|  |  |  |
| --- | --- | --- |
|  | ASIA-PACIFIC TELECOMMUNITY |  |
| **The 26th Meeting of the APT Wireless Group**  **(AWG-26)** |  |
| 14 – 18 September 2020, Virtual Meeting | 18 September 2020 |

AWG-26/OUT-18

**questionnaire ON current status and future plan ON REGULATions AND USAGE OF HAPS in the Fixed service in APT countries**

1. **Introduction:**

High altitude platform station (HAPS) as defined in No. **1.66A** of the ITU Radio Regulations, is a station located on an object at an altitude of 20 to 50 km and at a specified, nominal, fixed point relative to the Earth. It is intended that HAPS can provide broadband connectivity and telecommunication service in underserved communities and in rural and remote areas, as well as a possible means to support specific mission such as remote sensing, geo-localization, and disaster recovery.

In a crisis when ground-based network systems are not functioning, HAPS can be swiftly directed to assist the affected area. HAPS can be operated in various environment areas, including mountainous, jungle, coastal, ocean, urban, suburban and desert areas, to provide both last mile and backhaul connectivity.

HAPS is a good complementary option to other existing telecommunication technology to provide better telecommunication network due to its low cost, easy to operate and fast deployment. In recent years, the development of platform both lighter-than-air platforms and heavier-than-air have been extensively been conducted in many parts of the world leading to positive direction that HAPS is feasible to be implemented.

In all/some APT countries, the frequency bands summarized in Table 1 may be used by HAPS.

Table-1. Frequency bands identified for HAPS and their associated RR footnotes

and WRC Resolutions

|  |  |  |  |
| --- | --- | --- | --- |
| **No.** | **Frequency Band** | **RR Footnote** | **WRC Resolution** |
| 1 | 6 440-6 520 MHz (HAPS-to-ground)\*  6 560-6 640 MHz (ground-to-HAPS)\*  \*HAPS-Gateway link only. | 5.457 | 150 (WRC-12) |
| 2 | 27.9-28.2 GHz (HAPS-to-ground) | 5.537A | 145 (Rev.WRC-19) |
| 3 | 31-31.3 GHz | 5.543B | 167 (WRC-19) |
| 4 | 38-39.5 GHz | 5.550D | 168 (WRC-19) |
| 5 | 47.2-47.5 GHz / 47.9-48.2 GHz | 5.552A | 122 (Rev.WRC-19) |

It should be noted that in addition to the RR footnotes and WRC Resolutions for the operation of HAPS, HAPS shall be notified in accordance with Nos. **11.9** and **11.26** of the Radio Regulations. Information on the current status and future plan on regulation and usage of HAPS in the fixed service in the bands of 6 440-6 520 MHz, 6 560-6 640 MHz, 27.9-28.2 GHz, 31-31.3 GHz, 38-39.5 GHz, 47.2-47.5 GHz, and 47.9-48.2 GHz in APT countries would be useful for developing better regulatory mechanism and usage strategy of HAPS in APT countries.

1. **Objective of the Questionnaire:**

To facilitate the study of the current status and future plan on regulation and usage of HAPS in the fixed service in the bands of 6 440-6 520 MHz, 6 560-6 640 MHz, 27.9-28.2 GHz, 31-31.3 GHz, 38-39.5 GHz, 47.2-47.5 GHz, and 47.9-48.2 GHz in APT countries.

The response to this questionnaire will assist AWG to develop a new APT Report on *Current status and future plan on regulations and usage of HAPS in the fixed service in APT countries* which would be essential for developing better regulatory mechanism and usage strategy of HAPS which can be used by individual APT country or by the region. A brief HAPS network configuration is shown in Annex 1.

In order to provide such result in a timely manner, it is encouraged that APT Members to provide their responses by AWG-27 meeting.

1. **Responsible Group:**

Task Group HAPS

1. **Rapporteur of the Questionnaire:**

Mrs. ANNA CHRISTINA SITUMORANG (INS)

1. **Meeting at which the Questionnaire was approved:**

AWG-26 Document: AWG-26/OUT-18

1. **Target Responder:**

APT Members

1. **Deadline for Responses:**

In order to provide the result in a timely manner, APT Members are encouraged to respond by AWG-27 meeting.

1. **Questionnaire:**

The questionnaire consists of three parts: A. General Information, B. Regulation and C. Usage

1. **General Information**

At this part, the questions will be focused on the general information of the respondent.

1. **Institution/Company Information and Profile:**

Name of organization : <please type your answer here>

APT membership status :

1. Member
2. Affiliate
3. Associate

Official address : <please type your answer here>

Name of contact person : <please type your answer here>

Contact person E-mail : <please type your answer here>

Organization type :

* 1. Administrator
  2. Regulator
  3. Operator
  4. Vendor
  5. Other <please describe your answer here>

**NOTE:** You do not necessarily need to respond to all the questions in this Questionnaire. It is greatly appreciated if you could provide any relevant information or considerations as much as possible.

1. **Regulation**

At this part the questions will be focused on the current or and future plan of regulation on HAPS.

**Question 1:** What is/are the current and future planned service(s) and application(s) in the frequency bands identified for HAPS in your country?

*(Please fill your answers in the appropriate box)*

|  |  |  |  |
| --- | --- | --- | --- |
| **RR footnote** | **Frequency band** | **Current status of services (systems)** | **Future plan for implementing HAPS** |
| No.**5.457** | 6 440-6 520 MHz | FIXED (HAPS)  FIXED (other than HAPS)  FIXED-SATELLITE (Earth-to-space)  MOBILE  other(s) <please type your answer here> | Yes  <please describe your plan here>  No  Not sure |
| No.**5.457** | 6 560-6 640 MHz | FIXED (HAPS)  FIXED (other than HAPS)  FIXED-SATELLITE (Earth-to-space)  MOBILE  other(s) <please type your answer here> | Yes  <please describe your plan here>  No  Not sure |
| No.**5.537A** | 27.9-28.2 GHz | FIXED (HAPS)  FIXED (other than HAPS)  FIXED-SATELLITE (Earth-to-space)  MOBILE  other(s) <please type your answer here> | Yes  <please describe your plan here>  No  Not sure |
| No.**5.543B** | 31-31.3 GHz | FIXED (HAPS)  FIXED (other than HAPS)  MOBILE  Standard frequency and time signal-satellite (Earth-to-space)  Space research  other(s) <please type your answer here> | Yes  <please describe your plan here>  No  Not sure |
| No.**5.550D** | 38-39.5 GHz | FIXED (HAPS)  FIXED (other than HAPS)  FIXED-SATELLITE (space-to-Earth)  MOBILE  Earth exploration-satellite (space-to-Earth)  other(s) <please type your answer here> | Yes  <please describe your plan here>  No  Not sure |
| No.**5.552A** | 47.2-47.5 GHz | FIXED (HAPS)  FIXED (other than HAPS)  FIXED-SATELLITE (Earth-to-space)  MOBILE  other(s) <please type your answer here> | Yes  <please describe your plan here>  No  Not sure |
| No.**5.552A** | 47.9-48.2 GHz | FIXED (HAPS)  FIXED (other than HAPS)  FIXED-SATELLITE (Earth-to-space)  MOBILE  other(s) <please type your answer here> | Yes  <please describe your plan here>  No  Not sure |

**Question 2:** What license base is or will be provided for HAPS in the following bands?

*(Please fill your answers in the appropriate box)*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **RR footnote** | **Frequency band** | **License base provided for HAPS (may choose more than one)** | | | |
| RF | Coverage | Duration  of license | Other  (if any) |
| No.**5.457** | 6 440-6 520 MHz | Class  Station  BW  Other  <please type your answer here> | National  Cluster  Other  <please type your answer here> | Annual  <1 year  >1 year  Occasion  Other  <please type your answer here> | <please type your answer here> |
| No.**5.457** | 6 560-6 640 MHz | Class  Station  BW  Other  <please type your answer here> | National  Cluster  Other  <please type your answer here> | Annual  <1 year  >1 year  Occasion  Other  <please type your answer here> | <please type your answer here> |
| No.**5.537A** | 27.9-28.2 GHz | Class  Station  BW  Other  <please type your answer here> | National  Cluster  Other  <please type your answer here> | Annual  <1 year  >1 year  Occasion  Other  <please type your answer here> | <please type your answer here> |
| No.**5.543B** | 31-31.3 GHz | Class  Station  BW  Other  <please type your answer here> | National  Cluster  Other  <please type your answer here> | Annual  <1 year  >1 year  Occasion  Other  <please type your answer here> | <please type your answer here> |
| No.**5.550D** | 38-39.5 GHz | Class  Station  BW  Other  <please type your answer here> | National  Cluster  Other  <please type your answer here> | Annual  <1 year  >1 year  Occasion  Other  <please type your answer here> | <please type your answer here> |
| No.**5.552A** | 47.2-47.5 GHz | Class  Station  BW  Other  <please type your answer here> | National  Cluster  Other  <please type your answer here> | Annual  <1 year  >1 year  Occasion  Other  <please type your answer here> | <please type your answer here> |
| No.**5.552A** | 47.9-48.2 GHz | Class  Station  BW  Other  <please type your answer here> | National  Cluster  Other  <please type your answer here> | Annual  <1 year  >1 year  Occasion  Other  <please type your answer here> | <please type your answer here> |

**Notes:**

* BW: bandwidth (kHz, MHz)
* Class: hard limit on i.e. pfd, e.i.r.p
* Cluster: non-nationwide, spot coverage
* National: nation wide
* Station: radio station could be ground station or/and HAPS

**Question 3:** If there are difficulties in developing and implementing HAPS in your country from the regulatory perspective, please describe the details below.

**Answer:**

<please type your answer here>

1. **Usage(s)**

At this part the questions will be focused on the current or and future plan of HAPS usage.

**Question 4:** Among these usages supported by HAPS, which would be envisaged in the following frequency bands?

*(Please fill your answers in the appropriate box)*

|  |  |  |
| --- | --- | --- |
| **RR footnote** | **Frequency band** | **Usage (may choose more than one)** |
| No.**5.457** | 6 440-6 520 MHz | Backhaul  Last mile  other(s) <please type your answer here> |
| No.**5.457** | 6 560-6 640 MHz | Backhaul  Last mile  other(s) <please type your answer here> |
| No.**5.537A** | 27.9-28.2 GHz | Backhaul  Last mile  other(s) <please type your answer here> |
| No.**5.543B** | 31-31.3 GHz | Backhaul  Last mile  other(s) <please type your answer here> |
| No.**5.550D** | 38-39.5 GHz | Backhaul  Last mile  other(s) <please type your answer here> |
| No.**5.552A** | 47.2-47.5 GHz | Backhaul  Last mile  other(s) <please type your answer here> |
| No.**5.552A** | 47.9-48.2 GHz | Backhaul  Last mile  other(s) <please type your answer here> |

**Question 5:** Among these applications supported by HAPS, which would be envisaged in the following frequency bands?

*(Please fill your answers in the appropriate box)*

|  |  |  |
| --- | --- | --- |
| **RR footnote** | **Frequency band** | **Application (may choose more than one)** |
| No.**5.457** | 6 440-6 520 MHz | Rural and Remote  Disaster relief  Remote sensing  geo-localization  Mobile support  SCADA  other(s) <please type your answer here> |
| No.**5.457** | 6 560-6 640 MHz | Rural and Remote  Disaster relief  Remote sensing  geo-localization  Mobile support  SCADA  other(s) <please type your answer here> |
| No.**5.537A** | 27.9-28.2 GHz | Rural and Remote  Disaster relief  Remote sensing  geo-localization  Mobile support  SCADA  other(s) <please type your answer here> |
| No.**5.543B** | 31-31.3 GHz | Rural and Remote  Disaster relief  Remote sensing  geo-localization  Mobile support  SCADA  other(s) <please type your answer here> |
| No.**5.550D** | 38-39.5 GHz | Rural and Remote  Disaster relief  Remote sensing  geo-localization  Mobile support  SCADA  other(s) <please type your answer here> |
| No.**5.552A** | 47.2-47.5 GHz | Rural and Remote  Disaster relief  Remote sensing  geo-localization  Mobile support  SCADA  other(s) <please type your answer here> |
| No.**5.552A** | 47.9-48.2 GHz | Rural and Remote  Disaster relief  Remote sensing  geo-localization  Mobile support  SCADA  other(s) <please type your answer here> |

**Question 6:** what sector or industry that will be benefited by using HAPS in the following frequency bands?

*(Please fill your answers in the appropriate box)*

|  |  |  |
| --- | --- | --- |
| **RR footnote** | **Frequency band** | **Sector or Industry (may choose more than one)** |
| No.**5.457** | 6 440-6 520 MHz | Telecommunication  Education  Health  Agriculture  Fishery  Oil, mineral and gas  Forestry  Transportation  Media  other(s) <please type your answer here> |
| No.**5.457** | 6 560-6 640 MHz | Telecommunication  Education  Health  Agriculture  Fishery  Oil, mineral and gas  Forestry  Transportation  Media  other(s) <please type your answer here> |
| No.**5.537A** | 27.9-28.2 GHz | Telecommunication  Education  Health  Agriculture  Fishery  Oil, mineral and gas  Forestry  Transportation  Media  other(s) <please type your answer here> |
| No.**5.543B** | 31-31.3 GHz | Telecommunication  Education  Health  Agriculture  Fishery  Oil, mineral and gas  Forestry  Transportation  Media  other(s) <please type your answer here> |
| No.**5.550D** | 38-39.5 GHz | Telecommunication  Education  Health  Agriculture  Fishery  Oil, mineral and gas  Forestry  Transportation  Media  other(s) <please type your answer here> |
| No.**5.552A** | 47.2-47.5 GHz | Telecommunication  Education  Health  Agriculture  Fishery  Oil, mineral and gas  Forestry  Transportation  Media  other(s) <please type your answer here> |
| No.**5.552A** | 47.9-48.2 GHz | Telecommunication  Education  Health  Agriculture  Fishery  Oil, mineral and gas  Forestry  Transportation  Media  other(s) <please type your answer here> |

ANNEX 1

**Example of HAPS Network Configuration**

For its last mile and backhaul connectivity, HAPS may use frequency bands already identified in the ITU Radio Regulations for HAPS in the fixed service in the frequency bands of 6 440-6 520 MHz, 6 560-6 640 MHz, 27.9-28.2 GHz, 31.0-31.3 GHz, 38-39.5 GHz, 47.2-47.5 GHz, 47.9-48.2 GHz. An example of HAPS network in the fixed service is provided in the figure-1 as detailed in the Report ITU-R F.2439.

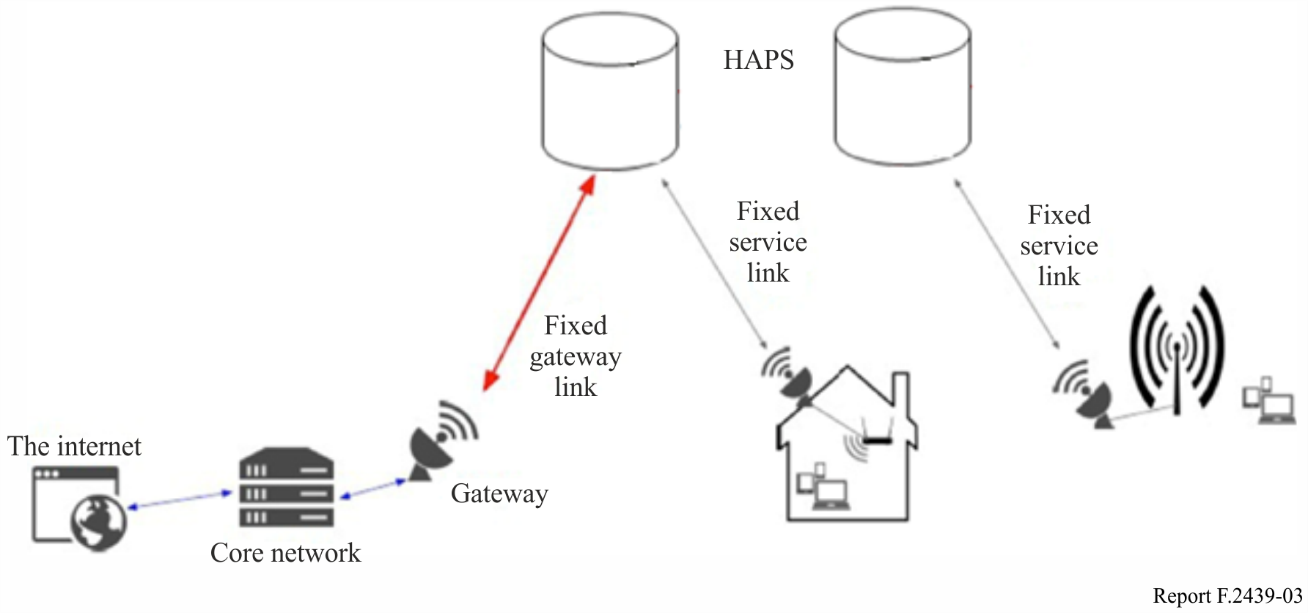


Figure-1. Example of HAPS Network Configuration

HAPS will be operated in accordance to related articles in ITU Radio Regulations, utilizing airborne platform either LTA (lighter than air) platform such as dirigible balloon or HTA (heavier than air) platform such as unmanned fixed wing air vehicle, either in stand-alone mode or in constellation mode.

HAPS will carry a mission payload that performs specific tasks such as internet (IP) communication services by providing access link (HAPS to end user terminal) and backhaul link (HAPS to gateway station) as well as mission bus for telemetry-telecommand of HAPS. The backhaul link can be done either directly from HAPS to gateway station or via IHL (inter HAPS link) as well as via HSL (HAPS-satellite link).