International Civil Aviation Organization

TENTH MEETING OF SPECTRUM REVIEW WORKING GROUP (SRWG/10)

Bangkok, Thailand, 04 – 06 February 2026

Agenda Item 3: Review Frequency planning requirements for the Asia/Pacific Region

SPACE-BASED VHF FREQUENCY COORDINATION FOR THE ASIA/PACIFIC REGION

(Presented by Australia)

SUMMARY

This paper addresses the need to establish a frequency coordination process for Space-based VHF communications in the Asia/Pacific region. Service providers are developing experimental systems and will soon require spectrum access for testing.

The paper outlines that ICAO is currently developing the necessary standards and guidance documents (expected completion mid-2026 to Q1 2027) and that two technical methods are being considered for frequency separation calculations: a geometric horizon method and a more complex radio propagation method.

The key issue is that while frequencies may appear unused in ICAO's Frequency Finder database, they could still be in operational use by states in the region. The paper proposes establishing a regional coordination process to identify available frequencies for Space-based VHF testing while protecting existing terrestrial VHF operations. The meeting is asked to endorse a decision to implement this coordination framework.

1. INTRODUCTION

1.1 Since the AMS(R)S allocation at WRC-23 in the VHF band 117.975 MHz – 137 MHz, ICAO has been working to develop SARPS and documents to support the introduction of Space-based VHF. This work includes updates to the volumes of Annex 10 to the Convention on International Civil Aviation with this work expected to be completed at the panel level before mid-2026.

1.2 Space-based VHF communications will provide significant operational benefits to civil aviation, particularly for oceanic and remote areas where traditional ground-based VHF infrastructure is not economically viable. This technology will enable direct air-ground voice communications in areas currently served only by HF or other satellite communications, improving flight safety, air traffic management efficiency, and operational flexibility. The successful integration of Space-based VHF requires coordinated spectrum management to ensure compatibility with existing terrestrial VHF operations.

1.3 ICAO is developing a Manual on Space-based VHF Communication Systems (ICAO Doc.10228). Its general purpose is to serve as an implementation and interoperability guide for Space-

based VHF system vendors, avionics vendors, ANSPs, and CSPs. This document is planned to be finalised in Q1 of 2027, however this is subject to the contribution from experts in the community.

1.4 ICAO is developing updates to the ICAO Handbook on Radio Frequency Spectrum Requirements for Civil Aviation (Doc.9718). This document is split into two volumes. Volume I contains the *ICAO spectrum strategy, policy statements and related information* and Volume II contains *Frequency assignment planning criteria for aeronautical radio communication and navigation systems*.

1.5 The ICAO Frequency Spectrum Management Panel have discussed the planning criteria for Space-based VHF and agreed that no changes are required to the Volume 5 of Annex 10 to the Convention on International Civil Aviation, but additional guidance material will be needed in Doc.9718.

2. DISCUSSION

2.1 AMS(R)S Experimental Systems

2.1.1 ITU Resolution 406 (WRC-2023)[1] allows for the use of the frequency band 117.975-137 MHz by AMS(R)S experimental systems while SARPS are being developed and before operational deployment. Space-based VHF service providers are progressing in the development of their systems, and it is likely that the request for access to spectrum will increase.

2.1.2 Service Providers of Space-based VHF are continuing their development of systems to implement this new technology. As the development and testing of these systems progresses the need to conduct trials from space will become more common.

2.1.3 To ensure that this new technology can be developed, and that there is no impact to the operation of terrestrial VHF, the ICAO APAC office is encouraged to begin the work to lead the implementation of the regional and interregional coordination process.

2.2 AMS(R)S Planning Criteria

2.2.1 The FSMP is progressing two methods for calculating the separation required between facilities operating on the same frequency in the VHF band 117.975 MHz – 137 MHz. The first is a radio horizon method, this is reasonably simple. Refraction causes radio waves to bend due to changes in the atmosphere's density and refractive index with altitude. However, most of the signal path for Space-based VHF occurs outside of Earth's atmosphere; therefore, the geometric (or optical) horizon should be used for these calculations.

2.2.2 The second is a radio propagation method that would allow the calculation of the desired to undesired signal ratio. The advantage of the radio propagation method is that it allows the calculation to consider the signal propagation and the VHF space station characteristics including the orbit, transmitted power, receiver sensitivity and antenna pattern characteristics.

[1] https://www.itu.int/dms_pub/itu-r/oth/0C/0A/R0C0A0000110091PDFE.pdf

2.2.3 Both of these are valid methods for calculating separation criteria as stated in Volume 5 of Annex 10 to the Convention on International Civil Aviation:

> *4.1.4.1 The geographical separation between facilities operating on the same frequency shall, except where there is an operational requirement for the use of common frequencies for groups of facilities, be such that the protected service volume of one facility is separated from the protected service volume of another facility by a distance not less than that required to provide a desired to undesired signal ratio of 20 dB or by a separation distance not less than the sum of the distances to the associated radio horizon of each service volume, whichever is smaller.*

2.3 AMS(R)S Frequency Coordination

2.3.1 At a FSMP-WG/21, the secretariat presented the outcome of a meeting with the Regional Offices (RO's) on the draft coordination mechanism of Space-based VHF frequencies. This draft mechanism includes both regional and inter-regional coordination processes.

2.3.2 Considering the likely need for Space-based VHF frequencies and looking at the Frequency Finder, 135.550 MHz is listed as not in use. The Regional Frequency Allotment Tables (Doc.9718) lists this frequency as allocated to the FIS-U (GPS) (Flight Information Services) in the APAC region.

2.3.3 Based on this information, it would then seem realistic for this frequency to be allowed for Space-based VHF. However, it is possible that this frequency is in operational use by states in the APAC region, but it is not listed in Frequency Finder. A process to notify and coordinate within a reasonable time frame is required to ensure there is no impact to operational services.

2.4 The meeting is requested to review, modify if necessary, and endorse the following decision:

<table>
<tr><td colspan="3">Conclusion/Decision XX/XX - IMPLEMENT A SPACE-BASED VHF FREQUENCY COORDINATION PROCESS</td></tr>
<tr><td colspan="2">What: Define a process to allow the testing of Space-based VHF in the frequency band 117.975 – 137 MHz, while not impacting the operational use of the frequency band. The process should allow the identification of available frequencies, for testing of Space-based VHF.</td><td>Expected impact:
☐ Political / Global
☐ Inter-regional
☐ Economic
☐ Environmental
☒ Ops/Technical</td></tr>
<tr><td>Why: To enable Space-based VHF testing and to ensure existing operational use of the VHF band is not impacted.</td><td colspan="2">Follow-up: ☐Required from States</td></tr>
<tr><td>When: 4-Feb-26</td><td colspan="2">Status: Draft to be adopted by Subgroup</td></tr>
<tr><td colspan="3">Who: ☐Sub groups ☐APAC States ☐ICAO APAC RO ☐ICAO HQ ☐Other: XXXX</td></tr>
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3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a) note the information contained in this paper;

b) discuss any relevant matter as appropriate; and

c) Consider the proposed Conclusion/Decision.

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