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| **The 4th Meeting of the APT Conference Preparatory****Group for WRC-23 (APG23-4)** | **APG23-4/OUT-16** |
| 15 – 20 August 2022, Bangkok, Thailand | 20 August 2022 |

Working Party 2

**PRELIMINARY VIEWs on WRC-23 agenda item 1.9**

**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**

Agenda Item 1.9 was proposed by an aviation community Region 2 administration and had broad support at the WRC19. ICAO supports the work that may lead to changes and improvements to the Appendix **27**.

The HF spectrum has largely been broken up into repeating allocations throughout the range 3-30 MHz. These allocations have their conventional implementation arrangements and the traditional adoption of multiple 3 kHz channels (with a 2.7 kHz emission in the initial planning days) allowed for adjacent channel use, adjacent band use and service allocation replication across the HF domain. This is all to enable beyond line of site communications across all periods of the day, month, season and sunspot cycle.

There is a new layer of technologies that enable higher data rates in the HF frequency range via aggregation of contiguous 3 kHz channels as well as aggregation of non-contiguous channels.

The HF manufacturers want to be able to implement this aggregation for wider applications within the aviation domain. This application, conventionally termed Wideband HF or WBHF is being implemented in a non-aviation domain. The regulations do not preclude the use of WBHF but the current studies and implementation arrangements do not enable easy adoption of the new technologies in these allocations.

The aviation community, including ICAO, are supporting the studies limited to Appendix **27** bands only, to enable early adoption of the newer WBHF technologies.

More recent investigations have shown that the ability to change the Appendix **27** to enable wider bandwidths will require significant re-engineering as the channel plan has been designed to enable frequency re-use on an area-based pattern to minimize/remove the likelihood of interference, and this re-use pattern is not on a contiguous basis. It has been confirmed that the current Appendix **27** does not explicitly preclude the use of wideband HF, however because of the current frequency re-use plan there is very little opportunity to use contiguous wideband technologies. The use of non-contiguous wideband technologies would be achievable.

**Current documents of relevance within WP5B are:**

* + [Annex 4](https://www.itu.int/dms_ties/itu-r/md/19/wp5b/c/R19-WP5B-C-0649%21N04%21MSW-E.docx) to Document 5B/649-E Chairman’s Report ***-*** *Draft CPM Text for WRC-23 agenda item 1.9*
	+ [Annex 29](https://www.itu.int/dms_ties/itu-r/md/19/wp5b/c/R19-WP5B-C-0481%21N29%21MSW-E.docx) to Document 5B/481-E Chairman’s Report - *Working Document towards preliminary draft new report ITU-R M.[Aero-Wideband-HF]*

**Executive Summary from the Draft CPM Text – Doc ITU-R 5B/649 Annex 4**

To address this agenda item, ITU-R has undertaken a regulatory analysis, pursuant to Resolution **429 (WRC-19)**, on consideration of regulatory provisions for updating Appendix **27** of the Radio Regulations (RR) in support of aeronautical HF modernization.

Two methods are considered to address this agenda item:

– Method A: no change (NOC)

– 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.

**2. Documents**

**2.1 Input Documents submitted to the meeting of APG23-4**

* Document [APG23-4/INP-08](https://www.apt.int/sites/default/files/2022/08/APG23-4-INP-08_J-2_WP2_Preliminary_Views_on_WRC-23_Agenda_Items_1.6_1.7_1.8_1.9_1.10_1.11_and_RES.427.docx) (Japan)

[APG23-4/INP-15](https://www.apt.int/sites/default/files/2022/08/APG23-4-INP-15_AUS_WP2_Preliminary_Views_on_WRC-23_Agenda_Items_1.6_1.7_1.8_1.9_1.10_1.11_and_Res.427WRC-19.docx) (Australia)

[APG23-4/INP-35](https://www.apt.int/sites/default/files/2022/08/APG23-4-INP-35_KOR_WP2_Preliminary_Views_on_WRC-23_Agenda_Items_1.6_1.7_1.8_1.9_1.10_and_1.11.docx) (Korea)

[APG23-4/INP-41](https://www.apt.int/sites/default/files/2022/08/APG23-4-INP-41_China_WP2_Preliminary_Views_on_WRC-23_Agenda_Items_1.6_1.7_1.8_1.9_1.10_1.11_and_Res.427WRC-19.docx) (China)

[APG23-4/INP-46](https://www.apt.int/sites/default/files/2022/08/APG23-4-INP-46_Thailand_WP2_Preliminary_Views_on_WRC-23_Agenda_Items_1.7_1.8_1.9_and_1.11.docx) (Thailand)

[APG23-4/INP-52](https://www.apt.int/sites/default/files/2022/08/APG23-4-INP-52_NZL_WP2_Preliminary_Views_on_WRC-23_Agenda_Items_1.7_1.8_1.9_and_1.11.docx) (New Zealand)

[APG23-4/INP-56](https://www.apt.int/sites/default/files/2022/08/APG23-4-INP-56_SNG_WP2_Preliminary_Views_on_WRC-23_Agenda_Items_1.6_and_1.9.docx) (Singapore)

[APG23-4/INP-62](https://www.apt.int/sites/default/files/2022/08/APG23-4-INP-62_India_WP2_Preliminary_Views_on_WRC-23_Agenda_Items_1.7_1.9_and_1.10.docx) (India)

[APG23-4/INP-75](https://www.apt.int/sites/default/files/2022/08/APG23-4-INP-75_VTN_WP2_Preliminary_Views_on_WRC-23_Agenda_Items_1.7_1.8_1.9_1.10_and_1.11.docx) (Viet Nam)

**2.2 Information Documents submitted to the meeting of APG23-4**

* Document [APG23-4/INF-02](https://www.apt.int/sites/default/files/2022/07/APG23-4-INF-02_ATU_preparation.docx) (ATU)

[APG23-4/INF-21](https://www.apt.int/sites/default/files/2022/08/APG23-4-INF-21_ASMG_Preparation_for_WRC-23.pdf) (ASMG)

[APG23-4/INF-28(Rev.1)](https://www.apt.int/sites/default/files/2022/08/APG23-4-INF-28Rev.1_CITEL_Preparation_for_WRC-23.pdf) (CITEL)

[APG23-4/INF-44](https://www.apt.int/sites/default/files/2022/08/APG23-4-INF-44_Status_of_RCC_preparation_to_the_World_Radio_Conference_and_Radio_Assembly_2023.pdf) (RCC)

[APG23-4/INF-48](https://www.apt.int/sites/default/files/2022/08/APG23-4-INF-48_Status_of_CEPT_preparation_for_WRC-23_and_RA-23.pdf) (CEPT)

**2.3 Briefing Document submitted to the meeting of APG23-4**

* Document [APG23-4/INF-50](https://www.apt.int/sites/default/files/2022/08/APG23-4-INF-50_Brief_on_AI1.9.docx)

**3. Summary of discussions**

**3.1 Summary of APT Members’ views**

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

Japan supports studies with a view to identify any necessary modifications to RR. Appendix **27** to accommodate wideband HF technologies for the aeronautical mobile (route) service (AM(R)S) between 2 850 and 22 000 kHz in accordance with Resolution **429 (WRC-19)** with the need to avoid harmful interference to Primary services in the same band and adjacent bands in particular existing AM(R)S HF systems.

Japan recognizes that there are differing Wideband HF technologies and are of the view that changes to RR. Appendix **27** should allow new digital wideband HF systems taking into account technology neutrality.

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

Australia supports sharing studies to ensure compatibility between the proposed digital technologies and the incumbent primary services within the frequency bands under Resolution **429 (WRC-19)** and adjacent bands. Australia supports ensuring studies and changes proposed are technology neutral.

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

The Republic of Korea supports possible modifications to RR Appendix **27** to accommodate digital technologies for aeronautical wideband HF systems, while ensuring compliance with safety requirements and protection of other primary allocated services in the same and the adjacent bands.

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

China is of the view that when introducing aeronautical wideband digital systems under AM(R)S in the HF band of Agenda Item 1.9, protection of current HF applications from harmful interference shall be ensured.

**3.1.5 Thailand** - **Document APG23-4/INP-46**

Thailand supports necessary modifications of RR Appendix **27** to accommodate the use of wideband HF technologies for the AM(R)S, while ensuring the protection of existing services in the same frequency band and adjacent frequency bands.

**3.1.6 New Zealand** - **Document APG23-4/INP-52**

New Zealand supports enabling new systems that improve the utility and efficiency of the HF bands (e.g. for modern digital wideband applications that can be used for long range, beyond line of sight communications). New Zealand supports Method B, which is the 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. This method permits additional digital services in the Radio Regulations without removing the existing analogue services.

**3.1.7 Singapore** - **Document APG23-4/INP-56**

Singapore supports **Method B** in the current draft CPM text to accommodate the introduction of HF wideband aeronautical communication systems.

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

India supports the proposed changes to Appendix **27** of Radio Regulations to allow new modern/digital wideband HF communication systems using contiguous and/or non-contiguous 3 kHz channels coexisting with current HF voice and data systems.

**3.1.9 Vietnam** - **Document APG23-4/INP-75**

Viet Nam supports the ITU-R studies with a view to identify any necessary modifications to RR. Appendix **27** to accommodate wideband HF technologies for the AM(R)S between 2 850 and 22 000 kHz frequency range in accordance with Resolution **429 (WRC-19)** while ensuring no adverse effect on the allocation of the existing services and their future development in the same band and adjacent bands, in particular existing AM(R)S HF systems.

Viet Nam is of the view that changes to RR. Appendix **27** should allow new digital wideband HF systems taking into account technology neutrality and possible usage of aggregating contiguous and/or not contiguous channels.

Viet Nam recognizes that the implementation of new wideband AM(R)S HF systems would require coordination with ICAO and its regional groups given their role in organizing HF aeronautical channel plans in flight information regions.

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

None

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

* APT Members support any necessary modifications to RR Appendix**27** to accommodate wideband HF technologies for the aeronautical mobile (route) service (AM(R)S) between 2 850 and 22 000 kHz in accordance with Resolution **429 (WRC-19)** with theneed to avoid harmful interference to Primary services in the same and adjacent bands in particular existing AM(R)S HF systems.
* APT Members noted that there are differing Wideband HF technologies and are of the view that changes to RR Appendix **27** should allow new digital wideband HF systems taking into account technology neutrality.
* APT Members are also of the view that the implementation of new wideband AM(R)S HF systems may require necessary coordination through ICAO given their role in organizing HF aeronautical channel plans in flight information regions.

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

* Some APT Members support Method B of the Draft CPM text as developed by ITU-R Working Party 5B.

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

* APT Members are encouraged to consider which is their preferred method within the Draft CPM Report to satisfy the Agenda Item 1.9 with a view for APT Members being able to form a common proposal.

**7. Views from Other Organisations** (as provided in the information documents to

APG23-4)

**7.1 Regional Groups**

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

* Promote optimal use of the frequency spectrum through initial support for the inclusion of the relevant part of the Rules of Procedure relating to Appendix **27** in the Radio Regulations provided coexistence with existing analogue systems is ensured.

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

* Support the ITU-R technical and regulatory studies to identify the necessary modifications to RRAppendix **27**, in order to accommodate digital technologies that are supposed to improve the HF communication systems and enhance aviation safety-of-life applications, provided that:
	+ The new proposed HF systems should coexist with the existing analog voice and data communication systems and operate in accordance with the ICAO international Standards and Recommended Practices and procedures.
	+ Protection of in band and adjacent band services shall be ensured.

**7.1.3 CEPT** - **Document APG23-4/INF-48**

* CEPT supports the modification of the Appendix **27** of RR that would allow new digital wideband HF systems including aggregating contiguous and/or not contiguous channels, if retained, ensuring:
	+ the protection of other primary services operating in band and in adjacent frequency bands, and
	+ coexistence with existing aeronautical analogue voice and data HF systems.

**7.1.4 CITEL** - **Document APG23-4/INF-28Rev1**

* Some Administrations support studies called for by Resolution **429 (WRC-19)** to
accommodate new digital HF technologies.

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

The RCC Administrations do not oppose modifications to RR Appendix 27, aimed at the use of digital technologies for commercial aviation AM(R)S safety-of-life applications in existing HF bands allocated to the aeronautical mobile (route) service when ensuring coexistence of current HF systems alongside modernized HF systems.

**7.2 International Organisations**

**7.2.1 IARU** - **Document APG23-4/INF-27**

* No current or previous information provided.

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

* To support ITU-R studies as called for by Resolution **429 (WRC-19).**
* To support, based on agreed studies, the necessary modification of Appendix **27** to the Radio Regulations that will enable the introduction of HF wideband aeronautical communication systems. Those systems shall be operated in accordance with international Standards and Recommended Practices and procedures established in accordance with the Convention on International Civil Aviation.

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