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

Thailand (Kingdom of)

**preliminary views on WRC-23 agenda itemS 1.6, 1.7, 1.8, 1.9 AND 1.11**

**Agenda Item 1.6:**

*to consider, in accordance with Resolution* ***772 (WRC-19)****, regulatory provisions to facilitate radiocommunications for sub-orbital vehicles;*

**1. Background**

Resolution **772 (WRC-19)**, in preparation for WRC-23 agenda item 1.6, invites the ITU-R to study the spectrum needs for stations on board sub-orbital vehicles, any appropriate modification to the Radio Regulations, excluding any new allocations or changes to the existing allocations in RR Article **5**, and to identify whether there is a need for access to additional spectrum that should be addressed after WRC-23 by a future competent conference.

WRC-23 agenda item 1.6 is intended, among other aspects, to safely integrate sub-orbital vehicles into the airspace used by conventional aircraft and minimize disruption to this controlled airspace during sub-orbital vehicles transition.

In addition, sub-orbital vehicles are intended to operate at higher altitudes than conventional aircraft during short periods of time without permanently entering an orbit as defined in RR No. **1.184** and potentially flying at speeds up to several times the speed of sound.

In the draft CPM text, two methods were considered to satisfy this agenda item:

* Method A: No change to RR and suppression of Resolution **772 (WRC-19)**; and
* Method B: A new WRC Resolution containing the provisions to operate radiocommunications for sub-orbital vehicles, including definition or description of sub-orbital vehicle without any change to RR Article **5**. There are three alternative approaches to this method. All three approaches propose to suppress Resolution **772 (WRC-19)**.

**2. Preliminary Views**

- Thailand supports Method B in the current draft CPM text, in order to develop a new WRC Resolution containing the provisions to operate radiocommunications for on board sub-orbital vehicles.

- Thailand is of the view that the radiocommunications operating on board sub-orbital vehicles shall ensure the protection and not impose any additional constraint on existing services in the frequency bands to be used by sub-orbital vehicles and, as appropriate in adjacent frequency bands.

**Agenda Item 1.7:**

*to consider a new aeronautical mobile-satellite (R) service (AMS(R)S) allocation in accordance with Resolution* ***428 (WRC-19)*** *for both the Earth-to-space and space-to-Earth directions of aeronautical VHF communications in all or part of the frequency band 117.975-137 MHz, while preventing any undue constraints on existing VHF systems operating in the AM(R)S, the ARNS, and in adjacent frequency bands.*

**1. Background**

WRC-23 Agenda Item 1.7 was initiated by APT, CEPT and CITEL to consider a new AMS(R)S allocation that will enable satellite relay of existing aeronautical VHF communications to complement terrestrial infrastructures and extend the direct controller-pilot communications for aircraft operating in remote/oceanic region without having the need to change the existing aircraft equipage.

In the draft CPM text, three methods were considered to satisfy this agenda item:

* Method A: No change to RR; and
* Method B: This Method, which provides general common elements required to be complemented with Methods B1 or B2, proposes to add a new allocation to the AMS(R)S in the frequency band 117.975-137 MHz, or part thereof, limited to non-geostationary satellite systems and to internationally standardized aeronautical systems. This Method is not an independent and standalone Method as such and thus should be considered together with Methods B1 or B2.
* Method B1 is containing the elements of Method B, and proposes to add a pfd limit, where appropriate, on AMS(R)S space stations unwanted emissions falling above 137 MHz, in order to ensure protection of adjacent band services above 137 MHz; and
* Method B2 is containing the elements of Method B, and proposes that AMS(R)S be subject to the application of regulatory and technical measures to ensure compatibility with existing services in co-frequency bands and in the adjacent bands.

The three methods propose the suppression of Resolution **428 (WRC-19)**.

**2. Preliminary Views**

Thailand supports Method B in the current draft CPM text, to allocate AMS(R)S on primary basis in the frequency band 117.975-137 MHz, or part thereof, while ensuring protection and not constraining the systems of existing services in the same frequency band and adjacent frequency bands.

**Agenda Item 1.8:**

*to consider, on the basis of ITU-R studies in accordance with Resolution* ***171 (WRC-19)****, appropriate regulatory actions, with a view to reviewing and, if necessary, revising Resolution* ***155 (Rev.WRC-19****) and No.* ***5.484B*** *to accommodate the use of fixed-satellite service (FSS) networks by control and non-payload communications of unmanned aircraft systems.*

**1. Background**

WRC-15 agenda item 1.5 considered possibility to use fixed-satellite service (FSS) networks to provide control and non-payload communications (CNPC) links of unmanned aircraft system (UAS) and established Resolution **155 (WRC-15)** in order to benefit of the opportunity of using existing satellite transponders. Recognizing the need for further studies on regulatory provisions and technical criteria both within ICAO and ITU, WRC-15 decided that consideration of the outcome of these studies, also taking into account the progress obtained by ICAO in the completion of its Standards and Recommended Practices (SARPs) on the use of FSS for the UAS CNPC links would again be considered by WRC-23.

Accordingly, this agenda item was established by WRC-19, in accordance with Resolution **171 (WRC-19)**, to consider appropriate regulatory actions, with a view to reviewing and, if necessary, revising Resolution **155 (Rev.WRC-19)** and RR No. **5.484B** to accommodate the use of FSS networks by UAS CNPC. The ITU-R is invited to:

1. Continue and complete in time for WRC-23 relevant studies of the technical, operational and regulatory aspects, based on the frequency bands mentioned in resolves 1 of Resolution **155 (Rev.WRC-19)**, in relation to the implementation of Resolution **155 (Rev.WRC-19)**, taking into account the progress obtained by ICAO in the completion of SARPs on use of the FSS for the UAS CNPC links;
2. Review No. **5.484B** and Resolution **155 (Rev.WRC-19)** taking into account the results of the above studies.

The draft CPM text contains two methods to satisfy this agenda item:

* Method A proposes suppression of RR No. **5.484B**, Resolution **155 (Rev.WRC-19)** and Resolution **171 (WRC-19)**; and
* Method B proposes possible revision of RR No. **5.484B**, revision of Resolution **155** **(Rev.WRC-19)** and suppression of Resolution **171 (WRC-19).**

**2. Preliminary Views**

Thailand is of the view that further ITU-R developments of, among other things, safety of life aspect and protection of terrestrial services, in accordance with Resolution **171 (WRC-19)** should be completed in order to consider appropriate regulatory actions up to the extent of revising Resolution **155 (Rev.WRC-19)** and RR No. **5.484B**, if necessary, to accommodate the use of FSS for the UAS CNPC links, taking into account the development of SARPs by ICAO.

**Agenda Item 1.**9**:**

*to review Appendix* ***27*** *of the Radio Regulations and consider appropriate regulatory actions and updates based on ITU-R studies, in order to accommodate digital technologies for commercial aviation safety-of-life applications in existing HF bands allocated to the aeronautical mobile (route) service and ensure coexistence of current HF systems alongside modernized HF systems, in accordance with Resolution* ***429 (WRC-19)***

**1. Background**

HF Radio communications is the long-range communication system supporting safe, efficient air travel over long range routes beyond the range of ground-based VHF radiocommunication systems. However, technology now provides for satellite communications which have also been recognized by regulatory authorities for use in long range communications.

Communications using both satellite and terrestrial means for long-range communication provides diversity and synergy that offers increased availability and reliability.

The current HF voice systems suffer from noise and propagation effects that require skilled and knowledgeable radio operators on the ground to provide reliable HF communications. Existing HF data links do not have the throughput required to sufficiently satisfy the communication needs.

In order to use digital HF aeronautical spectrum which would increase the data rates to reach required performance by modern aeronautical systems, RR Appendix **27** needs to allow the use of multiple contiguous and/or non-contiguous 3 kHz channels simultaneously.

In the draft CPM text, two methods were considered to satisfy this agenda item:

* Method A: No change to RR; and
* Method B: Inclusion of the relevant part of the Rules of Procedure relating to RR Appendix **27** into the Radio Regulations and the introduction into RR Appendix **27** of other provisions related to wideband digital communications.

The two methods propose the suppression of Resolution **429 (WRC-19)**.

**2. Preliminary Views**

Thailand supports Method B in the current draft CPM text, in order to modify the relevant part of the Rules of Procedure relating RR Appendix **27** to accommodate the use of wideband HF technologies for the AM(R)S.

**Agenda Item 1.11:**

*to consider possible regulatory actions to support the modernization of the Global Maritime Distress and Safety System and the implementation of e‑navigation, in accordance with Resolution* ***361 (Rev.WRC‑19)***

**1. Background**

Resolution **361 (Rev. WRC-19)** through the section *resolves to invite the 2023 World Radiocommunication Conference* identifies three topics which are studied and solved independently.

WP 5B is the responsible group, together with contributing groups WP 4C and WP 7D, according to the CPM23-1 results (CA/251), to address the ITU-R preparatory work for WRC-23.
There are three issues assigned for study as follows:

**Issue A (*resolves 1*): GMDSS Modernization**

Considering the decisions of IMO and after an analysis of all the RR provisions impacted by these decisions, the following measures have been proposed in a unique method:

* The deletion of the narrow band direct printing (NBDP) for distress and safety communications from GMDSS in RR Appendices **15** and **17** for MF and HF in all bands.
* Introduction of a new automatic connection system (ACS) which will be proposed to be implemented on the frequencies which had previously been used by NBDP for GMDSS in all MF and HF bands in the RR Article **5** and Appendix **17** by a footnote.
* Introduction of the NAVDAT frequencies in MF and HF in the RR Appendix **15** and modification of the relevant provisions in RR Articles **5**, **32**, **33** and **52**. Those frequencies have been already introduced by the WRC-19 in RR Appendix **17**, the difference is that now NAVDAT is part of the GMDSS.
* To implement automatic identification system search and rescue transmitter (AIS-SART) as locating equipment for which frequencies are protected by reference in RR Appendix **15**. Taking into account studies performed within ITU-R, especially in Recommendation ITU-R M.1371, it is proposed to amend RR No. **31.7** that survival craft stations may carry this equipment as an alternative to the RADAR-SART to be in line with SOLAS Chapter IV.

In this Method, regarding the frequency band 1 645.5-1 646.5 MHz which is no longer used by the satellite emergency position indicating radio beacons (EPIRBs), no consensus has been reached for the regulatory action proposed to WRC-23.

**Issue B (*resolves 2*): E-navigation**

The e-navigation is developed by IMO which has concluded that various existing satellite networks already support the e-navigation concept, and usability studies have been conducted. The VHF data exchange system (VDES) and NAVDAT systems, for which IMO has agreed to develop performance standards, would also support e-navigation by means of enabling broadcasting (by NAVDAT) and exchange of digital files (by VDES). From a spectrum regulatory point of view, the requirements for e-navigation are thus covered. Therefore, a unique Method NOC to the RR is proposed.

**Issue C (*resolves 3*): Introduction of additional satellite systems into the GMDSS**

An existing geostationary-satellite system operating at 1 610-1 626.5 MHz (Earth-to-space) and 2 483.5-2 500 MHz (space‑to-Earth) was considered by IMO in order to become a new GMDSS satellite provider. These frequency bands under study contained already primary allocation for the mobile-satellite service (MSS), for this reason no new allocation is necessary by WRC-23 in order to accommodate the GMDSS.

Three methods have been proposed to satisfy Issue C of this agenda item:

* Method C1: No change to the RR except suppression of *resolves 3*, Resolution **361 (Rev.WRC‑19)**;
* Method C2: Identify spectrum for GMDSS if the IMO’s action to recognize the new GSO MSS GMDSS satellite system is complete, and the new GSO MSS GMDSS system is fully coordinated in accordance with Articles **9** and **11** of the RR and recorded in the MIFR in accordance with RR No. **11.37**. There are 2 alternatives associated with the method in relation to the applicability of RR No. **4.10** to GMDSS; and
* Method C3: In order to support the requirement of safety of life aspects by the GMDSS and implement applicable provisions of the RR, including applicability of RR No. **4.10** to the specific frequency bands use by the additional MSS system for GMDSS. This method also proposes an associated new Resolution.

**2. Preliminary Views**

**Issue A: GMDSS Modernization**

Thailand supports Method A in the current draft CPM text as follows:

* The deletion of the NBDP for distress and safety communications from GMDSS;
* The implementation of an ACS for MF and HF bands;
* The introduction of MF and HF NAVDAT frequencies into Appendix **15** of RR;
* The implementation of the AIS-SART as locating equipment as alternative to Radar SART; and
* The removal of the use of satellite EPIRBs from the frequency band 1645.5-1646.5 MHz.

**Issue B: E-navigation**

Thailand supports Method B in the current draft CPM text with the view that it is not necessary to modify the RR in support of e-navigation.

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