELLITE (Earth-to-Space)  (81-84GHz) |  |  |
| 5. RADIO ASTRONOMY  (81-86GHz) |  |  |
| 6. Space Research (Space-to-Earth)  (81-84GHz) |  |  |
| 84-86  FIXED  MOBILE  FIXED-SATELLITE  (Earth-to-Space)  RADIO ASTRONOMY | 1. FIXED  (81-86GHz) |  |  |
| 2. MOBILE  (81-86GHz) |  |  |
| 3. FIXED-SATELLITE  (Earth-to-Space)  (81-86GHz) |  |  |
| 4. RADIO ASTRONOMY  (81-86GHz) |  |  |

1. *The applications listed in the table above are based on “the Survey of Actual Radio Spectrum Utilization” conducted in 2015. It should be noted that other radio stations of the allocated services may be used in the respective frequency bands.*
2. **Islamic Rep. of Iran**

| **Frequency**  **Ranges (GHz)** | **Sub Ranges (GHz)** | **Service**  **(Please indicate frequency range(s) for each service)** | **Applications** | **Status**  **(e.g. Commercial Operator/ License duration)** |
| --- | --- | --- | --- | --- |
| 66-76  81-86 | 66-71 | - | None | None |
| 71-76 | Fixed | PTP for  Backhaul and FWA | Cellular Mobile & FWA Operator, etc |
| 81-86 |

1. **Singapore**

| **Frequency**  **Ranges (GHz)** | **Sub Ranges (GHz)** | **Service** | **Applications** | **Status** |
| --- | --- | --- | --- | --- |
| 66-76 GHz  81-86GHz | - | None | None | NA |

1. **Korea (Republic of)**

| **Frequency**  **Ranges (GHz)** | **Sub Ranges (GHz)** | **Service** | **Applications** | **Status** |
| --- | --- | --- | --- | --- |
| 66-76  81-86 | 66-71 | INTER-SATELLITE  MOBILE  MOBILE SATELLITE  RADIONAVIGATION  RADIONAVIGATION  SATELLITE |  |  |
| 71-74 | FIXED  FIXED SATELLITE  (space-to-Earth)  MOBILE  MOBILE SATELLITE  (space-to-Earth) | Fixed Point-to-Point Communication | Local license for 5 years |
| 74-76 | BROADCASTING  BROADCASTING SATELLITE  FIXED  FIXED SATELLITE  (space-to-Earth)  MOBILE | Fixed Point-to-Point Communication | Local license for 5 years |
| Experimental Station | Experimental license |
| 81-84 | FIXED  FIXED SATELLITE  (Earth-to-space)  MOBILE  MOBILE SATELLITE  (Earth-to-space)  RADIO ASTRONOMY | Fixed Point-to-Point Communication | Local license for 5 years |
| 84-86 | FIXED  FIXED SATELLITE  (Earth-to-space)  MOBILE  RADIO ASTRONOMY | Fixed Point-to-Point Communication | Local license for 5 years |

1. **Socialist Republic of Viet Nam**

| **Frequency**  **Ranges (GHz)** | **Sub Ranges (GHz)** | **Service** | **Applications** | **Status** |
| --- | --- | --- | --- | --- |
| 66-76 | 66-71 | 1. INTER-SATELLITE |  |  |
| 2. MOBILE |  |  |
| 3. MOBILE SATELLITE |  |  |
| 4. RADIO NAVIGATION |  |  |
| 5. RADIO NAVIGATION SATELLITE |  |  |
| 71-74 | 1. FIXED |  |  |
| 2. FIXED SATELLITE (space to earth) |  |  |
| 3. MOBILE |  |  |
| 4. MOBILE SATELLITE (space to earth) |  |  |
| 74-76 | 1. FIXED |  |  |
| 2. FIXED SATELLITE (space to earth) |  |  |
| 3. MOBILE |  |  |
| 4. BROADCASTING |  |  |
| 5. BROADCASTING SATELLITE |  |  |
| 6. Space research (space to earth) |  |  |
| 81-86 GHz | 81-84 | 1. FIXED |  |  |
| 2. FIXED SATELLITE (space to earth) |  |  |
| 3. MOBILE |  |  |
| 4. MOBILE SATELLITE (earth to space) |  |  |
| 5. RADIO ASTRONOMY |  |  |
| 6. Space research (space to earth) |  |  |
| 84-86 | 1. FIXED |  |  |
| 2. FIXED SATELLITE (space to earth) |  |  |
| 3. MOBILE |  |  |
| 4. RADIO ASTRONOMY |  |  |

1. **Thailand**

| **Frequency**  **Ranges (GHz)** | **Sub Ranges (GHz)** | **Service** | **Applications** | **Status** |
| --- | --- | --- | --- | --- |
| 66-76  81-86 | 66-71 | INTER-SATELLITE |  |  |
| MOBILE |  |  |
| MOBILE-SATELLITE |  |  |
| RADIONAVIGATION |  |  |
| RADIONAVIGATION-SATELLITE |  |  |
| 71-74 | FIXED |  |  |
| FIXED-SATELLITE |  |  |
| MOBILE |  |  |
| MOBILE-SATELLITE (space-to-Earth) |  |  |
| 74-76 | FIXED | E-Bandfixed links | Commercial operators  License Duration: 5 years |
| FIXED-SATELLITE (space-to-Earth) |  |  |
| MOBILE |  |  |
| BROADCASTING |  |  |
| BROADCASTING-SATELLITE |  |  |
| Space research (space-to-Earth) |  |  |
| 81-84 | FIXED | E-Bandfixed links | Commercial operators  License Duration: 5 years |
| FIXED-SATELLITE (Earth-to-space) |  |  |
| MOBILE |  |  |
| MOBILE-SATELLITE (Earth-to-space) |  |  |
| RADIO ASTRONOMY |  |  |
| Space research (space-to-Earth) |  |  |
| 84-86 | FIXED | E-Bandfixed links | Commercial operators  License Duration: 5 years |
| FIXED-SATELLITE (Earth-to-space) |  |  |
| MOBILE |  |  |
| RADIO ASTRONOMY |  |  |

1. **Australia**

| **Frequency**  **Ranges (GHz)** | **Sub Ranges**  **(GHz)** | **Service**  **(Please indicate frequency range(s) for each service)** | **Applications** | **Status**  **(e.g. Commercial Operator/ License duration)** |
| --- | --- | --- | --- | --- |
| 66-76  &  81-86 | 66-71 | INTER-SATELLITE  MOBILE  MOBILE SATELLITE  RADIONAVIGATION  RADIONAVIGATION-  SATELLITE | - | - |
| 71-74 | FIXED  FIXED-SATELLITE  (space-to-Earth)  MOBILE  MOBILE-SATELLITE  (space-to-Earth) | 71.25-75.875 GHz (“75 GHz band”), Self-coordinated point-to-point links | Commercial use, 335 licences issued as of August 2016 |
| 74-76 | BROADCASTING  BROADCASTING- SATELLITE  FIXED  FIXED-SATELLITE  (space-to-Earth)  MOBILE | 71.25-75.875 GHz (“75 GHz band”), Self-coordinated point-to-point links | Commercial use, 335 licences issued as of August 2016 |
| SRDs: Low power radio-determination devices | Authorised by the LIPD Class Licence |
| 81-84 | FIXED  FIXED-SATELLITE  (Earth-to-space)  MOBILE  MOBILE-SATELLITE  (Earth-to-space)  RADIO ASTRONOMY | 81.125-85.875 GHz (“85 GHz band”), Self-coordinated point-to-point links | Commercial use, 335 licences issued as of August 2016 |
| SRDs: Low power radio-determination devices | Authorised by the LIPD Class Licence |
| 84-86 | FIXED  FIXED-SATELLITE  (Earth-to-space)  MOBILE  RADIO ASTRONOMY | 81.125-85.875 GHz, Self-coordinated point-to-point links | Commercial use, 335 licences issued as of August 2016 |
| SRDs: Low power radio-determination devices | Authorised by the LIPD Class Licence |

1. **Malaysia**

| **Frequency**  **Ranges** | **Sub Ranges** | **Service**  **(Please indicate frequency range(s) for each service)** | **Applications** | **Status**  **(e.g. Commercial Operator/ License duration)** |
| --- | --- | --- | --- | --- |
| 66-76 GHz  81-86GHz | 66-71 GHz | INTER-SATELLITE  MOBILE  MOBILE-SATELLITE  RADIONAVIGATION  RADIONAVIGATION-SATELLITE | N/A | N/A |
| 71-74 GHz | FIXED  FIXED-SATELLITE  (space-to-Earth)  MOBILE  MOBILE-SATELLITE | Terrestrial Microwave Link | Commercial |
| 74-76 GHz | FIXED  FIXED-SATELLITE  (space-to-Earth)  MOBILE  BROADCASTING  BROADCASTING-SATELLITE | Terrestrial Microwave Link | Commercial |
| 81-84 GHz | FIXED  FIXED-SATELLITE  (Earth-to-space)  MOBILE  MOBILE-SATELLITE  (Earth-to-space)  RADIO ASTRONOMY | Terrestrial Microwave Link | Commercial |
| 84-86 GHz | FIXED  FIXED-SATELLITE  (Earth-to-space)  MOBILE  RADIO ASTRONOMY | Terrestrial Microwave Link | Commercial |

1. **China**

| **Frequency**  **Ranges** | **Sub Ranges** | **Service**  **(Please indicate frequency range(s) for each service)** | **Applications** | **Status**  **(e.g. Commercial Operator/ License duration)** |
| --- | --- | --- | --- | --- |
| 66-76 GHz | 66-71 | 1. INTER-SATELLITE |  |  |
| 2. MOBILE |  |  |
| 3. MOBILE-SATELLITE |  |  |
| 4. RADIONAVIGATION |  |  |
| 5. RADIONAVIGATION-SATELLITE |  |  |
| 6. RADIOLOCATION |  |  |
| 71-74 | 1. FIXED |  |  |
| 2. FIXED-SATELLITE (space-to-Earth) |  |  |
| 3. MOBILE |  |  |
| 4. MOBILE-SATELLITE (space-to-Earth) |  |  |
| 74-76 | 1. FIXED |  |  |
| 2. FIXED-SATELLITE (space-to-Earth) |  |  |
| 3. MOBILE |  |  |
| 4. BROADCASTING |  |  |
| 5. BROADCASTING-SATELLITE |  |  |
| 6. Space research (space-to-Earth) |  |  |
| 81-86 GHz | 81-84 | 1. FIXED |  |  |
| 2. FIXED-SATELLITE (Earth-to-space) |  |  |
| 3. MOBILE |  |  |
| 4. MOBILE-SATELLITE (Earth-to-space) |  |  |
| 5. RADIO ASTRONOMY |  |  |
| 6. Space research (space-to-Earth) |  |  |
| 84-86 | 1. FIXED |  |  |
| 2. FIXED-SATELLITE (Earth-to-space) |  |  |
| 3. MOBILE |  |  |
| 4. RADIO ASTRONOMY |  |  |

1. **Indonesia**

| **Frequency**  **Ranges** | **Sub Ranges** | **Service**  **(Please indicate frequency range(s) for each service)** | **Applications** | **Status**  **(e.g. Commercial Operator/ License duration)** |
| --- | --- | --- | --- | --- |
| **66-76 GHz** | 66–71GHz | INTER-SATELLITE  MOBILE  MOBILE-SATELLITE  RADIONAVIGATION  RADIONAVIGATION-SATELLITE |  |  |
| 71–74GHz | FIXED  FIXED-SATELLITE (space-to-Earth)  MOBILE  MOBILE-SATELLITE (space-to-Earth) | Point-to-point telecommunication | Radio station license  Duration 10 years |
| 74–76GHz | FIXED  FIXED-SATELLITE (space-to-Earth)  MOBILE  BROADCASTING  BROADCASTING-SATELLITE  Space research (space-to-Earth) | Point-to-point telecommunication | Radio station license  Duration 10 years |
| **81-86 GHz** | 81–84GHz | FIXED  FIXED-SATELLITE (Earth-to-space)  MOBILE  MOBILE-SATELLITE (Earth-to-space)  RADIO ASTRONOMY  Space research (space-to-Earth) | Point-to-point telecommunication | Radio station license  Duration 10 years |
| 84–86GHz | FIXED  FIXED-SATELLITE (Earth-to-space)  MOBILE  RADIO ASTRONOMY | Point-to-point telecommunication | Radio station license  Duration 10 years |

1. **Lao PDR**

| **Frequency**  **Ranges** | **Sub Ranges** | **Service**  **(Please indicate frequency range(s) for each service)** | **Applications** | **Status**  **(e.g. Commercial Operator/ License duration)** |
| --- | --- | --- | --- | --- |
| 66-76 GHz | 66-71 | 1. INTER-SATELLITE | None | - |
| 2. MOBILE | None | - |
| 3. MOBILE-SATELLITE | None | - |
| 4. RADIONAVIGATION | None | - |
| 5. RADIONAVIGATION-SATELLITE | None | - |
|  | None | - |
| 71-74 | 1. FIXED | None | - |
| 2. FIXED-SATELLITE (space-to-Earth) | None | - |
| 3. MOBILE | None | - |
| 4. MOBILE-SATELLITE (space-to-Earth) | None | - |
| 74-76 | 1. FIXED | None | - |
| 2. FIXED-SATELLITE (space-to-Earth) | None | - |
| 3. MOBILE | None | - |
| 4. BROADCASTING | None | - |
| 5. BROADCASTING-SATELLITE | None | - |
| 6. Space research (space-to-Earth) | None | - |
| 81-86 GHz | 81-84 | 1. FIXED | None | - |
| 2. FIXED-SATELLITE (Earth-to-space) | None | - |
| 3. MOBILE | None | - |
| 4. MOBILE-SATELLITE (Earth-to-space) | None | - |
| 5. RADIO ASTRONOMY | None | - |
| 6. Space research (space-to-Earth) | None | - |
| 84-86 | 1. FIXED | None | - |
| 2. FIXED-SATELLITE (Earth-to-space) | None | - |
| 3. MOBILE | None | - |
| 4. RADIO ASTRONOMY | None | - |

1. **New Zealand**

| **Frequency**  **Ranges** | **Sub Ranges** | **Service**  **(Please indicate frequency range(s) for each service** | **Applications** | **Status(e.g. Commercial Operator/ License duration)** |
| --- | --- | --- | --- | --- |
| 66-76 GHz  and  81-86GHz | 66-71 GHz | UNALLOCATED |  |  |
| 71-76 GHz | FIXED | 71-76 GHz Fixed “80 GHz” band – lower half | Administrative radio licensing ([[PIB 22: Fixed Service Bands in New Zealand](http://www.rsm.govt.nz/online-services-resources/publications/pibs/22)](http://www.rsm.govt.nz/online-services-resources/publications/pibs/22)  [PIB 58: Radio Licence Policy Rules](http://www.rsm.govt.nz/online-services-resources/publications/pibs/58)) |
| 81-86 GHz | FIXED | 81-86 GHz Fixed “80 GHz” band – upper half | Administrative radio licensing ([[PIB 22: Fixed Service Bands in New Zealand](http://www.rsm.govt.nz/online-services-resources/publications/pibs/22)](http://www.rsm.govt.nz/online-services-resources/publications/pibs/22)  [PIB 58: Radio Licence Policy Rules](http://www.rsm.govt.nz/online-services-resources/publications/pibs/58)) |

1. **Philippines**

| **Frequency**  **Ranges** | **Sub Ranges** | **Service**  **(Please indicate frequency range(s) for each service)** | **Applications** | **Status**  **(e.g. Commercial Operator/ License duration)** |
| --- | --- | --- | --- | --- |
| 66-76 GHz  81-86GHz | 71-76 GHz / 81-86 GHz) | Fixed Wireless Systems (FWS) | Fixed Relays |  |

1. **Bangladesh**

| **Frequency Ranges** | **Sub Ranges** | **Service (Please indicate frequency range(s) for each service)** | **Applications** | **Status (e.g. Commercial Operator/ License duration)** |
| --- | --- | --- | --- | --- |
| 66-76 GHz | 66.00-71.00 GHz | 1. INTER-SATELLITE | Fixed Links | Commercial Operator |
| 2. MOBILE |
| 3. MOBILE-SATELLITE |
| 4. RADIONAVIGATION |
| 5. RADIONAVIGATON SATELLITE |
| 71.00-74.00 GHz | 1. FIXED |
| 2. FIXED-SATELLITE |
| 3. MOBILE |
| 4. MOBILE-SATELLITE |
| 74.00-76.00 GHz | 1. FIXED |
| 2. FIXED-SATELLITE |
| 3. MOBILE |
| 4. BROADCASTING |
| 5. BROADCASTING-SATELLITE |
| 6. Space Research (S/E) |
| 81-86GHz | 81.00-84.00 GHz | 1. FIXED |
| 2. FIXED-SATELLITE (E/S) |
| 3. MOBILE |
| 4. MOBILE-SATELLITE (E/S) |
| 5. RADIO ASTRONOMY |
| 6. Space Research (S/E) |
| 84.00-86.00 GHz | 1. FIXED |
| 2. FIXED-SATELLITE (E/S) |
| 3. MOBILE |
| 4. RADIO ASTRONOMY |

1. **India**

| **Frequency**  **Ranges** | **Sub Ranges** | **Service**  **(Please indicate frequency range(s) for each service)** | **Applications** | **Status**  **(e.g. Commercial Operator/ License duration)** |
| --- | --- | --- | --- | --- |
| 66-76 GHz and 81-86GHz | 66-71 GHz | INTER-SATELLITE  MOBILE  MOBILE-SATELLITE  RADIONAVIGATION  RADIONAVIGATION-SATELLITE |  |  |
|  | 71-74 GHz | FIXED  FIXED-SATELLITE (space-to-Earth)  MOBILE  MOBILE-SATELLITE (space-to-Earth) | Telecom Regulatory Authority of India has recommended this spectrum for backhaul to the Government |  |
|  | 74-76 GHz | FIXED  FIXED-SATELLITE (space-to-Earth)  MOBILE  BROADCASTING  BROADCASTING-SATELLITE  Space Research (space-to-Earth) |  |
|  | 81-84 GHz | FIXED  FIXED-SATELLITE (Earth-to-space)  MOBILE  MOBILE-SATELLITE (Earth-to-space)  RADIO ASTRONOMY  Space Research (space-to-Earth) |  |
|  | 84-86 GHz | FIXED  FIXED-SATELLITE (Earth-to-space)  MOBILE  RADIO ASTRONOMY |  |  |

**Question 2:**

Please describe technical and operational characteristics of the existing services/applications that would be necessary for consideration in sharing/compatibility studies of applications in the bands listed above (or part(s) bands). For the system characteristics, for example, relevant information based on Table X and/or reference to ITU-R Report/Recommendation or Regulation/Rule/study in your country can be provided.

**Answer**

| **Country** | **Sub**  **Ranges (GHz)** | **Applications** | **System Characteristics** |
| --- | --- | --- | --- |
| Japan | 66-76  81-86 |  |  |
| Islamic Rep. of Iran | 66-71 | None | None |
| 71-76  81-86 | Fixed (PTP for  Backhaul and FWA) | ITU-R F.2005  R.R Appendices 2&3 |
| Singapore | 66-76  81-86 | NA | NA |
| Korea | 71-74 | Fixed Point-to-Point Communication | See Table 1-4 (1-4-1, 1-4-2) in Annex 6 |
| 74-76 | Fixed Point-to-Point Communication | See Table 1-5 (1-5-1, 1-5-2) in Annex 6 |
| 81-84 | Fixed Point-to-Point Communication | See Table 1-6 (1-6-1, 1-6-2) in Annex 6 |
| 84-86 | Fixed Point-to-Point Communication | See Table 1-7 in Annex 6 |
| Socialist Republic of Viet Nam | 66-76  81-86 |  |  |
| Thailand | 66-76  81-86 |  | Thailand is in the process of creating a regulation for spectrum sharing between FSS and FS, and between FSS and MS. This question is therefore to be answered when the regulation is adopted. |
| Australia | 71-74 | 71.25-75.875 GHz, Self-coordinated point-to-point links | See Table 2-3 in Annex 6 |
| 74-76 | 71.25-75.875 GHz, Self-coordinated point-to-point links | See Table 2-3 in Annex 6 |
| SRDs | SRDs are authorised under the [LIPD](https://www.legislation.gov.au/Details/F2016C00432) Class and operate on a no interference and no protection basis Licence |
| 81-84 | 81.125-85.875 GHz, Self-coordinated point-to-point links | See Table 2-3 in Annex 6 |
| SRD | See response for 74-76 GHz frequency range |
| 84-86 | 81.125-85.875 GHz, Self-coordinated point-to-point links | See Table 2-3 in Annex 6 |
| SRD | See response for 74-76 GHz frequency range |
| Malaysia | 71-76 GHz/  81-86 GHz | Terrestrial Microwave Link | Station transmissions EIRP shall not exceed +55dBW.  Please refer to Standard Radio System Plan (SRSP) 548. |
| Indonesia | 71–76GHz  81-86GHz | Point-to-point telecommunication | ITU-R F. 2006  Regulation No. 33 year 2015 of Ministry Communication and Informatics of the Republic of Indonesia on Usage Plan of Radio Frequency Band Point to Point Microwave Link. |
| New Zealand | 71-76 GHz | 71-76 GHz Fixed “80 GHz” band – lower half | Recommendation [ITU-R F.2006](http://www.itu.int/dms_pubrec/itu-r/rec/f/R-REC-F.2006-0-201203-I!!PDF-E.pdf) |
| 81-86 GHz | 81-86 GHz Fixed “80 GHz” band – upper half | Recommendation [ITU-R F.2006](http://www.itu.int/dms_pubrec/itu-r/rec/f/R-REC-F.2006-0-201203-I!!PDF-E.pdf) |
| Philippines |  |  |  |
| Bangladesh |  |  |  |
| India |  |  |  |

**Question 3:**

What are the main concerned allocation and applications to be protected including within and adjacent to this range, and the type and extent of current use?

**Answer**

| **Country** | **Sub**  **Range (GHz)** | **Main concerned allocation and application** |
| --- | --- | --- |
| Japan | 66-76  81-86 |  |
| Islamic Rep. of Iran | 66-71 | None |
| 71-76  81-86 | Fixed (PTP for Backhaul and FWA) |
| Singapore | 66-76 | Adjacent band coexistence - Short range device and low powered applications from 57 to 66GHz |
| 81-86 | None |
| Korea | 71-74 | Fixed Local Relay Systems |
| 74-76 | Fixed Local Relay Systems |
| 81-84 | Fixed Local Relay Systems |
| 84-86 | Fixed Local Relay Systems |
| Socialist Republic of Viet Nam | 66-76  81-86 | In some bands, fixed links have been deployed to provide backhauling for public mobile networks. Coexistence and compatibility between new and incumbent systems in those bands should be ensured. |
| Thailand | 66-76  81-86 | No particular allocation in the listed bands is to be protected. However, protection criteria for the Radio Astronomy stated in ITU Recommendation RA.769 are used for the 42.5-43.5 GHz and 81-86 GHz bands. |
| Australia | 71.25-75.875 GHz | Fixed Service |
| 81.125-85.875 GHz |  |
| 86-92 GHz | Earth Exploration Satellite (passive) Service  Space Research (passive) Service  Radio Astronomy Service |
| Malaysia | 66-76 GHz  81-86GHz | Fixed Service (Terrestrial Microwave Link) |
| Indonesia |  | Since those bands are assigned for the point-to-point telecommunications it is therefore important to maintain and ensure the compatibility between new and existing systems |
| New Zealand | 71-76 GHz | 71-76 GHz Fixed “80 GHz” band – lower half |
| 81-86 GHz | 81-86 GHz Fixed “80 GHz” band – upper half |
| Philippines |  |  |
| Bangladesh | 66.00-71.00 GHz | FIXED LINKS |
| 71.00-74.00 GHz |
| 74.00-76.00 GHz |
| 81.00-84.00 GHz |
| 84.00-86.00 GHz |
| India |  |  |

\* Refer also to Australia’s response to question 1.

**Question 4:**

Do you have planned or potential future services and applications in the bands listed above (or part(s) bands), if YES, what is/are planned or potential future services and applications in the bands?

**Answer**

| **Country** | **Sub**  **Ranges (GHz)** | **Planned/Future services and applications** | **Timeline** |
| --- | --- | --- | --- |
| Japan | 66-76  81-86 |  |  |
| Islamic Rep. of Iran | 66-71 | Mobile  These frequency bands are probably candidates for Cellular Mobile with geographical separation based on the results of WRC-19. | After WRC-19 |
| 71-76  81-86 | FIXED & Mobile  These frequency bands are probably candidates for Cellular Mobile with geographical separation based on the results of WRC-19. |  |
| Singapore | 66-76  81-86 | None – pending WRC19 outcome | NA |
| Korea | 66-76  81-86 |  |  |
| Socialist Republic of Viet Nam | 66-76  81-86 |  | Under consideration |
| Thailand | 66-76  81-86 |  | No immediate amendment is planned. |
| Australia | 66-76  81-86 |  |  |
| Malaysia | 66-76  81-86 | Under consideration | None |
| Indonesia |  | No at the moment, will be updated later on. |  |
| Philippines |  |  |  |
| Bangladesh |  |  | Depends on WRC-19 and Development of ECO system. |
| India |  |  |  |

**Question 5:**

Do you have any additional issue to be addressed for the bands listed above (or part(s) bands)? What is the issue?

**Answer**

| **Country** | **Any additional issue** |
| --- | --- |
| Japan | None |
| Islamic Rep. of Iran | None |
| Singapore | None |
| Korea (Republic of) | K-ICT Plan in Korea  On January 19, 2017, the Ministry of Science, ICT and Future Planning (MSIP) issued ‘K-ICT Spectrum Plan’ which is an official roadmap for pioneering domain of future frequencies in Korea including 5G spectrum. According to the K-ICT Spectrum Plan, the Republic of Korea also considers 28GHz frequency ranges for the 5G spectra. The Korean regulator plans to provide 3 GHz bandwidth in the band 26.5-29.5 GHz by 2018 when 5G systems are available, at the latest by 2021. Moreover, additional 1 GHz bandwidth in the band above 24.25 GHz will be allocated by 2026 taking into account WRC-19 results.  The Korean operators already submitted contribution about the K-ICT Spectrum Plan to the last RAN4 #82 and 3GPP TSG RAN#74 meeting (1). And the Korean government provided the updated spectrum needs for IMT under WRC-19 agenda item 1.13 in ITU-R WP 5D 26th meeting (2).  (1) R4-1702200, NR spectrum for Korea, KT, SK Telecom, LG Uplus, RAN4 #82  (2) R15-WP5D-C-0485, Further updates for Answers to question on spectrum needs for IMT under WRC-19 Agenda Item 1.13, Republic of Korea, ITU-R WP5D #26 |
| Socialist Republic of Viet Nam | Not yet, so far. |
| Thailand | No additional issue. |
| Australia | None |
| Malaysia | None |
| China | China promotes global/regional harmonization under WRC-19 AI.1.13, prioritizing bands below 43.5GHz. China is currently conducting preliminary sharing and compatibility studies on 24.25-27.5GHz and 37-43.5GHz. |
| Indonesia | No. |
| New Zealand | No specific issue. |
| Philippines |  |
| Bangladesh | No |
| India |  |

**Annex 6**

**Additional information on   
technical and operational characteristics of the existing services/applications**

**Korea (Republic of)**

**Table 1-1 Experimental Station for 5G in the band 37-37.5 GHz**

| **Parameters** | | **Value** |
| --- | --- | --- |
| Max. transmitter power (dBm) | | 0.063W(18dBm) |
| Bandwidth (MHz) | | 56MHz |
| Tx/Rx antenna | Gain (dB) | 45.1 |
| Pattern (if many, provide closest one to omnidirectional) |  |
| Antenna type | Parabola |
| Height (m) |  |
| Polarization (if any) | Vertical |
| Protection criteria (I/N) | |  |
| Noise temperature (K) | |  |
| Feeder loss (dB) | |  |
| Deployment status (Coverage) | |  |
| Other parameters for sharing studies if any | |  |

**Table 1-2 Experimental Station for 5G in the band 37.5-38 GHz**

| **Parameters** | | **Value** |
| --- | --- | --- |
| Max. transmitter power (dBm) | | 1W(30dBm) |
| Bandwidth (MHz) | | 625MHz |
| Tx/Rx antenna | Gain (dB) | 25 |
| Pattern (if many, provide closest one to omnidirectional) |  |
| Antenna type | Horn |
| Height (m) | 20 |
| Polarization (if any) | Vertical |
| Protection criteria (I/N) | |  |
| Noise temperature (K) | |  |
| Feeder loss (dB) | | 1 |
| Deployment status (Coverage) | |  |
| Other parameters for sharing studies if any | |  |

**Table 1-3 Experimental Station for 5G in the band 38-39.5 GHz**

| **Parameters** | | **Value** |
| --- | --- | --- |
| Max. transmitter power (dBm) | | 1W(30dBm) |
| Bandwidth (MHz) | | 625MHz |
| Tx/Rx antenna | Gain (dB) | 25 |
| Pattern (if many, provide closest one to omnidirectional) |  |
| Antenna type | Horn |
| Height (m) | 20 |
| Polarization (if any) | Vertical |
| Protection criteria (I/N) | |  |
| Noise temperature (K) | |  |
| Feeder loss (dB) | | 1 |
| Deployment status (Coverage) | |  |
| Other parameters for sharing studies if any | |  |

**Table 1-4-1** **Fixed Point-to-Point Communication in the band 71-74 GHz**

| **Parameters** | | **Value** |
| --- | --- | --- |
| Max. transmitter power (dBm) | | 10mW(10dBm) |
| Bandwidth (MHz) | | 500MHz |
| Tx/Rx antenna | Gain (dB) | 43.8 |
| Pattern (if many, provide closest one to omnidirectional) |  |
| Antenna type | Parabola |
| Height (m) | 23 |
| Polarization (if any) | Vertical |
| Protection criteria (I/N) | |  |
| Noise temperature (K) | |  |
| Feeder loss (dB) | |  |
| Deployment status (Coverage) | |  |
| Other parameters for sharing studies if any | |  |

**Table 1-4-2 Fixed Point-to-Point Communication in the band 71-74 GHz**

| **Parameters** | | **Value** |
| --- | --- | --- |
| Max. transmitter power (dBm) | | 15.8mW(12dBm) |
| Bandwidth (MHz) | | 500MHz |
| Tx/Rx antenna | Gain (dB) | 43 |
| Pattern (if many, provide closest one to omnidirectional) |  |
| Antenna type | Parabola |
| Height (m) | 35 |
| Polarization (if any) | Horizontal |
| Protection criteria (I/N) | |  |
| Noise temperature (K) | |  |
| Feeder loss (dB) | |  |
| Deployment status (Coverage) | |  |
| Other parameters for sharing studies if any | |  |

**Table 1-5-1 Fixed Point-to-Point Communication in the band 74-76 GHz**

| **Parameters** | | **Value** |
| --- | --- | --- |
| Max. transmitter power (dBm) | | 10mW(10dBm) |
| Bandwidth (MHz) | | 500MHz |
| Tx/Rx antenna | Gain (dB) | 43.8 |
| Pattern (if many, provide closest one to omnidirectional) |  |
| Antenna type | Parabola |
| Height (m) | 23 |
| Polarization (if any) | **Vertical** |
| Protection criteria (I/N) | |  |
| Noise temperature (K) | |  |
| Feeder loss (dB) | |  |
| Deployment status (Coverage) | |  |
| Other parameters for sharing studies if any | |  |

**Table 1-5-2 Fixed Point-to-Point Communication in the band 74-76 GHz**

| **Parameters** | | **Value** |
| --- | --- | --- |
| Max. transmitter power (dBm) | | 3.1mW(5dBm) |
| Bandwidth (MHz) | | 500MHz |
| Tx/Rx antenna | Gain (dB) | 42 |
| Pattern (if many, provide closest one to omnidirectional) |  |
| Antenna type | Parabola |
| Height (m) | 16 |
| Polarization (if any) | Horizontal |
| Protection criteria (I/N) | |  |
| Noise temperature (K) | |  |
| Feeder loss (dB) | |  |
| Deployment status (Coverage) | |  |
| Other parameters for sharing studies if any | |  |

**Table 1-6-1 Fixed Point-to-Point Communication in the band 81-84 GHz**

| **Parameters** | | **Value** |
| --- | --- | --- |
| Max. transmitter power (dBm) | | 10mW(10dBm) |
| Bandwidth (MHz) | | 500MHz |
| Tx/Rx antenna | Gain (dB) | 43.8 |
| Pattern (if many, provide closest one to omnidirectional) |  |
| Antenna type | Parabola |
| Height (m) | 23 |
| Polarization (if any) | Vertical |
| Protection criteria (I/N) | |  |
| Noise temperature (K) | |  |
| Feeder loss (dB) | |  |
| Deployment status (Coverage) | |  |
| Other parameters for sharing studies if any | |  |

**Table 1-6-2 Fixed Point-to-Point Communication in the band 81-84 GHz**

| **Parameters** | | **Value** |
| --- | --- | --- |
| Max. transmitter power (dBm) | | 15.8mW(12dBm) |
| Bandwidth (MHz) | | 500MHz |
| Tx/Rx antenna | Gain (dB) | 43 |
| Pattern (if many, provide closest one to omnidirectional) |  |
| Antenna type | Parabola |
| Height (m) | 35 |
| Polarization (if any) | Horizontal |
| Protection criteria (I/N) | |  |
| Noise temperature (K) | |  |
| Feeder loss (dB) | |  |
| Deployment status (Coverage) | |  |
| Other parameters for sharing studies if any | |  |

**Table 1-7 Fixed Point-to-Point Communication in the band 84-86 GHz**

| **Parameters** | | **Value** |
| --- | --- | --- |
| Max. transmitter power (dBm) | | 10mW(10dBm) |
| Bandwidth (MHz) | | 500MHz |
| Tx/Rx antenna | Gain (dB) | 43.8 |
| Pattern (if many, provide closest one to omnidirectional) |  |
| Antenna type | Parabola |
| Height (m) | 23 |
| Polarization (if any) | Vertical |
| Protection criteria (I/N) | |  |
| Noise temperature (K) | |  |
| Feeder loss (dB) | |  |
| Deployment status (Coverage) | |  |
| Other parameters for sharing studies if any | |  |

**Australia**

**Table 2-1 – 38 GHz Point-to-point links**

| **Parameters** | | **Value** |
| --- | --- | --- |
| Max. transmitter power (dBm) | | Max: 40 dBm |
| Bandwidth (MHz) | | 7 MHz, 14 MHz & 28 MHz |
| Tx/Rx antenna | Gain (dB) | 34.5-45.2 dBi, average is 41.1 dBi  (based on registered licences) |
| Pattern | Minimum antenna requirements:  XPD = 30 dB and F/B > 45 dB (RALI FX3)  typically comply with ITU-R Recommendation F.699 and/or  ETSI EN 302 217-4-2 |
| Antenna type | Parabolic |
| Height (m) | 3-300m, average is 29.9 m  (based on registered licences) |
| Polarization (if any) | Predominantly vertical |
| Protection criteria (I/N) | | C/I criteria is used |
| Noise temperature (K) | | N/A due to use of C/I criteria |
| Feeder loss (dB) | | - |
| Deployment status (Coverage) | | - |
| Other parameters for sharing studies if any | | C/I criteria, [refer to RALI FX3 for details](http://www.acma.gov.au/webwr/radcomm/frequency_planning/frequency_assignment/docs/fx3/38g.pdf). Protection criteria has been developed based on:   * ITU-R Recommendations P.530, P.837, P.838 * ETSI TR 101 854, ETSI EN 302 217   ITU-R Recommendation P.452 is recommended for determining path loss. |

**Table 2-2 – 49/50 GHz Point-to-point links**

| **Parameters** | | **Value** |
| --- | --- | --- |
| Max. transmitter power (dBm) | | Max: 40 dBm |
| Bandwidth (MHz) | | 40 MHz |
| Tx/Rx antenna | Gain (dB) | 40-44 dBi, average is 40.2 dBi  (based on registered licences) |
| Pattern | ITU-R Recommendation F.699 |
| Antenna type | Parabolic |
| Height (m) | 5-50m, average is 18.6m  (based on registered licences) |
| Polarization (if any) | Vertical |
| Protection criteria (I/N) | | N/A due to use of C/I criteria |
| Noise temperature (K) | | N/A due to use of C/I criteria |
| Feeder loss (dB) | | - |
| Deployment status (Coverage) | | - |
| Other parameters for sharing studies if any | | C/I criteria, [refer to RALI FX3 for details](http://www.acma.gov.au/webwr/radcomm/frequency_planning/frequency_assignment/docs/fx3/38g.pdf). Protection criteria has been developed based on:   * ITU-R Recommendations P.530, P.837, P.838 * ETSI TR 101 854, ETSI EN 302 217   ITU-R Recommendation P.452 is recommended for determining path loss. |

**Table 2-3 – 70/80 GHz Point-to-point links**

| **Parameters** | | **Value** |
| --- | --- | --- |
| Max. transmitter power (dBm) | | Max: 30 dBm |
| Bandwidth (MHz) | | up to 4750 MHz, most common is 500 MHz  (based on registered licences) |
| Tx/Rx antenna | Gain (dB) | 41-56 dBi, average is 46.4 dBi  (based on registered licences) |
| Pattern | - |
| Antenna type | Parabolic |
| Height (m) | 4-300m, average is 37.8m  (based on registered licences) |
| Polarization (if any) | Predominantly vertical |
| Protection criteria (I/N) | | “Self-coordinated” links operate on a best-efforts “no interference, no protection” basis, [refer to RALI FX 20 for details](http://www.acma.gov.au/~/media/Spectrum%20Engineering/Information/pdf/RALI%20FX20%20Millimetre%20Wave%20Point%20to%20Point%20Self%20Coordinated%20Stations.pdf), protection is based on manufacturer published Threshold to Interference ratio, if not available then an I/N < -6 dB and noise figure of 8 dB should be used. |
| Noise temperature (K) | | 288 |
| Feeder loss (dB) | | - |
| Deployment status (Coverage) | | - |
| Other parameters for sharing studies if any | | * Noise figure of 8 dB (unless manufacturer published value available) * Path loss: Free space (Rec. ITU-R P.525) + gaseous absorption (Rec. ITU-R P.676)… can also use other models to account for terrain obstructions over interference paths (e.g. P.452) |

**Table 2-4 – 47-47.2 GHz Amateur Characteristics**

| **Parameters** | | **Value** |
| --- | --- | --- |
| Max. transmitter power (dBm) | | 1 - 45 dBW |
| Bandwidth (MHz) | | 10 MHz, but depends on mode, some narrow band modes require only a few kHz |
| Tx/Rx antenna | Gain (dB) | 10 – 42 dBi |
| Pattern |  |
| Antenna type | Paraboloid, horn and patch |
| Height (m) | 1 – 2 m typical, but may be higher |
| Polarization (if any) |  |
| Protection criteria (I/N) | | Depends on transmission mode |
| Noise temperature (K) | |  |
| Feeder loss (dB) | | 0 - 6 |
| Deployment status (Coverage) | |  |
| Other parameters for sharing studies if any | |  |

\_\_\_\_\_\_\_\_\_\_\_\_

1. Including studies with respect to services in adjacent bands, as appropriate. [↑](#footnote-ref-1)
2. When conducting studies in the band 24.5-27.5 GHz, to take into account the need to ensure the protection of existing earth stations and the deployment of future receiving earth stations under the EESS (space-to-Earth) and SRS (space-to-Earth) allocation in the frequency band 25.5-27 GHz. [↑](#footnote-ref-2)
3. <http://www.miit.gov.cn/n1146285/n1146352/n3054355/n3057735/n3057748/n3057749/c5676741/content.html> [↑](#footnote-ref-3)