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| **42 MEETING OF PERMANENT**  **CONSULTATIVE COMMITTEE II:**  **RADIOCOMMUNICATIONS**  **August 28 to September 01, 2023**  **Ottawa, Canada** | | **OEA/Ser.L/XVII.4.2.42**  **CCP.II-RADIO /doc. 5900/23**  **06 August 2023**  **Original: English** | |
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|  | **PROPOSALS FOR THE WORK OF THE CONFERENCE**  **AGENDA ITEM 10 – HF WIDEBAND AP26** | |  |
|  | **(Item on the Agenda: 3.1 (SGT-5))** | |  |
|  | **(Document submitted by the delegation of the United States of America)** | |  |

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| **Impact on the sector:** |
| This document supports the work of CITEL’s PCC.II Working Group for WRC under 3.1 of the agenda. |

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| **Executive Summary:** |
| The United States submits an agenda item 10 proposal for WRC-27 to review Appendix **26** of the Radio Regulations and consider appropriate regulatory actions and updates based on ITU-R studies, to accommodate wideband HF (WBHF) technologies in existing HF bands allocated to the aeronautical mobile (off route) service and to ensure that existing HF systems are protected and not constrained by WBHF systems, in accordance with Resolution [USA/10/WIDEBAND HF] (WRC-23). |

**UNITED STATES OF AMERICA**

**PROPOSALS FOR THE WORK OF THE CONFERENCE**

Agenda Item 10

10 to recommend to the Council items for inclusion in the agenda for the next WRC, and items for the preliminary agenda of future conferences, in accordance with Article 7 of the Convention and Resolution 804 (Rev.WRC-19)

**Consideration of regulatory provisions for updating Appendix 26 of the Radio Regulations to support the modernization of aeronautical mobile (OR)**

**Background:**

The High Frequency (HF) (3-30 MHz) range may be an effective alternative to provide integrated and interoperable Beyond-Line-of-Sight (BLOS) communications capabilities. HF is also a critical and practicable option for global broadcasting and amateur radio, and an alternative when other communications services are unavailable due to natural disasters or other national emergencies. There is a need to review regulatory provisions to support aeronautical mobile use of HF frequencies that would increase sharing opportunities in the most efficient and effective manner taking into account changes in technologies and avoiding harmful interference to incumbent users. Such consideration to update Appendix 26 would aim to increase bandwidth that would be required to achieve HF’s advantages without constraining the existing frequency needs of incumbent users, groups or countries.

Modern wideband HF (WBHF) technologies are available that enable the flexibility to use wider channel bandwidths within advanced digital HF and enhanced applications that can support a shared environment while also maximizing spectrum efficiency. Current and planned wideband systems for the aeronautical mobile applications embrace technology and methodologies that automate the use and operation of the Radio Frequency (RF) environment while mitigating any harmful interference to existing users in, or adjacent to, a desired HF frequency range. WBHF technologies would be similarly beneficial for aeronautical use of HF.

Aeronautical use of the various HF frequency bands in the range 3025 to 18030 kHz is essential to long distance aeronautical communications in geographically remote and oceanic areas not served by Line-of-Sight communications. The use of HF by aviation has continued to change and grow and RR Appendix 26 may require review in order to consider current and future aviation developments within the HF band. New HF technology could significantly improve capacity, connectivity, and quality of service for aviation data and voice, including increased channel bandwidths for greater data throughput. Such developments within existing aviation HF allocations would provide aviation with additional capabilities, improving safety and global coverage. Appendix **26** of the ITU Radio Regulations limits Aeronautical Mobile (OR) to a maximum bandwidth of 2.8 kHz. Thus, RR Appendix **26** should be reviewed and revised to meet the current and future aeronautical requirements by allowing for bonding contiguous HF channels and digital modulations that support higher data rates while ensuring that interference outside of the assigned multi-channel bands is no greater than the interference of individually utilized channels.

**Proposal:**

To review Appendix **26** of the Radio Regulations and consider appropriate regulatory actions and updates based on ITU-R studies, to accommodate wideband HF (WBHF) technologies in existing HF bands allocated to the aeronautical mobile (off route) service and to ensure that existing HF systems are protected and not constrained by WBHF systems, in accordance with Resolution [USA/10/WIDEBAND HF] (WRC-23).

**ADD USA/WBHF/1**

DRAFT NEW RESOLUTION [WBHF-2027]

**Agenda for the 2027 World Radiocommunication Conference**

The World Radiocommunication Conference (Geneva, 2023),

*considering*

*a)* that, in accordance with No. 118 of the ITU Convention, the general scope of the agenda for a world radiocommunication conference should be established four to six years in advance and that a final agenda shall be established by the Council two years before the conference;

*b)* Article 13 of the ITU Constitution relating to the competence and scheduling of world radiocommunication conferences and Article 7 of the Convention relating to their agendas;

*c)* the relevant resolutions and recommendations of previous world administrative radio conferences (WARCs) and world radiocommunication conferences (WRCs),

*resolves*

to recommend to the Council that a world radiocommunication conference be held in 2027 for a maximum period of four weeks, with the following agenda:

1 on the basis of proposals from administrations, taking account of the results of WRC-19 and the Report of the Conference Preparatory Meeting, and with due regard to the requirements of existing and future services in the bands under consideration, to consider and take appropriate action in respect of the following items:

1.[XXX] to consider, on the basis of ITU-R studies in accordance with Resolution **[WBHF] (WRC-23)**, appropriate regulatory actions, including possible updates to Appendix **26** of the Radio Regulations in support of aeronautical mobile (OR) Wideband HF modernization;

*resolves further*

to activate the Conference Preparatory Meeting,

*invites the Council*

to finalize the agenda and arrange for the convening of WRC-27, and to initiate as soon as possible the necessary consultations with Member States,

*instructs the Director of the Radiocommunication Bureau*

to make the necessary arrangements to convene meetings of the Conference Preparatory Meeting and to prepare a report to WRC-27,

*instructs the Secretary-General*

to communicate this Resolution to international and regional organizations concerned.

**Reasons:** To provide for studies, review and possible revision of RR Appendix **26** to meet current and future aeronautical requirements in light of availability of new technologies capable of modernizing HF including significant improvements to capacity, connectivity and quality of service.

**ADD USA/WBHF/2**

DRAFT NEW RESOLUTION [WBHF] (WRC-23)

**Consideration of regulatory provisions for updating Appendix 26 of the Radio Regulations in support of aeronautical mobile (OR) HF modernization**

The World Radiocommunication Conference (Dubai, 2023),

*considering*

*a*) that for the purpose of this Resolution, the term “wideband” in HF communications may refer to a combination of multiple 2.8 kHz channels to provide improved data rates;

*b*) that, with the availability of advanced digital technologies and the demonstrated

capabilities of aeronautical wideband HF, including contiguous or non-contiguous channel

aggregation, faster data rates and better voice communications are possible;

*c*) that digital aeronautical HF need to coexist with existing aeronautical analogue voice and data HF systems without causing any harmful interference;

*d*) that desirable properties of HF propagation enable global coverage for aircraft;

*e*) that aeronautical analogue voice and narrowband digital HF systems are the current primary

means for international and domestic aviation to communicate with aircraft in remote and

oceanic areas;

*f*) that there is an operational need for the modernization of data link services in the HF

band for messages that may support safety and regularity of flight for use by international civil

aviation;

*g*) that current aeronautical HF systems are limited in operation due to changes in technology, and are

insufficient to meet many modern aircraft information requirements without being augmented by

aeronautical safety satellite communications;

*h*) that use of the frequencies in the frequency bands allocated to the aeronautical mobile

(OR) service (AM(OR)S) between 3025 and 18030 kHz is governed by the provisions of Appendix 26,

*recognizing*

*a*) the need for improving aeronautical HF performance in support of internationally

recognized aviation performance standards as defined by the International Civil Aviation

Organization (ICAO);

*b*) that Annex 10 (Volume III) to the Convention on International Civil Aviation is a part of the international Standards and Recommended Practices (SARPs) for the current aeronautical

narrowband HF communication systems used by international civil aviation;

*c*) that the modernization of aeronautical HF communications will not require any changes to Article **5** of the Radio Regulations;

*d*) that the frequencies 3 023 kHz and 5 680 kHz are designated for search and rescue in

Appendix **15** of the Radio Regulations;

*e*) that any channel aggregation needs to be performed in a manner that protects other

primary services operating in band and in adjacent frequency bands,

*noting*

*a*) that a similar resolution, (Res 429 (WRC-19)), considered regulatory provisions for updating Appendix 27 of the Radio Regulations in support of HF modernization for aeronautical mobile (R);

*b*) that the existing regional frequency allotments are detailed in Appendix **26** for

aeronautical HF in the AM(OR)S;

*c*) that Appendix **26** provides international and regional allotments for HF channels within the AM(OR)S;

*d*) that the current aeronautical HF narrowband digital communications are detailed in

Recommendation ITU-R M.1458;

*e*) that inter-system compatibility among internationally standardized aeronautical

equipment is the responsibility of ICAO;

*f*) that new HF contiguous or non-contiguous channel aggregation technology allows for

variable bandwidths greater than 2.8 kHz,

*resolves to invite the ITU Radiocommunication Sector*

1 based on ITU-R studies, to identify any potential modifications to Appendix **26** for the AM(OR)S between

3025 and 18030 kHz, noting recognizing c);

2 to identify any necessary transition arrangements for the introduction of new digital

aeronautical wideband HF systems and any consequential changes to Appendix **26**;

3 to consider how new digital aeronautical wideband HF systems can be introduced

taking into account recognizing e);

4 to define the relevant technical and operational characteristics and to conduct sharing and compatibility studies with incumbent services that are allocated on a primary basis in the same or adjacent frequency bands

5 to complete the studies in time for WRC-27,

*invites the 2027 World Radiocommunication Conference*

to consider necessary changes to Appendix **26**, on the basis of the studies conducted under

resolves 4 *to invite the ITU Radiocommunication Sector* above,

*instructs the Secretary-General*

to bring this Resolution to the attention of the ICAO,

*invites the International Civil Aviation Organization*

to participate actively by providing aeronautical operational requirements and relevant available

technical characteristics to be taken into account in ITU Radiocommunication Sector studies.

Reasons: To provide a roadmap for studies and review for possible revision of RR Appendix **26** to meet current and future aeronautical requirements in light of availability of new technologies capable of modernizing HF including significant improvements to capacity, connectivity and quality of service.

**ATTACHMENT**

**PROPOSAL FOR FUTURE AGENDA ITEM TO UPDATE ITU RADIO REGULATION APPENDIX 26 IN SUPPORT OF WIDEBAND HF**

**Subject:** Proposed Future WRC Agenda Item for WRC-2027 to support updates to ITU Radio Regulations in support of Wideband HF

**Origin**: United States of America

*Proposal:* To review and update the relevant sections of ITU RR Appendix 26 in support of Wideband HF for aviation applications while ensuring compatibility with legacy HF uses.

***Background/reason:***

The aeronautical use of the various HF frequency bands in the range 3025 and 18030 kHz kHz is essential to long distance aeronautical communications in remote and oceanic areas. Since the last substantive review of RR Appendix 26 of the ITU Radio Regulations, use of HF by aviation has continued to change and grow. Aviation is evaluating future developments within the HF band, using new technology to significantly improve capacity, connectivity, and quality of service for aviation data and voice, including increased channel bandwidths for greater data throughput. Such developments within existing aviation HF allocations would provide aviation with additional capabilities, improving safety and global coverage. RR Appendix 26 needs to be reviewed to ensure it meets the current and future aeronautical requirements by allowing for bonding contiguous HF channels and allow digital modulations that support higher data rates while ensuring that interference outside of the assigned multi-channel bands is no greater than the interference of individually utilized channels.

***Radiocommunication services concerned:***

Aeronautical Mobile (OR)

***Indication of possible difficulties:*** none foreseen

***Previous/ongoing studies on the issue***: N/A

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| ***Studies to be carried out by:*** ITU-R WP5B | *with the participation of:*  ICAO |

***ITU-R Study Groups concerned:*** SG 5, SG 6

***ITU resource implications, including financial implications (refer to CV126):*** minimal

***Common regional proposal:*** Yes/No ***Multicountry proposal:*** Yes/No

*Number of countries:*

***Remarks***

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