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| **The 5th Meeting of the APT Conference Preparatory****Group for WRC-23 (APG23-5)** | **APG23-5/OUT-15** |
| 20 – 25 February 2023, Busan, Republic of Korea | 24 February 2023 |

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 Report**

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 APG23-5**

* Document

[APG23-5/INP-13](https://www.apt.int/sites/default/files/2023/02/APG23-5-INP-13_Singapore_and_Thailand-WP2-Preliminary_View_on_WRC-23_Agenda_Item_1.9.docx) (Singapore and Thailand)

[APG23-5/INP-15](https://www.apt.int/sites/default/files/2023/02/APG23-5-INP-15_Japan-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)

[APG23-5/INP-27](https://www.apt.int/sites/default/files/2023/02/APG23-5-INP-27_India_WP2-Preliminary_Views_on_WRC_23_Agenda_Items_1.7_1.9_1.10_and_1.11.docx) (India)

[APG23-5/INP-33](https://www.apt.int/sites/default/files/2023/02/APG23-5-INP-33_Bangladesh_WP2-Preliminary_Views_on_WRC_23_Agenda_Items_1.7_1.9_1.10_and_1.11.docx) (Bangladesh)

[APG23-5/INP-37](https://www.apt.int/sites/default/files/2023/02/APG23-5-INP-37_Iran-WP2-Preliminary_Views_on_WRC_23_Agenda_Items_1.6_1.7_1.8_1.9_1.10_and_1.11.docx) (Iran)

[APG23-5/INP-53](https://www.apt.int/sites/default/files/2023/02/APG23-5-INP-53_Viet_Nam-WP2-Preliminary_Views_on_WRC-23_Agenda_Items_1.7_1.8_1.9_1.10_and_1.11.docx) (Viet Nam)

[APG23-5/INP-57](https://www.apt.int/sites/default/files/2023/02/APG23-5-INP-57_Australia-WP2-Preliminary_Views_on_WRC-23_Agenda_Items_1.61.8_1.9_1.10_1.11_and_Res.427WRC-19.docx) (Australia)

[APG23-5/INP-64](https://www.apt.int/sites/default/files/2023/02/APG23-5-INP-64_Rep_of_Korea-WP2-Preliminary_Views_on_WRC-23_Agenda_Items_1.6_1.7_1.81.9_1.10_and_1.11.docx) (Korea, Republic of)

[APG23-5/INP-74](https://www.apt.int/sites/default/files/2023/02/APG23-5-INP-74_New_Zealand-WP2-Preliminary_Views_on_WRC-23_Agenda_Items_1.7_1.8_1.9_and_1.11.docx) (New Zealand)

[APG23-5/INP-79](https://www.apt.int/sites/default/files/2023/02/APG23-5-INP-79_Indonesia-WP2-Preliminary_Views_on_WRC-23_Agenda_Items_1.7_1.8_1.9_and_1.11.docx) (Indonesia)

[APG23-5/INP-89](https://www.apt.int/sites/default/files/2023/02/APG23-5-INP-89_China-WP2-Preliminary_Views_on_WRC-23_Agenda_Items_1.6_1.7_1.8_1.9_1.10_1.11_and_RES.427.docx) (China)

[APG23-5/INP-96](https://www.apt.int/sites/default/files/2023/02/APG23-5-INP-96_Malaysia-WP2-Preliminary_Views_on_WRC-23_Agenda_Items_1.7_1.9_and_1.11.docx) (Malaysia)

**2.2 Information Documents submitted to the meeting of APG23-5**

* Document [APG23-5/INF-39](https://www.apt.int/sites/default/files/2023/02/APG23-5-INF-39_Status_of_CEPT_preparation_for_WRC-23_and_RA-23.pdf) (CEPT)

[APG23-5/INF-43](https://www.apt.int/sites/default/files/2023/02/APG23-5-INF-43_CITEL_preparation_for_WRC-23.pdf)  (CITEL)

[APG23-5/INF-45](https://www.apt.int/sites/default/files/2023/02/APG23-5-INF-45_Status_of_RCC_preparation_to_the_WRC-23.pdf) (RCC)

**2.3 Briefing Document submitted to the meeting of APG23-5**

* Document [APG23-5/INF-42](https://www.apt.int/sites/default/files/2023/02/APG23-5-INF-42_Brief_on_AI1.9.docx) (DG 1.9 Chair)

**3. Summary of discussions**

**3.1 Summary of APT Members’ views**

**3.1.1 Singapore and Thailand** - **Document APG23-5/INP-13**

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

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

Japan supports 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, as indicated in Method B. However, Japan is of the view that such modification must avoid harmful interference to existing systems, including current AM(R)S HF system, operating in the existing primary allocations in both the same and adjacent bands. Japan also recognizes that there are differing Wideband HF technologies, and is of the view that changes to RR Appendix 27 should ensure technology neutrality to allow new digital wideband HF systems.

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

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. India supports Method B to satisfy this Agenda Item.

**3.1.4 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, appropriate technical and regulatory measures is required in order to prevent constraints to the operation of the current HF systems.

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

This Administration does not oppose Method B for modifications to RR Appendix 27 and inclusion of relevant parts of the current text of the Rules of Procedures in RR Appendix 27 and make adjustments to explicit the use of wideband emissions with the need to avoid harmful interference to primary services in the same and adjacent bands, in particular, existing AM(R)S HF systems.

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

Viet Nam support **Method B** in the current draft CPM text: 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.

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

Australia supports modification of RR Appendix 27 to accommodate new technologically neutral digital applications and regulatory provisions that ensure compatibility with incumbent primary services within the frequency bands under Resolution **429 (WRC-19)** and adjacent bands.

Australia supports draft CPM text Method B for WRC-23 agenda item 1.9 (Annex 4 to Document 5B/649-E).

**3.1.8 Republic of Korea** - **Document APG23-5/INP-64**

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 services in the same and adjacent bands.

**3.1.9 New Zealand** - **Document APG23-5/INP-74**

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.

**3.1.10 Indonesia** - **Document APG23-5/INP-79**

Indonesia is of the view to consider the opportunity of appropriate regulatory actions and updates based on ITU‑R studies, to accommodate digital technologies for commercial aviation safety-of-life applications in existing HF bands allocated to the aeronautical mobile (route) service, while ensuring the coexistence of current HF systems alongside modernized HF systems*.*

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

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.

**3.1.12 Malaysia** - **Document APG23-5/INP-96**

Malaysia supports necessary modifications to the regulatory procedures in Appendix **27** of the Radio Regulations to accommodate wideband digital communications for commercial aviation safety-of-life applications in existing HF bands allocated to the aeronautical mobile (route) service (AM(R)S) and ensure coexistence with current HF systems as well as to avoid harmful interference to primary services within the same and at the adjacent bands. The digital wideband HF systems shall be technology neutral and operated in accordance with the International Civil Aviation Organization (ICAO) Standards and Recommended Practices (SARPs).

Malaysia is of the view that by enabling this new system, the effectiveness and efficiency throughout the HF band could be improved.

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

None.

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

APT Members support modifications to RR to accommodate digital technologies for aeronautical wideband HF systems, while ensuring compliance with safety requirements and protection of other 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 the RR should allow new digital wideband HF systems taking into account technology neutrality.

APT Members are of the view that digital wideband HF systems operating in the bands allocated to the aeronautical mobile (route) service (AM(R)S) relating to RR Appendix **27** shall be operated in accordance with the ICAO SARPs.

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

Some APT Members support Method B of the draft CPM Report to address this agenda item.

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

APT Members are encouraged to make contributions to the APG23-6 meeting explicitly stating which method of the CPM Report they choose to satisfy this agenda item.

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

APG23-5)

**7.1 Regional Groups**

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

* CEPT is of the view that the current version of RR Appendix 27 does not preclude the use of wideband digital HF communication by using multiple channels simultaneously. CEPT is of the view that relevant parts of the current text of the Rules of Procedures need to be introduced in RR Appendix 27 and make adjustments to make explicit the use of wideband emissions by aggregation of multiple individual channels each of which complies with the provisions of the RR Appendix 27

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

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

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

* 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 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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