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| APTlogogreen3 | ASIA-PACIFIC TELECOMMUNITY |  |
| **The 23rd Meeting of the APT Wireless Group (AWG-23)**  |  |
| 9 – 13 April 2018, Da Nang City, Socialist Republic of Viet Nam | 13 April 2018 |

Source: AWG-23/OUT-15(Rev.1)

Ad Hoc Group on HAPS

**questionnaire ON current status and future plan related to HAPS in APT countries**

**Section 1: Elementary Part**

1. **Introduction:**

High altitude platform station (HAPS) 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. Considering that a large number of people remain unconnected, there is a need for greater broadband connectivity and telecommunication services in underserved communities and in rural and remote areas. This challenge has focused attention on many tools in the broadband connectivity toolkit. HAPS is also a possible mean to deal with the challenge by providing both fixed and mobile services in remote areas, including mountainous, coastal and sandy desert areas.

Some identifications for HAPS have been added in Radio Regulation. WRC-97 added a global identification for HAPS in the frequency bands 47.2-47.5 GHz and 47.9-48.2 GHz. WRC-2000 agreed, because of concerns with rain fade in that frequency range, on a HAPS identification for the frequency band 27.9-28.2 GHz (fixed downlink), paired with the frequency band 31.0-31.3 GHz (fixed uplink), outside Region 2. At WRC-12 five countries joined footnote 5.457 for a HAPS designation in the fixed service for frequency bands 6 440-6 520 MHz (HAPS-to-ground) and 6 560-6 640 MHz (ground-to-HAPS). In addition, according to Resolution 221 (Rev.WRC-07), in Regions 1 and 3, the bands 1 885-1 980 MHz, 2 010-2 025 MHz and 2 110-2 170 MHz and, in Region 2, the bands 1 885-1 980 MHz and 2 110-2 160 MHz may be used by HAPS as base stations to provide International Mobile Telecommunications (IMT).

In some ITU-R Recommendation, such as Rec. ITU-R F.1500, Rec. ITU-R F.1569, the HAPS configurations are based on large, lighter-than-air platforms. In recent years, the platform has been extended to both lighter-than-air platforms and heavier-than-air platforms, and newly envisaged HAPS broadband system architecture occurs. But all the existing HAPS identifications were established without reference to today's broadband HAPS.

At the last meeting of APT Conference Preparatory Group (APG19-3), a proposal contributed from Japan (APG19-3/INP-54) was considered as an initial idea for inclusion in the agenda of future WRC meeting. The proposal is to consider identification to use HAPS as base stations to provide IMT in the frequency bands around and below 2 GHz that have been already identified to IMT, and whether changes are needed to the set of existing bands identified for use by HAPS IMT base stations. APG19-3 invited AWG to develop further technical information and inform APG the results of its studies in a timely manner for consideration.

1. **Objective of the Questionnaire:**

To facilitate the study of the existing and future operation of HAPS in the frequency band around and below 2 GHz in the Asia Pacific region and to support discussion of a possible future WRC-23 Agenda Item in APG19, and collect the information of service-link in mobile service and feeder-link in fixed service, AWG-23 developed this questionnaire to collect the information on the current status and future plan of implementation and deployment relating to HAPS in APT countries.

The replies to the questionnaire will assist AWG to develop a new APT report to inform APG on current status and future plan of implementation and development relating to HAPS in APT countries.

In order to provide the result to APG19-4 meeting in a timely manner, it is encouraged APT Members to provide their responses by the next 24th meeting of AWG in 3Q 2018. If any further or updated information received in AWG-25, these information will be provided to APG19-5.

It should be noted that every APT Member does not necessarily need to respond to all the questions in the questionnaire.

1. **Responsible Group:**

Ad Hoc Group HAPS

1. **Rapporteur of the Questionnaire:**

TBD

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

AWG-23 Document: AWG-23/OUT-15

1. **Target Responder:**

APT Members

1. **Deadline for Responses:**

In order to provide the result to APG19-4 meeting in a timely manner, APT Members are encouraged to respond at AWG-24, with possibilities to further add or update information at AWG-25.

**Section 2: Questionnaire Part**

**About Your Administration**

Name of Administration :

Name of Contact Person :

Telephone Number :

Postal Address :

Email Address :

**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.

**Questions:**

Question 1: What is/are current usage and future plan(s) for HAPS in frequency bands already identified to HAPS in your country?

**Example:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **1. RR** | **2. Frequency Ranges** | **3. Have HAPS trials** | **4.If yes, please describe HAPS currently using scenario** | **5.Have future plan for HAPS(Please describe)** |
| 5.388A | 1885-1980 MHz | [x] Yes[ ] No[ ]  Not sure | [x] Disaster Relief[ ] Emergency communication[ ]  Broadband connectivity[ ] Others | [x] Yes        [ ] No[ ]  Not sure |

**Answer:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **1. RR** | **2. Frequency Ranges** | **3. Have HAPS trials** | **4.If yes, please describe HAPS currently using scenario** | **5.Have future plan for HAPS****(Please describe)** |
| 5.388A | 1885-1980 MHz | [ ] Yes[ ] No[ ]  Not sure | [ ] Disaster Relief[ ] Emergency communication[ ]  Broadband connectivity[ ] Others | [ ] Yes        [ ] No[ ]  Not sure |
| 5.388A | 2010-2025MHz | [ ] Yes[ ] No[ ]  Not sure | [ ] Disaster Relief[ ] Emergency communication[ ]  Broadband connectivity[ ] Others  | [ ] Yes        [ ] No[ ]  Not sure |
| 5.388A | 2110-2170MHz | [ ] Yes[ ] No[ ]  Not sure | [ ] Disaster Relief[ ] Emergency communication[ ]  Broadband connectivity[ ] Others | [ ] Yes        [ ] No[ ]  Not sure |

Question 2:

What is/are current and future planned service(s)using inthe frequency bands identified to IMT around and below 2 GHz (or part(s) bands) in your country?

Which frequency bands are you interested in introduction of HAPS IMT in your country?

Which service(s) or system(s) do you particularly concern in terms of sharing and compatibility with HAPS IMT base stations? (see also Annex 1). Please provide concerned service(s) or system(s), frequency range and reasons.

Please fill your answers in the table below refer to the example.

**Example:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **1. RR** | **2. Frequency Ranges** | **3. IMT or Services currently using and future planned**  | **4. Interest in introduction of HAPS IMT**  | **5. Concerned services or systems in terms of sharing and compatibility with HAPS IMT base stations(Please describe reasons as well)** |
| 5.388 | 2 110-2 200 MHz | [x] IMT | [x]  Yes[ ]  No [ ]  Not sure | MSS (s/E), 2170-2200 MHz, widly covered |
| [ ]  FIXED |
| [ ]  MOBILE (other than IMT) |
| [ ] SPACE RESEARCH (deep space) |
| [x] MOBILE-SATELLITE (space-to-Earth) |
| [ ]  OthersPlease put the service |

**Answer:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **1. RR** | **2. Frequency Ranges** | **3. IMT or Services currently using and future planned**  | **4. Interest in introduction of HAPS IMT** | **5. Concerned services or systems in terms of sharing and compatibility with HAPS IMT base stations(Please describe reasonsas well)** |
| 5.286AA | 450-470 MHz | [ ] IMT | [ ] Yes[ ] No[ ]  Not sure |       |
|  |  | [ ] FIXED |  |  |
|  |  | [ ] MOBILE (other than IMT) |  |  |
|  |  | [ ]  OthersPlease put the service |  |  |
| 5.296A | 470-698 MHz | [ ] IMT | [ ]  Yes[ ]  No [ ]  Not sure |       |
|  |  | [ ] FIXED |  |  |
|  |  | [ ] MOBILE (other than IMT) |  |  |
|  |  | [ ] BROADCASTING |  |  |
|  |  | [ ] RADIONAVIGATION |  |  |
|  |  | [ ]  OthersPlease put the service |  |  |
| 5.296A | 610-698 MHz | [ ] IMT | [ ]  Yes[ ]  No [ ]  Not sure |       |
|  |  | [ ] FIXED |  |  |
|  |  | [ ] MOBILE (other than IMT) |  |  |
|  |  | [ ] BROADCASTING |  |  |
|  |  | [ ]  OthersPlease put the service |  |  |
| 5.313A | 698-790MHz | [ ] IMT | [ ]  Yes[ ]  No [ ]  Not sure |       |
|  |  | [ ] FIXED |  |  |
|  |  | [ ] MOBILE (other than IMT) |  |  |
|  |  | [ ] BROADCASTING |  |  |
|  |  | [ ]  OthersPlease put the service |  |  |
| 5.317A | 790-960 MHz | [ ] IMT | [ ]  Yes[ ]  No [ ]  Not sure |       |
|  |  | [ ] FIXED |  |  |
|  |  | [ ] MOBILE (other than IMT) |  |  |
|  |  | [ ] BROADCASTING |  |  |
|  |  | [ ]  OthersPlease put the service |  |  |
| 5.341C | 1 427-1 452 MHz | [ ] IMT | [ ]  Yes[ ]  No [ ]  Not sure |       |
|  |  | [ ] SPACE OPERATION (Earth-to-space) |  |  |
|  |  | [ ] FIXED |  |  |
|  |  | [ ] MOBILE (other than IMT) |  |  |
|  |  | [ ]  OthersPlease put the service |  |  |
| 5.346A | 1 452- 1492 MHz | [ ] IMT | [ ]  Yes[ ]  No [ ]  Not sure |       |
|  |  | [ ] FIXED |  |  |
|  |  | [ ] MOBILE (other than IMT) |  |  |
|  |  | [ ] BROADCASTING |  |  |
|  |  | [ ] BROADCASTING-SATELLITE |  |  |
|  |  | [ ]  OthersPlease put the service |  |  |
| 5.341C | 1 492-1 518 MHz | [ ] IMT | [ ]  Yes[ ]  No [ ]  Not sure |       |
|  |  | [ ] FIXED |  |  |
|  |  | [ ] MOBILE (other than IMT) |  |  |
|  |  | [ ]  OthersPlease put the service |  |  |
| 5.384A | 1 710-1 885 MHz | [ ] IMT | [ ]  Yes[ ]  No [ ]  Not sure |       |
|  |  | [ ] FIXED |  |  |
|  |  | [ ] MOBILE (other than IMT) |  |  |
|  |  | [ ]  OthersPlease put the service |  |  |
| 5.388 | 1 885-2 025 MHz | [ ] IMT | [ ]  Yes[ ]  No [ ]  Not sure |       |
|  |  | [ ] FIXED |  |  |
|  |  | [ ] MOBILE (other than IMT) |  |  |
|  |  | [ ] MOBILE-SATELLITE (Earth-to-space) |  |  |
|  |  | [ ]  OthersPlease put the service |  |  |
| 5.388 | 2 110-2 200 MHz | [ ] IMT | [ ]  Yes[ ]  No [ ]  Not sure |       |
|  |  | [ ] FIXED |  |  |
|  |  | [ ] MOBILE (other than IMT) |  |  |
|  |  | [ ] SPACE RESEARCH (deep space) |  |  |
|  |  | [ ] MOBILE-SATELLITE (space-to-Earth) |  |  |
|  |  | [ ]  OthersPlease put the service |  |  |
| 5.384A | 2 300-2400 MHz | [ ] IMT | [ ]  Yes[ ]  No [ ]  Not sure |       |
|  |  | [ ] FIXED |  |  |
|  |  | [ ] MOBILE (other than IMT) |  |  |
|  |  | [ ] RADIOLOCATION |  |  |
|  |  | [ ]  OthersPlease put the service |  |  |
| 5.384A | 2 500-2690 MHz | [ ] IMT | [ ]  Yes[ ]  No [ ]  Not sure |       |
|  |  | [ ] FIXED |  |  |
|  |  | [ ] MOBILE (other than IMT) |  |  |
|  |  | [ ] FIXED-SATELLITE (space-to-Earth) |  |  |
|  |  | [ ] MOBILE-SATELLITE (space-to-Earth) |  |  |
|  |  | [ ] BROADCASTING-SATELLITE |  |  |
|  |  | [ ] FIXED-SATELLITE(Earth-to-space) |  |  |
|  |  | [ ] MOBILE-SATELLITE(Earth-to-space) |  |  |
|  |  | [ ]  OthersPlease put the service |  |  |

Question 3: What kind of technical studies, in addition to those outlined in Annex 2, are required for substantial consideration for the introduction of HAPS as IMT base stations in the frequency bands identified for IMT around and below 2GHz bands?

Views：

**Annex 1**

**Assumed Usage of HAPS IMT Base Stations and Sharing Studies
(cited from APG19-3/INP-54)**

For its backhaul connection, HAPS IMT base stations will use frequency bands already identified or being studied under WRC-19 Agenda Item 1.14 for HAPS as stations in the fixed service. User terminals to be used to provide service and which will connect to HAPS IMT base stations are expected to be the same as the ones used in terrestrial IMT systems.

Therefore, possible interference scenario to be assessed in sharing studies would be between HAPS IMT base stations and services in neighboring countries.



***[Editor’s Note:*** *The description above mentioned possible interference studies in the frequency bands on Service-link (blue and red lines in the above figure). Note that actual sharing and compatibility studies will be conducted once the future WRC meeting adopted this possible Agenda Item.]*

**Annex 2**

**proposed Working document towards a preliminary draft new AWG report on****Technical and operational Analysis for USING HAPS as imt base stations in the frequency bands around and below 2 GHz identified to IMT**

**Suggested Scope:** This report is to provide technical and operational analysis information as required by APG-19.

**Suggested Layout:** Administrations are invited to propose additional elements or improvements to this layout.

1. Introduction

*Description of “underserved areas” concept, current and future situations of global “underserved areas” and related challenges, potential role of HAPS as IMT base station to address these challenges.*

*[Note: this session to answer why we may need HAPS]*

*A general introduction to and a background history of HAPS as base stations to provide IMT.*

1. Possible usage scenarios and befits of HAPS as IMT base stations

*Description of possible usage scenarios, including mobile connectivity in underserved areas, disaster relief and emergency communications and benefits of using HAPS as IMT base stations.*

1. Architecture of HAPS as IMT base stations

*Description of system architecture including frequency usage scenarios (**service-link in mobile service and feeder-link in fixed service) and network architecture*

1. Analysis on spectrum usage in APT countries

*Analysis on regulatory conditions and current and future usage in APT countries of the frequency bands around and below 2 GHz identified to IMT based on replies of the questionnaire*

1. Potential impacts using HAPS as IMT base stations

Analysis on the potential interference scenarios and initial compatibility studies, if any.

Analysis on the operational and regulatory issues, if any.

1. Analysis on necessary studies in the future WRC meeting and next ITU-R study period

*Analysis on expected studies (e.g. sharing and compatibility studies’ scenarios)*

**Note:** This report will be initialized in AWG-24 (September 2018) to inform APG19-4 (January 2019) and is planned to be finalized in AWG-25 (TBD, 2019) in order to support discussion of a possible future WRC-23 Agenda Item in APG19

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