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| **The 4th Meeting of the APT Conference Preparatory**  **Group for WRC-23 (APG23-4)** | **APG23-4/OUT-17** |
| 15 – 20 August 2022, Bangkok, Thailand | 20 August 2022 |

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 five WP 5B meetings, the Working Document towards a Preliminary Draft New Report ITU-R M.[NON-SAFETY AMS CHARACTERISTICS AND SHARING STUDIES] was developed. 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 text, 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: APG23-4/INP-08(J), APG23-4/INP-15(AUS), APG23-4/INP-24Rev.1(IRN), APG23-4/INP-35(KOR), APG23-4/INP-41(CHN), APG23-4/INP-62(IND), APG23-4/INP-75(VTN).
* Information Documents: APG23-4/INF-02(ATU), APG23-4/INF-03(WMO), APG23-4/INF-21(ASMG), APG23-4/INF-44(RCC), APG23-4/INF-48(CEPT).

**3. Summary of discussions**

**3.1 Summary of APT Members’ views**

**3.1.1 Japan** - **Document APG23-4/INP-08**

Japan supports 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)**;

Japan is 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, as appropriate, in adjacent frequency bands should be ensured.

**3.1.2 Australia** - **Document APG23-4/INP-15**

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.

**3.1.3 Iran** - **Document APG23-4/INP-24Rev.1**

I.R. of Iran supports to add new allocation for AM(OR)S in the frequency band 15.4-15.7 GHz with an associated footnote under condition that it shall not cause unacceptable interference nor claim protection for the services to which the band is allocated.

**3.1.4 Korea** - **Document APG23-4/INP-35**

The Republic of Korea supports the on-going ITU-R studies related to agenda item 1.10 in accordance with Resolution **430 (WRC-19)**.

**3.1.5 China** - **Document APG23-4/INP-41**

* 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 15.4-15.7 GHz and 22-22.21 GHz and the adjacent frequency bands should be ensured;
* China is the view of that the existing use and future development of the radiolocation, aeronautical navigation and fixed-satellite (Earth-to-space) services allocated in the 15.4-15.7 GHz band should not be adversely affected.

**3.1.6 India** - **Document APG23-4/INP-62**

India supports a new allocation in the bands 15.4-15.7 GHz and 22-22.21 GHz to the aeronautical mobile service for the introduction of new non-safety aeronautical mobile applications as per the outcome of studies undertaken in this regard in ITU-R. The intended use shall ensure protection and not constraint the incumbent services operating in-band and adjacent bands.

**3.1.7 Viet Nam** - **Document APG23-4/INP-75**

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.

**3.2 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, as appropriate, in adjacent frequency bands should be ensured.
  + 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 the fixed service, to support the development of telecommunication infrastructure in many countries and is 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.

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

* + Some APT Members support to add new allocation for AM(OR)S in the frequency band 15.4-15.7 GHz with an associated footnote under condition that it shall not cause unacceptable interference nor claim protection for the services to which the band is allocated.
  + Some APT Members support a new allocation in the bands 15.4-15.7 GHz and 22-22.21 GHz to the aeronautical mobile service for the introduction of new non-safety aeronautical mobile applications as per the outcome of studies undertaken in this regard in ITU-R. The intended use shall ensure protection and not constraint the incumbent services operating in-band and adjacent bands.

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

* APT Members are encouraged to contribute to the next APG meeting on the 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 APG23-4/INF-48**

* CEPT acknowledges the need for additional spectrum to fulfil the increasing demand for non-safety aeronautical applications and is considering a new allocation to AMS for non-safety application in whole range or a part of the frequency bands 15.4-15.7 GHz and 22-22.21 GHz while:
* ensuring protection for the EESS/SRS (passive) and the RAS (taking into account RR Nos. 5.149 and 5.340) allocated in adjacent frequency band from emissions of the AMS;
* ensuring protection for the primary allocations to radiolocation, aeronautical radionavigation and fixed‐satellite (Earth‐to‐space) services in the relevant part of the frequency band 15.4-15. 7 GHz;
* ensuring protection for the primary allocations of fixed and mobile services in the frequency band 22‐22.21 GHz, noting that the fixed service is allocated in the 21.2‐23.6 GHz frequency range;
* in making assignments to stations of AMS in the frequency band 22‐22.21 GHz, administrations are urged to take all practicable steps to protect the radio astronomy service from harmful interference in accordance with RR No. 5.149;
* noting that CEPT will need to consider the protection of the following usages within relevant CEPT administrations:
* water vapour radiometers at 22.235 GHz in the frequency range 22.00‐22.50 GHz;
* RAS in the frequency band 22.00‐22.21 GHz allocated in their national frequency allocation tables, with primary or secondary status.

**7.1.4 CITEL** - **Document APG23-2/INF-34**

* To be developed.

**7.1.5 RCC** - **Document APG23-4/INF-44**

* 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.

**7.2 International Organisations**

**7.2.1 WMO** - **Document APG23-4/INF-03**

* WMO supports studies to ensure protection of the EESS (passive) in the adjacent frequency band 22.21-22.5 GHz. WMO is also concerned that adjacent band interference may limit usability of passive sensing in the 15.35-15.4 GHz band, however ensuring protection may not be possible due to the lack of operational characteristics and sharing criteria.

**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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