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| **The 5th Meeting of the APT Conference Preparatory****Group for WRC-23 (APG23-5)** | **APG23-5/OUT-16** |
| 20 – 25 February 2023, Busan, Republic of Korea | 24 February 2023 |

Working Party 2

**PRELIMINARY VIEWs on WRC-23 agenda item 1.10**

**Agenda Item 1.10:**

*to conduct studies on spectrum needs, coexistence with radiocommunication services and regulatory measures for possible new allocations for the aeronautical mobile service for the use of non-safety aeronautical mobile applications, in accordance with Resolution* ***430 (WRC 19)****;*

**1. Background**

Resolution **430 (WRC-19)** resolves to invite ITU-R to conduct, and complete in time for WRC-23:

* studies on spectrum needs for new non-safety aeronautical mobile applications for air-to-air, ground-to-air and air-to-ground communications of aircraft systems;
* sharing and compatibility studies in the frequency band 22-22.21 GHz, already allocated on a primary basis to the mobile, except aeronautical mobile, service, in order to evaluate the possible revision or deletion of the “except aeronautical mobile” restriction while ensuring the protection of primary services in the considered frequency bands and, as appropriate, in adjacent frequency bands;
* sharing and compatibility studies on possible new primary allocations to the aeronautical mobile service (AMS) for non-safety aeronautical applications in the frequency band 15.4-15.7 GHz, while ensuring the protection of primary services in the considered frequency bands and, as appropriate, adjacent frequency bands;
* definition of appropriate protection for passive services and radio astronomy allocated in adjacent bands from unwanted emission of AMS.

In accordance with the results of CPM23-1, ITU-R Working Party 5B (WP 5B) was assigned to be the responsible group for the Agenda Item 1.10.

During the past six WP 5B meetings, the Working Document towards a Preliminary Draft New Report ITU-R M.[NON-SAFETY AMS CHARACTERISTICS AND SHARING STUDIES] was progressed. The working document provides various characteristics from ITU-R Recommendations of systems in the incumbent services, recommended propagation models as well as preliminary characteristics and operational concept of systems in the possible new AMS allocation for non-safety application. And various sharing and compatibility studies were incorporated into this working document.

Regarding the draft CPM Report, the following methods were proposed to satisfy this agenda item:

* Method A: No change (NOC);
* Method B: New primary AM(OR)S allocation in the frequency band 15.4-15.7 GHz;
* Method C: Remove the exception of AM(OR)S in the frequency band 22-22.21 GHz;
* Method D: Combination of Methods B and C.

Methods B, C and D are accompanied with different footnotes to reflect the technical conditions which are based on the result of the technical studies.

Relevant ITU-R Reports/Recommendations and ongoing studies are as follows,

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| *Recommendations* |
| [ITU-R F.758](https://www.itu.int/rec/R-REC-F.758/en) | System parameters and considerations in the development of criteria for sharing or compatibility between digital fixed wireless systems in the fixed service and systems in other services and other sources of interference |
| [ITU-R M.1730](https://www.itu.int/rec/R-REC-M.1730-1-200910-I/en) | Characteristics of and protection criteria for the radiolocation service in the frequency band 15.4-17.3 GHz |
| [ITU-R RA.517](https://www.itu.int/rec/R-REC-RA.517-4-200605-I/en) | Protection of the radio astronomy service from transmitters operating in adjacent bands.  |
| [ITU-R RA.769](https://www.itu.int/rec/R-REC-RA.769-2-200305-I/en) | Protection criteria used for radio astronomical measurements |
| [ITU-R RA.1513](https://www.itu.int/rec/R-REC-RA.1513-2-201503-I/en) | Levels of data loss to radio astronomy observations and percentage-of-time criteria resulting from degradation by interference for frequency bands allocated to the radio astronomy service on a primary basis |
| [ITU-R RA.1631](https://www.itu.int/rec/R-REC-RA.1631-0-200305-I/en) | Reference radio astronomy antenna pattern to be used for compatibility analyses between non-GSO systems and radio astronomy service stations based on the epfd concept |
| [ITU-R RS.1028](https://www.itu.int/rec/R-REC-RS.1028-2-200305-W/en) | Performance criteria for satellite passive remote sensing  |
| [ITU-R RS.1029](https://www.itu.int/rec/R-REC-RS.1029-2-200305-W/en) | Interference criteria for satellite passive remote sensing  |
| [ITU-R RS.1813](https://www.itu.int/rec/R-REC-RS.1813-1-201102-I/en) | Reference antenna pattern for passive sensors operating in the Earth exploration-satellite service (passive) to be used in compatibility analyses in the frequency range 1.4-100 GHz |
| [ITU-R RS.1861](https://www.itu.int/rec/R-REC-RS.1861/en) | Typical technical and operational characteristics of Earth exploration-satellite service (passive) systems using allocations between 1.4 and 275 GHz |
| [ITU-R RS.2017](https://www.itu.int/rec/R-REC-RS.2017/en) | Performance and interference criteria for satellite passive remote sensing |
| [ITU-R S.1340](https://www.itu.int/rec/R-REC-S.1340-0-199710-I/en) | Sharing between feeder links for the mobile-satellite service and the aeronautical radionavigation service in the Earth-to-space direction in the band 15.4-‑15.7 GHz |
| [ITU-R S.1341](https://www.itu.int/rec/R-REC-S.1341-0-199710-I/en) | Sharing between feeder links for the mobile-satellite service and the aeronautical radionavigation service in the space-to-Earth direction in the band 15.4‑15.7 GHz and the protection of the radio astronomy service in the band 15.35-15.4 GHz |
| [ITU-R SA.509](https://www.itu.int/rec/R-REC-SA.509-3-201312-I/en) | Space research earth station and radio astronomy reference antenna radiation pattern for use in interference calculations, including coordination procedures, for frequencies less than 30 GHz  |
| [ITU-R SA.510](https://www.itu.int/rec/R-REC-SA.510-3-201707-I/en) | Feasibility of frequency sharing between the space research service and other services in bands near 14 and 15 GHz - Potential interference from data relay satellite systems |
| *Reports* |  |
| [ITU-R M.2170](https://www.itu.int/pub/R-REP-M.2170-2009) | Compatibility analysis and results for radiolocation systems planned to operate in the 15.4 to 17.3 GHz band and aircraft landing system operating in the 15.4‑15.7 GHz band as well as the radio astronomy service operating in the adjacent band 15.35-15.40 GHz, FSS systems and aeronautical radionavigation systems |
| [ITU-R M.2229](https://www.itu.int/pub/R-REP-M.2229-2011) | Compatibility study to support line-of-sight control and non-payload communications links for unmanned aircraft systems proposed in the frequency band 15.4-15.5 GHz  |
| [ITU-R M.2230](https://www.itu.int/pub/R-REP-M.2230-2011) | Frequency sharing between unmanned aircraft systems for beyond line of sight control and non-payload communications links and other existing and planned services in the frequency bands 13.25-13.40 GHz, 15.4-15.7 GHz, 22.5‑22.55 GHz and 23.55-23.60 GHz |
| [ITU-R RA.2131](https://www.itu.int/pub/R-REP-RA.2131-2009) | Supplementary information on the detrimental threshold levels of interference to radio astronomy observations in Recommendation ITU-R RA.769 |

WDPDN Recommendation ITU-R M.[15.4-15.7 GHz ARNS] Characteristics of and protection criteria for radars operating in the aeronautical radionavigation service in the frequency band 15.4‑15.7 GHz.

**2. Documents**

* Input Documents: APG23-5/INP-15(J), APG23-5/INP-27(IND), APG23-5/INP-33(BGD), APG23-5/INP-37(IRN), APG23-5/INP-53(VTN), APG23-5/INP-57(AUS), APG23-5/INP-64(KOR), APG23-5/INP-89(CHN).
* Information Documents: APG23-5/INF-01(WMO), APG23-5/INF-39(CEPT), APG23-5/INF-43(CITEL), APG23-5/INF-45(RCC).

**3. Summary of discussions**

**3.1 Summary of APT Members’ views**

**3.1.1 Japan** - **Document APG23-5/INP-15**

Japan supports further ITU-R studies on spectrum needs, coexistence with radiocommunication services and regulatory measures for possible new allocations for the aeronautical mobile service for the use of non-safety aeronautical mobile applications, in accordance with Resolution **430 (WRC-19)**.

For 15.4-15.7 GHz, Japan is of the view that harmful interference to existing primary services in the same frequency band (FSS (Fixed Satellite Service) (earth to space), ARNS (Aeronautical Radio Navigation Service), RLS (Radiolocation Service)), and in the adjacent frequency bands (RA(Radio Astronomy), EESS(Earth Exploration Satellite Service) (passive), SRS(Space Research Service) (passive), and RLS (Radiolocation Service)) should be avoided.

For 22-22.21 GHz, Japan is also of the view that harmful interference to existing primary services in the same frequency band (FS (Fixed Service), MS (Mobile Service), and in adjacent frequency bands (FS (Fixed Service), MS(Mobile Service), BS(Broadcasting Service), BSS(Broadcasting Satellite Service), EESS(Earth Exploration Satellite Service) (passive), SRS(Space Research Service) (passive), and RA(Radio Astronomy)) should be avoided.

**3.1.2 India** - **Document APG23-5/INP-27**

India supports NOC for this Agenda Item.

**3.1.3 Bangladesh** - **Document APG23-5/INP-33**

To satisfy this agenda item, Bangladesh administration supports method B of the draft CPM report to WRC-2023. However, method D could be supported if fixed service is protected from aeronautical mobile service (AMS).

**3.1.4 Iran** - **Document APG23-5/INP-37**

This Administration prefers Method C from the draft CPM Report with an associated footnote for limitation of AMS. However, there is a need to consider that, when identifying possible new allocations to aeronautical mobile service (AMS) in the frequency band 15.4–15.7 GHz as well as when removing constraints on the use of the frequency band 22 – 22.21 GHz by aeronautical mobile service for non-safety application, following actions to be taken:

• Ensure protection of the primary allocations to radiolocation, aeronautical radionavigation and fixed-satellite (Earth-to-space) services in the relevant parts of the frequency band 15.4-15.7 GHz;

• Ensure protection of the EESS/SRS (passive), and the RAS from unwanted emissions of the AMS;

• Ensure protection of the primary allocations to the fixed and mobile services in the frequency band 22-22.21 GHz and adjacent bands.

**3.1.5 Viet Nam** - **Document APG23-5/INP-53**

Viet Nam supports ITU-R studies on spectrum needs, coexistence with radiocommunication services and regulatory measures for possible new allocation to AMS for the use of non-safety aeronautical mobile applications in the frequency bands 15.4-15.7 GHz and 22-22.21 GHz in accordance with Resolution **430 (WRC-19)**, while ensuring no adverse effect on the allocation of the existing services and their future development in the same and adjacent frequency bands, in particular the fixed service allocated in the frequency band 21.2-23.6 GHz.

**3.1.6 Australia** - **Document APG23-5/INP-57**

Australia supports studies on spectrum needs for new non-safety aeronautical mobile applications as well as sharing and compatibility studies in the 15.4–15.7 GHz and 22–22.21 GHz frequency bands to evaluate possible primary allocations to aeronautical mobile services, while ensuring the protection of primary services in these bands and, as appropriate, in adjacent frequency bands.

**3.1.7 Korea (Republic of)** - **Document APG23-5/INP-64**

Based on the study results conducted by ITU-R on WRC-23 agenda item 1.10 in accordance with Resolution **430 (WRC-19)**, the Republic of Korea does not support Method A in the draft CPM Report.

**3.1.8 China** - **Document APG23-5/INP-89**

China supports studies being conducted in ITU-R in accordance with Resolution **430 (WRC-19)**;

China is the view of that the protection of incumbent services in the frequency bands 15.4-15.7GHz and 22-22.21GHz and the adjacent frequency bands should be ensured, and supports Method A (no change to RR).

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

None.

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

APT Members support ongoing ITU-R studies on spectrum needs, coexistence with radiocommunication services and regulatory measures for possible new allocations for the aeronautical mobile service for the use of non-safety aeronautical mobile applications, in accordance with Resolution **430 (WRC-19)**.

APT Members are of the view that the protection of existing primary services in the 15.4-15.7 GHz and 22-22.21 GHz frequency bands and in adjacent frequency bands should be ensured.

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

Some APT Members support Method A, no change to RR.

Some APT Members support Method B or Method C separately under condition that it shall not cause unacceptable interference nor claim protection for the services to which the band is allocated.

Some APT Members will support Method D, if the fixed service is protected from AM(OR)S.

Some APT Members are also of the view that:

* the radiolocation, aeronautical navigation and fixed-satellite (Earth-to-space) services are allocated and used in the 15.4-15.7 GHz band, and future AM(OR)S shall not cause unacceptable interference to nor claim protection from these services.
* the frequency band 21.2-23.6 GHz is extensively used by terrestrial services, in particular fixed service, to support the development of telecommunication infrastructure in many countries and crucial in developing countries and no adverse effect by the potential AM(OR)S allocation on the terrestrial services allocated in this band and its future development should be ensured.

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

APT Members are encouraged to contribute to the next and final APG meeting on agenda item 1.10, taking into account the studies of ITU-R WP5B, in particular the studies relating to protection of terrestrial services.

**7. Views from Other Organisations**

**7.1 Regional Groups**

**7.1.1 ATU** - **Document APG23-4/INF-02**

* Support the ITU-R studies (Working Party 5B) to ensure the protection of incumbent services as well as the adjacent services, such as defining unwanted emission limits and appropriate protection measures for station of aeronautical mobile service in the frequency bands 15.35-15.4 GHz and 22.21-22.5 GHz to protect EESS (passive) and radio astronomy service.

**7.1.2 ASMG** - **Document APG23-4/INF-21**

* Follow on-going studies with the need to provide the necessary protection for incumbent services in the frequency bands under study and adjacent bands, and consider the possibility of adding a new allocation to the aeronautical mobile service for non-safety aeronautical mobile applications in the frequency bands under study.

**7.1.3 CEPT** - **Document APG23-5/INF-39**

* CEPT acknowledges the need for additional spectrum to fulfil the increasing demand for non-safety aeronautical mobile applications. Therefore, CEPT supports a new allocation to AM(OR)S for non-safety application in the whole range or a part of the frequency band 15.4-15.7 GHz, and considers the possibility of a new allocation to AM(OR)S for non-safety application in the whole range or parts of the frequency band 22-22.21 GHz while:
* ensuring protection of the EESS/SRS (passive), and the RAS from unwanted emissions of the AMS;
* ensuring protection of the primary allocations to radiolocation, aeronautical radionavigation and fixed-satellite (Earth-to-space) services in the relevant parts of the frequency band 15.4-15.7 GHz;
* ensuring protection of the primary allocations to the fixed and mobile services in the frequency band 22-22.21 GHz noting that the frequency range 21.2-23.6 GHz is allocated to the fixed service;
* considering that RR No. 5.149 applies, also recognizing that some CEPT administrations operate RAS under their National regulation with a primary or secondary status in the frequency band 22.00-22.21 GHz.
* Noting that some CEPT Administrations operate water vapour radiometers in the frequency range 22-22.5 GHz utilized by some radio astronomy stations and in a variety of environmental applications, including weather forecasting and nowcasting, as well as climate monitoring for meteorology, CEPT will also ensure their necessary protection.

**7.1.4 CITEL** - **Document APG23-5/INF-43**

* An Administration provided Preliminary Proposal at recent CITEL meeting. This proposal is based on the sharing and compatibility studies carried out in line with Resolution **430 (WRC-19)** in the frequency bands 15.4-15.7 GHz and 22 -22.21 GHz in consideration of new allocation for aeronautical mobile service for non-safety applications.
* NOC in relation to frequency band 15.4-15.7 GHz
* NOC in relation to frequency band 22.0-22.21 GHz
* SUP RESOLUTION **430 (WRC-19)** – Consequential to the results of studies at ITU-R in relation to this Resolution.

**7.1.5 RCC** - **Document APG23-5/INF-45**

* The RCC Administrations consider that, when identifying possible new allocations to aeronautical mobile service in the frequency band 15.4 – 15.7 GHz as well as when removing constraints on the use of the frequency band 22 – 22.21 GHz by aeronautical mobile service, it is necessary to provide protection of:
* radiolocation and aeronautical radionavigation services in the frequency band 15.4-15.7 GHz, of fixed satellite service in the frequency band 15.43-15.63 GHz, and of fixed service in the frequency band 22-22.21 GHz;
* radioastronomy service in the frequency bands 15.35-15.4 GHz and 22,21-22,5 GHz by means of unwanted emissions’ limits of aeronautical mobile service stations in these frequency bands.
* Method D from the draft CPM Report is preferable.

**7.2 International Organisations**

**7.2.1 WMO** - **Document APG23-5/INF-01**

* WMO is not opposed to new allocations for the aeronautical mobile service for the use of non-safety aeronautical mobile applications, if an appropriate unwanted emission limit (-23 dBW per 100 MHz) applies in the band 22.21-22.5 GHz to ensure that EESS (passive) is protected from the AM(OR)S.

**7.2.2 ICAO** - **Document APG23-3/INF-15**

* To support ITU-R studies as called for by Resolution **430 (WRC-19)**.
* To support, based on the agreed results of studies, new allocations to the aeronautical mobile service only for use by non-safety aeronautical mobile applications.
* To ensure that any such modification does not adversely affect the status or provision of aeronautical safety services.

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