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| **U.S. Radiocommunications Sector**  **Fact Sheet** | |
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| **Purpose/Objective:** The purpose of this paper is to continue drafting the CPM text for Agenda Item 1.9, in accordance with Resolution **411 (WRC-23)**. | |
| **Abstract:** Working Party 5B is the responsible Working Party for reviewing Appendix 26 in accordance with Resolution **411 (WRC-23)** and developing draft CPM text. To date, WP 5B has initiated a Working Document towards a Preliminary Draft New Report for modernization of HF AM(OR)S. This paper will propose edits to the draft CPM text for Agenda Item 1.9. | |

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| **United States of America** | |
| |  | | --- | | Proposed text for the CPM text on agenda item 1.9 | | |

The United States proposes the following Attachment be considered for the development of Draft CPM text for Agenda Item 1.9. The United States submits this contribution to facilitate the drafting of text for methods and regulatory considerations.

**Attachment:** 1

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| ATTACHMENT | |
| WORKING DOCUMENT TOWARDS A DRAFT CPM REPORT TO WRC-27 ON AGENDA ITEM 1.9 | |
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CHAPTER 2

Fixed, mobile and radiolocation issues

(Agenda items 1.7, 1.8, 1.9, 1.10)

Agenda item 1.9

(**WP 5B / WP 3L, WP 5C, WP 6A, WP 7A**)

*1.9 to consider appropriate regulatory actions to update Appendix****26*** *to the Radio Regulations in support of aeronautical mobile (OR) high frequency modernization, in accordance with Resolution****411*** *(****WRC‑23)****;*

Resolution **411 (WRC-23)** – *Consideration of appropriate regulatory actions to update Appendix****26*** *in support of modernization of high-frequency spectrum use in the aeronautical mobile (OR) service*

# 2/1.9/1 Executive summary

This agenda item provides the opportunity to update RR Appendix **26** in order to include the use of wideband digital emissions. A decision in accordance with this proposal would require appropriate action to be taken in terms of compatibility with services operating in-band and in adjacent bands based on the results of compatibility and sharing analysis. To address this agenda item, ITU-R has undertaken studies, pursuant to Resolution **411 (WRC-23)**, on consideration of modifications for updating Appendix **26** of the Radio Regulations (RR) in support of aeronautical (OR) HF modernization. Under WRC-27 agenda item 1.9, two methods have been identified (see sections 2/1.9/4 and 2/1.9/5):

– **Method A:** no change (NOC).

– **Method B:** Modification of RR Appendix **26;** recognition of the aggregation of single channel for wideband digital communications and, as appropriate, consideration of merging channels.

The suppression of Resolution **411 (WRC-23)** is also proposed for all methods (see section 2/1.9/5.3).

# 2/1.9/2 Background

The High Frequency (HF) band has been identified as an effective alternative to provide much-needed integrated and interoperable Beyond-Line-of-Sight (BLOS) communications capabilities. HF is also a critical and affordable option when other communications services are unavailable due to natural disasters or other national emergencies. The challenge with meeting the growing requirement for modern HF is the need for the increased bandwidth needs. These bandwidth needs would be required to achieve higher data rates and improved voice quality communications while not impeding the legacy frequency needs of incumbent users, groups, or countries. Appendix **26** of the ITU Radio Regulations limits Aeronautical Mobile (OR) Service (AM(OR)S) to a maximum bandwidth of 2.8 kHz.

There are modern wideband HF (WBHF) technologies available that enable the flexibility to use wider channel bandwidths within advanced digital HF. This includes enhanced applications that can support a shared environment while also maximizing spectrum efficiency. Current wideband technology and methodologies are available that automate the negotiating of the Radio Frequency (RF) environment while preventing any harmful interference to existing users in, or adjacent to, a desired HF frequency range.

WRC-23 through Resolution **411** (**WRC-23**) resolves to invite the Radiocommunication Sector to review Appendix **26** of the Radio Regulations and consider necessary changes, as appropriate, to Appendix **26**, on the basis of studies without modifying the existing area allotments, and while taking into account that the current use of the narrowband systems shall remain unchanged and shall not be impacted nor precluded by the revision of Appendix **26**.

# 2/1.9/3 Summary and analysis of the results of ITU-R studies

[

For non-contiguous channels aggregation of channels:

Since the approach for the aggregation of single channels is considered followed for the analyses was to keep the provisions of this RR Appendix **26** for the individual channels unchanged, for wideband communication using aggregation of channels no technical studies were required as coexistence conditions remains unchanged while the RR Appendix **26** current emission mask is still applicable.

For contiguous channels aggregation:

Several analysis were conducted to support the modernization of HF spectrum use in the AM(OR)S. A comparative measurement was conducted and results showed that adjacent band emissions and noise floor levels were below the incumbent maximum interference levels, below the average noise floor across the 3 to 18 MHz frequency band, did not contain any anomalous emissions and met the WBHF emission mask as described in Appendix 27.

A static analysis was also conducted and the results of the static analysis showed that signal levels at the incumbent receiver are below the maximum interference levels for the incumbents along path lengths of 500, 1000, 5000 and 10000 km and show a positive margin between 66 to 175 dB.

Editor’s note: for contiguous channels aggregation, the coexistence conditions are to be explained]

# 2/1.9/4 Methods to satisfy the agenda item

All methods propose the suppression of Resolution **411 (WRC-23)**. See section 2/1.9/5.3.

## 2/1.9/4.1 Method A: No change

Method A considers that the current version of RR Appendix 26 does not preclude some wideband digital HF communication for the relevant type of classes.

## 2/1.9/4.2 Method B: Modification of RR Appendix 26, to include the aggregation of single channels for wideband digital communications

This agenda item could be the opportunity to include appropriate language in Appendix **26** for the use of wideband digital emissions. Although aggregation of carriers could be considered, this method proposes the possibility to aggregate single channels to benefit from wideband digital communications without modifying the existing Plan.

# 2/1.9/5 Regulatory and procedural considerations

2/1.9/5.1 Method A: No Change

NOC

**Reasons:** TBD

[USA note: The following section is presented as changes against the Chairman’s Report and therefore may not necessarily reflect the specific changes that would appear as against the current Appendix 26 in the RR Volume 2. The US proposes that these changes should be reflected against the current Appendix 26 when the documents are merged during the SWG meetings with other contributions.]

2/1.9/5.2 Method B: Explicit recognition of channels aggregation

MOD

APPENDIX 26 (REV.WRC-27)[[1]](#footnote-1)\*

Provisions and associated Frequency Allotment Plan for the aeronautical   
mobile (OR) service in the bands allocated exclusively to that   
service between 3 025 kHz and 18 030 kHz

(See Article 43)

MOD

## **26**/2.2 Allotment in the aeronautical mobile (OR) service

A frequency allotment in the aeronautical mobile (OR) service which comprises:

– a frequency channel from the channels appearing in the channelling arrangement in No. 26/3[[2]](#footnote-2);

– an occupied bandwidth of up to 2.8 kHz, situated wholly within the frequency channel concerned;

– a power within the limits laid down in No. 26/4.4 or specified against the allotted frequency channel;

– an allotment area which is the area in which the aeronautical station can be situated and which coincides with all or part of the territory of the country, or of the geographical area, as indicated against the frequency channel concerned in the Frequency Allotment Plan.

**MOD**

**26/**3.5 The aeronautical radiotelephone stations shall use only single-sideband emissions (J(2,3,7,9)E). The upper sideband shall be employed, and the assigned frequency (see No. **1.148**) shall be 1 400 Hz higher than the carrier (reference) frequency.

MOD

26/3.6 The channelling arrangement specified in No. 26/3.1 does not prejudice the rights of administrations to establish, and to notify assignments to stations in the aeronautical mobile (OR) service other than those using radiotelephony, provided that:

–

for single channel or non-contiguous aggregation, the occupied bandwidth does not exceed 2 800 Hz and is situated wholly within one frequency channel;

– for contiguous aggregation, wider occupied bandwidths can be implemented using currently allotted frequency channels;

– the limits of unwanted emission are met (see Appendix 27, No. 27/74).     (WRC‑2000)

ADD

26/3.7 Individual non-contiguous or contiguous channels complying with the provisions of the Plan[[3]](#footnote-3) contained in this Appendix may be aggregated to provide wideband communication without changing the Plan of individual channels. Any aggregation of channels shall be situated wholly within the respective frequency bands listed in No. **26/1**.

MOD

## **26/4.2** Telephony – single-sideband, suppressed carrier

– J(2,3,7,9)E.

**MOD**

## **26/4.3** Telegraphy and data transmission

– A1A, A1B, F1B;

– (A,H)2(A,B);

– (R,J)2(A,B,D);

– J(7,9)(B,D,X).

– D(1,2)D

– G1D

**MOD**

26/4.4 Unless otherwise specified in Part III of this Appendix, the following transmitter power limits1 (i.e. power supplied to the antenna) for each channel using 2.8 kHz occupied bandwidth shall be applied:

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| Class of emission | Power limit values (peak envelope power supplied to the antenna) | |
|  | Aeronautical station | Aircraft station |
| J(2,3,7,9)E | 36 dBW (PX) | 23 dBW (PX) |
| A1A, A1B | 30 dBW (PX) | 17 dBW (PX) |
| F1B | 30 dBW (PX) | 17 dBW (PX) |
| A2A, A2B | 32 dBW (PX) | 19 dBW (PX) |
| H2A, H2B | 33 dBW (PX) | 20 dBW (PX) |
| (R,J)2(A,B,D) | 36 dBW (PX) | 23 dBW (PX) |
| J(7,9)(B,D,X)  D(1,2)D  G1D | 36 dBW (PX)  30 dBW (PX)  30 dBW (PX) | 23 dBW (PX)  17 dBW (PX)  17 dBW (PX) |

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ADD

**26**/7.4 The procedures in Nos. 26/7.1, 26/7.2, and 26/7.3 above do not apply to wide-band channels formed by aggregation of individual channels pursuant to 26/3.7.

2/1.9/5.3 For all Methods: Suppression of Resolution 411 (WRC-23)

SUP

RESOLUTION 411 (WRC-23)

Consideration of appropriate regulatory actions to update Appendix 26   
in support of modernization of high-frequency spectrum   
use in the aeronautical mobile (OR) service

1. \* This revision contains an up-to-date version of Part III, reflecting all amendments to Part III resulting from the application of the procedures of Part V, up to and including 10 May 2016, as well as those amendments, which resulted from geopolitical changes that occurred up to and including that date. [↑](#footnote-ref-1)
2. The channels appearing in No. 26/3 may be aggregated to provide wideband communication, see No. **26**/3.7 [↑](#footnote-ref-2)
3. In particular, the provisions related to the carrier and assigned frequencies (Nos. **26/3.1**, **26/3.5** and **26/3.6**), class of emission (Nos. **26/4.2** and **26/4.3**), power limits (Nos. **26/4.4** and **26/4.5**), out-of-band spectrum mask (No. **27/74**) and the compatibility (Part IV). [↑](#footnote-ref-3)