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| **The 3rd Meeting of the APT Conference Preparatory Group for WRC-19 (APG19-3)** | **APG19-3/OUT-06** |
| 12 – 16 March 2018, Perth, Australia | **16 March 2018** |

Working Party 1

**PRELIMINARY VIEWs on WRC-19 agenda item 1.14**

**Agenda Item 1.14:**

*To consider, on the basis of ITU R studies in accordance with Resolution* ***160 (WRC 15)****, appropriate regulatory actions for high-altitude platform stations (HAPS), within existing fixed-service allocations*

**1. Background**

**Resolution 160 (WRC-15)** “Facilitating access to broadband applications delivered by high-altitude platform stations”

resolves to invite ITU‑R

1. to study additional spectrum needs for gateway and fixed terminal links for HAPS to provide broadband connectivity in the fixed service taking into account:

* the existing identifications and deployments of HAPS systems;
* the deployment scenarios envisioned for HAPS broadband systems and related requirements such as in remote areas;
* the technical and operational characteristics of HAPS systems, including the evolution of HAPS through advances in technology and spectrally-efficient techniques, and their deployment;

1. to study the suitability of using the existing identifications in recognizing c), on a global or regional level, taking into account the regulatory provisions, such as geographical and technical restrictions associated with existing HAPS identifications based on the study performed in resolves to invite ITU‑R 1;
2. to study appropriate modifications to the existing footnotes and associated resolutions in the identifications in recognizing c) in order to facilitate the use of HAPS links on a global or regional level, limited to the currently identified frequency bands and, where the use of an identification is not technically feasible for HAPS use, the possible removal of the unsuitable identification;
3. to study, in order to meet any spectrum needs which could not be satisfied under resolves to invite ITU‑R 1 and 2, for the use of gateway and fixed terminal links for HAPS, the following frequency bands already allocated to the fixed service on a primary basis, not subject to Appendices 30, 30A, and 30B in any region:

* on a global level: 38-39.5 GHz, and
* on a regional level: in Region 2, 21.4-22 GHz and 24.25-27.5 GHz,

further resolves

1. that the studies referred to in *resolves to invite ITU‑R* 3 and 4 include sharing and compatibility studies to ensure protection of existing services allocated in the frequency ranges identified and, as appropriate, adjacent band studies, taking into account studies already performed in ITU‑R;
2. that modifications studied under *resolves to invite ITU‑R* 3 shall not consider the use of HAPS links in the frequency bands subject to Appendix **30B**;
3. to develop ITU‑R Recommendations and Reports, as appropriate, on the basis of the studies called for in *resolves to invite ITU‑R*1, 2, 3, and 4 above,

…

resolves to invite the 2019 World Radiocommunication Conference

to consider the results of the above studies and take necessary regulatory actions, as appropriate, provided that the results referred to in *resolves to invite ITU‑R* are complete and agreed by ITU-R study groups.

Relevant ITU-R ongoing studies are as follows,

* WD toward draft CPM text on WRC-19 agenda item 1.14 (5C/410 Annex 10)
* Workplan for WRC-19 agenda item 1.14 (5C/410 Annex 11)
* WD towards a PDN Report ITU-R F.[HAPS-SPECTRUM-NEEDS] (5C/410 Annex 12)
* HAPS Spec Requirement(5C/410 Annex 13)
* WD towards a PDN Recommendation ITU-R F.[BROADBAND HAPS CHARACTERISTICS] (5C/410 Annex 14)
* WD towards a PDN Recommendation ITU-R F.[HAPS-6GHz, 21GHz, 25GHz, 31Gz, 39GHz, 47GHz](5C/410 Annex 15-20)

The ITU has published the following Recommendations on HAPS usage in 47.2–47.5 GHz and 47.9‑48.2 GHz bands: [F.1500](http://www.itu.int/rec/R-REC-F/recommendation.asp?lang=en&parent=R-REC-F.1500), [F.1501](http://www.itu.int/rec/R-REC-F/recommendation.asp?lang=en&parent=R-REC-F.1501), [F.1608](http://www.itu.int/rec/R-REC-F/recommendation.asp?lang=en&parent=R-REC-F.1608), [F.1764](http://www.itu.int/rec/R-REC-F/recommendation.asp?lang=en&parent=R-REC-F.1764), [F.1819](http://www.itu.int/rec/R-REC-F/recommendation.asp?lang=en&parent=R-REC-F.1819), [F.1820](http://www.itu.int/rec/R-REC-F/recommendation.asp?lang=en&parent=R-REC-F.1820), [P.1409](http://www.itu.int/rec/R-REC-p/recommendation.asp?lang=en&parent=R-REC-P.1409), [SF.1481](http://www.itu.int/rec/R-REC-SF/recommendation.asp?lang=en&parent=R-REC-SF.1481), [SF.1843](http://www.itu.int/rec/R-REC-SF/recommendation.asp?lang=en&parent=R-REC-SF.1843).

The ITU has published the following Recommendations on HAPS usage in the 27.9-28.2 GHz and 31.0-31.3 GHz band: [F.1569](http://www.itu.int/rec/R-REC-F/recommendation.asp?lang=en&parent=R-REC-F.1569), [F.1570](http://www.itu.int/rec/R-REC-F/recommendation.asp?lang=en&parent=R-REC-F.1570), [F.1607](http://www.itu.int/rec/R-REC-F/recommendation.asp?lang=en&parent=R-REC-F.1607), [F.1609](http://www.itu.int/rec/R-REC-F/recommendation.asp?lang=en&parent=R-REC-F.1609), [F.1612](http://www.itu.int/rec/R-REC-F/recommendation.asp?lang=en&parent=R-REC-F.1612), [F.1764](http://www.itu.int/rec/R-REC-F/recommendation.asp?lang=en&parent=R-REC-F.1764), [P.1409](http://www.itu.int/rec/R-REC-p/recommendation.asp?lang=en&parent=R-REC-P.1409), [SF.1601](http://www.itu.int/rec/R-REC-SF/recommendation.asp?lang=en&parent=R-REC-SF.1601).

The ITU has published the following Reports and Recommendations on HAPS usage in the 6 440‑6 520 MHz (HAPS-ground) and 6 560-6 640 MHz (ground-HAPS) band: [F.2240](http://www.itu.int/pub/R-REP-F/publications.aspx?lang=en&parent=R-REP-F.2240), [F.1764](http://www.itu.int/rec/R-REC-F/recommendation.asp?lang=en&parent=R-REC-F.1764), [F.1891](http://www.itu.int/rec/R-REC-F/recommendation.asp?lang=en&parent=R-REC-F.1891), [F.2011](http://www.itu.int/rec/R-REC-F/recommendation.asp?lang=en&parent=R-REC-F.2011), [P.1409](http://www.itu.int/rec/R-REC-p/recommendation.asp?lang=en&parent=R-REC-P.1409).

**2. Documents**

* Input Documents:

APG19-3/INP-14(IND), INP-21(KOR), INP-28(IRN), INP-34(NZL), INP-41(AUS), INP-49(J), INP-65(SIN), INP-78(INS), INP-82(VTN), INP-86(CHN), INP-96(Rev.1)(BGD).

* Information Documents: APG19-3/INF-05(Rev.1)(Multi Affiliate Members), INF-06(CEPT), INF-08(CITEL).

**3. Summary of discussions**

**3.1 Summary of APT Members’ views**

**3.1.1 India– Document APG19-3/INP-14**

India acknowledges capabilities of HAPS technologies to complement existing terrestrial and satellite networks by supplying backhaul capacity to enable and accelerate deployments in unserved and underserved areas. This has the potential to support broadband penetration in hard to reach locations, bringing the benefits of the digital economy to the vast share of Indians residing in rural areas.

Given the insufficiency of existing identifications, India supports appropriate regulatory actions to accommodate HAPS future spectrum needs.

**3.1.2 Korea– Document APG19-3/INP-21**

The Republic of Korea proposes modifications to the APT preliminary views adopted at the APG19-2 as stated below:

“APT Members support the ITU-R studies undertaken in accordance with Resolution **160 (WRC-15)** to study spectrum needs for High Altitude Platform Stations (HAPS), taking into account existing frequency bands that have already been identified for HAPS in the Radio Regulations and appropriate regulatory actions.

APT Members also support the ITU-R studies on sharing and compatibility between HAPS and other services to ensure protection of current and future development of existing services to which frequency bands are allocated without any constraint to these services in accordance with Resolution **160 (WRC-15)**.”

**3.1.3 I.R. of Iran– Document APG19-3/INP-28**

This Administration is in the opinion that any additional identification for the HAPS links should be based on sufficient ITU-R sharing studies and real need of spectrum for specific applications taking into account the suitability of existing identifications for new spectrum accommodation. Furthermore, the studies shall ensure the protection of the existing services and their future developments without any constraint.

**3.1.4 New Zealand– Document APG19-3/INP-34**

New Zealand supports theITU-R studies undertaken in accordance with Resolution **160 (WRC-15)** in order to justify spectrum needs for High Altitude Platform Stations (HAPS), taking into account existing frequency bands that have already been identified for HAPS in the Radio Regulations.

If spectrum needs could not be satisfied within those existing HAPS identifications, any consideration for possible new HAPS identification should not restrict the consideration of the overlapping frequency bands for possible IMT identification with respect to WRC-19 Agenda item 1.13.

**3.1.5 Australia– Document APG19-3/INP-41**

ITU-R studies for developing regulatory actions for high-altitude platform stations (HAPS), should consider suitability of using the existing identifications in RR Table of Frequency Allocations and footnotes taking into account the regulatory provisions, such as geographical and technical restrictions associated with existing HAPS identifications.

Australia supports the suppression of identifications, should studies conclude existing HAPS Radio Regulations identifications are not in use and existing footnotes and associated Resolutions are not suitable, or modifications are not appropriate and where the use of an identification is not technically feasible for HAPS.

Otherwise, Australia supports consideration of use of gateway and fixed terminal links for HAPS, in the following frequency bands already allocated to the fixed service on a primary basis, not subject to Appendices **30**, **30A**, and **30B** in any region:

* on a global level: 38-39.5 GHz, and
* on a regional level: in Region 2, 21.4-22 GHz and 24.25-27.5 GHz.

Acceptance of an identification for HAPS in the above bands is subject to ITU-R sharing and compatibility studies ensuring protection and no additional constraints on existing services allocated in the frequency ranges identified and, as appropriate, adjacent bands, taking into account studies already performed in ITU R.

**3.1.6 Japan– Document APG19-3/INP-49**

Japan is of the view that the adequate protection of existing services is necessary. Japan supports the studies being conducted in ITU-R in accordance with Resolution 160.

**3.1.7 Singapore– Document APG19-3/INP-65**

Singapore recognises the potential of HAPS as a technology for delivering broadband connectivity and better communications integration throughout Southeast Asia and to all unserved and underserved communities. For such communities, Singapore believes that HAPS can serve as an effective complement to terrestrial and satellite services.

Notwithstanding the above, Singapore noted that the frequency range of 38 - 39.5 GHz is part of one of the candidate bands being considered for IMT services under Agenda Item 1.13. The propagation range of such spectrum when deployed terrestrially is expected to be limited and this raises the possibility of geographic reusability and spectrum sharing with other services, including HAPS. Depending on national interest of each country, administrations will have the flexibility to determine and identify the services that should be deployed in this spectrum range.

Considering the above, Singapore supports appropriate regulatory actions to facilitate access to broadband applications by HAPS. Methods to resolve Agenda Item 1.14 should address the suitability of current identifications and consider additional identifications in all new candidate frequency bands in accordance to Annex 12 of the ITU-R WP 5C Chairman’s Report. Additional identifications for HAPS should ensure the protection of incumbent and potential incoming services in accordance to Annex 16, 17 and 19 of the ITU-R WP 5C Chairman’s Report.

**3.1.8 Indonesia– Document APG19-3/INP-78**

Indonesia is of the view to follow the progress of ITU-R Study Group 5 for HAPS. Moreover, any frequency band identified for the HAPS links should include sufficient ITU-R studies on the status of the technical and regulatory implementations and shall ensure the protection of the existing services and their future developments.

**3.1.9 Viet Nam – Document APG19-3/INP-82**

Viet Nam supports the relevant ITU-R studies with regard to spectrum needs and regulatory provisions for gateway station and fixed terminal links for HAPS.

Viet Nam supports the ITU-R studies on sharing and compatibility between HAPS and the other services, in order to ensure protection of current and future development of existing services.

Viet Nam proposes to consider carefully the addition of the frequency bands 38-39.5GHz and 24.25-27.5 GHz that are currently under consideration for IMT in WRC-19 Agenda 1.13.

**3.1.10 China – Document APG19-3/INP-86**

In the viewpoint of China, HAPS is capable to provide broadband access in rural and remote areas short of terrestrial telecommunication infrastructure, and as backup system to provide emergency communication service in case of other traditional communication system were failed.

For better progressing in this study item, China suggests that:

1. If a new frequency is identified for HAPS, the existing services and applications in the same frequency band should be fully protected.
2. The differences between two types of HAPS platform shall be fully considered in term of inter-system sharing and compatibility studies.

**3.1.11 Bangladesh– Document APG19-3/INP-96(Rev.1)**

Bangladesh recognizes the potential of HAPS as a technology for delivering broadband connectivity and better communications integration throughout South Asia and to all un-served and underserved communities. Bangladesh believes that HAPS can serve as an effective complement to terrestrial and satellite services. Since current identifications have geographical and technical constraints, Bangladesh supports appropriate regulatory actions to facilitate access to broadband applications by HAPS. Methods to resolve Agenda Item 1.14 should address HAPS spectrum needs considering identification in all candidate frequency bands to be used as fixed services. In addition, the Agenda Item 1.14 should also consider the spectrum as IMT in future (as appropriate) ensuring the incumbent and potential incoming services.

**3.2 Summary of issues raised during the meeting**

* Several frequency bands under study by WRC-19 agenda item 1.14 are also under consideration by WRC-19 agenda items 1.13 and 1.6, including: 37.5-39.5GHz (Agenda item 1.6); 24.5-27.5 GHz and 37-40.5 GHz (Agenda item 1.13).
* The differences between two types of HAPS Platforms, HTA and LTA, have been recognized during ITU-R studies. Methods to resolve this agenda item in accordance with Res. 160 need to recognize these different platforms.

**4. APT Preliminary View(s)**

* APT Members support the ITU-R studies undertaken in accordance with Resolution 160 (WRC-15) on spectrum needs for High Altitude Platform Stations (HAPS), taking into account existing frequency bands that have already been identified for HAPS in the Radio Regulations, and appropriate regulatory actions.
* APT Members also support sharing and compatibility studies between HAPS and other services to ensure protection of the services to which frequency bands are allocated and their future developments.

**5. Other View(s) from APT Members**

* Some APT Members support consideration of use of gateway and fixed terminal links for HAPS in the frequency band 38-39.5GHz on the global level.
* Differences between two types of HAPS Platforms, HTA and LTA, have been recognized during ITU-R studies. Some APT Members have a view that method to resolve this agenda item in accordance with Res. 160 need to recognize these different platforms.

**6. Issues for Consideration at Next APG Meeting**

* APT Members are invited to provide their views on the draft CPM text.
* APT Members are invited to provide their views on the overlapping frequency bands between agenda item 1.14 and other agenda items.

**7. Views from Other Organisations**

**7.1 Regional Groups**

**7.1.1 ASMG– Document APG19-2/INF-01**

ASMG doesn’t support any additional identifications to applications of HAPS irrespective of results of ongoing studies under AI 1.6 and AI 1.13.

**7.1.2 ATU–Document APG19-2/INF-07**

APM19-1 considered that there is need to consider the utilization of frequency bands already identified for HAPS in Article 5 of RR. Also studies should consider protection of incumbent services and systems of fixed and mobile services, this protection has been implemented in previous bands identified for HAPS.

**7.1.3 CEPT– Document APG19-3/INF-06**

CEPT supports studies under this Agenda item in accordance with Resolution 160 (WRC-15) while taking into account in particular:

* the developments and requirements in HAPS in the fixed service and the associated spectrum sharing aspects
* the need to ensure there is protection in place in order not to limit the possibility to use and develop existing services including other applications of the fixed service in the frequency bands identified and, as appropriate, in the adjacent bands.
* the need to ensure that new sharing and compatibility studies are taking into account the outcome of studies already performed in ITU-R, where relevant, to support HAPS identification, in particular when considering the possible modifications of country footnotes HAPS identification into general HAPS identification.

CEPT is finalising studies on spectrum needs for broadband connectivity HAPS applications and results so far show that current HAPS identifications would not satisfy the overall spectrum requirements for HAPS connectivity applications. CEPT is of the view that any consideration of the frequency band 24.25-27.5 GHz in Region 2 under this Agenda item should not limit the possibility to identify the band for IMT on a global level under Agenda item 1.13.

**7.1.4 CITEL– Document APG19-3/INF-08**

Preliminary views from several countries support studies. Based on the outcome of studies, several support possible modifications to existing provisions and new identifications

**7.1.5 RCC– Document APG19-2/INF-05**

* The RCC Administrations support the need to justify spectrum requirements for gateway station and fixed terminal links for HAPS to provide broadband connectivity in the fixed service taking into account frequency bands which have been already identified for HAPS.
* The RCC Administrations support necessary modifications to existing RR Article 5 footnotes and related WRC Resolutions to facilitate HAPS development at global or regional level.
* The RCC Administrations consider that in the case of modification to conditions for use of frequency bands authorized for HAPS or identification of new frequency bands for gateway station and fixed terminal links for HAPS, the protection and the possibility of further development shall be ensured for existing services, including other applications of fixed service, having allocations in these and adjacent frequency bands.

**7.2 International Organisations**

**7.2.1 IARU**

None.

**7.2.2 ICAO– Document APG19-2/INF-02**

If agreed ITU-R studies demonstrate there is no adverse impact on aeronautical systems including those used for the safe operation of the platform on which the HAPS resides, then support the use of fixed service allocations for HAPS provided that any regulatory actions taken within the existing allocations to the fixed service noted in Resolution 160 (WRC-15) do not constrain the potential future use of those HAPS fixed links as part of aeronautical communication systems (e.g. VSAT enhancement).

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