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**Agenda Item 4:** Frequency coordination process and improvement for the Asia/Pacific Region

**REVIEW OF VOR FREQUENCY ASSIGNMENT CRITERIA  
IN APAC REGION**

(Airports Authority of India)

**SUMMARY**

This paper shares the experience of India in VOR frequency allocations and anticipated shortfall of new VOR channels

**1. INTRODUCTION**

1.1 This paper intends to sensitize SRWG on probable shortfall of VOR channels being experienced by India.

**2. DISCUSSION**

2.1 Globally, the frequency band 108 - 117.975 MHz is earmarked for Aeronautical Radio Navigation Service (ARNS) and used for ILS (Localizer) and VOR operation. The Ground Based Augmentation System (GBAS) and VDL Mode 4 are also implemented in this band under Aeronautical Mobile (Route) service [AM(R)S] allocation.

2.2 The sub-band 112- 117.975 MHz (channel spacing 100 kHz) is exclusively used for VOR deployment and the use of VOR systems is expected to be used well beyond 2030. Presently, the frequency assignment planning for radio navigation aids (NDB/VOR/ILS) in APAC Region is based on Conclusion 12/9 of ICAO Third Asia/Pacific Regional Air Navigation (ASIA/PAC/3 RAN) Meeting. VOR/ILS assignments are published by APAC Regional Office as Frequency List 2 (For the navigations facilities (VOR/DME and ILS) in the bands of 108-117.975 MHz and 960 – 1215 MHz).

2.3 The criteria applied for the selection of VOR frequencies in the APAC region are as under:

i. For VORs used for en-route flight operations, the required geographic separations are:

550 NM between 200 NM/45K co-channel facilities,

705 NM between 300 NM/45K ER co-channel facilities, and

220 NM for adjacent channel facilities.

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ii. For VORs providing service up to 60K, the required geographic separation between co-channel facilities is 720 NM.

iii. For VORs used in terminal areas, (40 NM / 25 K), the required geographic separations are:

200 NM for co-channel, and

60 NM for adjacent channel, (based on 100 kHz channel spacing)

2.4 In India, around 164 VOR frequency assignments are already existing. Further, there are growing needs for increased number of VOR channels due to upcoming new routes, airports and rationalization of sectors in addition to defense requirements. While meticulously processing for new channels in the VOR band based on the existing criteria, India is facing constraints to identify suitable candidate frequencies. The shortage of new channels is anticipated over the period of time.

2.5 Given the constraints, consideration of following measures in APAC region may probably ease the shortfall of VOR channels:

i. The sub-band 108-111.975 (presently used for ILS localizer in the APAC region) is shared between ILS localizer and VOR in an interleaved frequency arrangement for Short range Terminal VOR.

ii. Presently, the frequencies for VOR operation in the sub-band are allocated with 100 kHz channel spacing. Channel spacing of 50 kHz in the APAC Region can be considered for providing adequate number of channels.

2.6 The implementation of above measures requires regional agreements and APANPIRG mandate.

2.7 In view of the foregoing, meeting is invited to discuss the above suggestions.

**3. ACTION BY THE MEETING**

3.1 The meeting is invited to:

a) note the information contained in this paper;

b) share the experiences of various states; and

c) discuss any relevant matter and take decision as appropriate.

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