International Civil Aviation Organization

NINTH MEETING OF SPECTRUM REVIEW WORKING GROUP (SRWG/9)

Bangkok, Thailand, 7-9 May 2025

Agenda Item 11: Future Work Programme

11.2 Implementation of 8.33 kHz Separation

FREQUENCY SIMULATION FOR INDIA

[Presented by India]

SUMMARY

This paper presents a current analysis of the outcome of frequency simulation for India, which arose from the decisions made during the SRWG/5 WP/07. The simulation demonstrates that the frequency requirements for up to 2030 can be satisfied within the frequency band 117.975 - 137 MHz. During SRWG/6 (1 – 3 March 2022) WP/14, such frequency simulation from 2021 to 2030 was done. It was proposed to undertake a similar simulation between 2025-2027 to assess the severity of the congestion.

1. INTRODUCTION

1.1 In response to the outcome of SRWG/5 discussion from its WP/07, Indian VHF projections for 2030 based on future operational requirements and need for objective review of 8.33 kHz Channel Spacing Requirements in APAC Region. Airports Authority of India (AAI), during SRWG/6 (1 – 3 March 2022) WP/14, had submitted the requirement for frequency assignments for VHF-COM services in the frequency band 117.975 – 137 MHz that may be required for the period from 2021 to 2030.

1.2 As mentioned in the para no. 1.1 above, following projection was submitted during SRWG/6:

Sr. No.	**Facility**	**Usages**	**DOC**	***No. of frequencies projected till 2030***
1	AS	Greenfield Airports	CD C-5/100 Ft	30
2	SMC	Greenfield Airports/Defence Airfields	SMC C-5/100 Ft	70
3	TWR	Regional Connectivity Scheme (RCS)/Greenfield Airports/Defence Airfields	TWR C-25/040	180
4	APP	RCS/Greenfield Airports/ Defence Airfields	APP C-150/450	90
5	ACC	Greenfield Airports/Defence Airfields	ACC C-200/450	60
6	ATIS	Green Field Airports/ Defence Airfields	ATIS C-200/450	15
	Total			**445**

Table 1 – Requirements for frequency assignments for India for 2021 - 2030

1.3 This paper presents a current analysis of these requirements with the view to identifying whether these can be satisfied in the pools that are allotted for specific services in the APAC Region when continuing to use 25 kHz channel spacing.

1.4 At present, the following frequencies for different VHF-COM services have been allocated in India since 2021:

Sr. No.	**Facility**	**Usages**	**DOC**	**New Frequencies (2021-till date)**	**Frequencies withdrawn (2021-till date)**	**No. of frequencies implemented**
1	AS	Greenfield Airports	CD C-5/100 Ft	6	1	5
2	SMC	Greenfield Airports/Defence Airfields	SMC C-5/100 Ft	10	2	8
3	TWR	Regional Connectivity Scheme (RCS)/Greenfield Airports/Defence Airfields	TWR C-25/040	88	0	88
4	APP	RCS/Greenfield Airports/ Defence Airfields	APP C-50/120, 75/250, 150/450	57	0	57
5	ACC	Greenfield Airports/Defence Airfields	ACC C-155/250, 200/450, 260/450	71	3	68
6	ATIS	Green Field Airports/ Defence Airfields	ATIS C-200/450	13	11	2
7	VDL	SITA	VDL U-200/450	47	0	47
8	AOC	Airline operators/FTOs/Other	AOC U-100/250, 25/40, 10/100	25	0	25
	Total			**317**	**17**	**300**

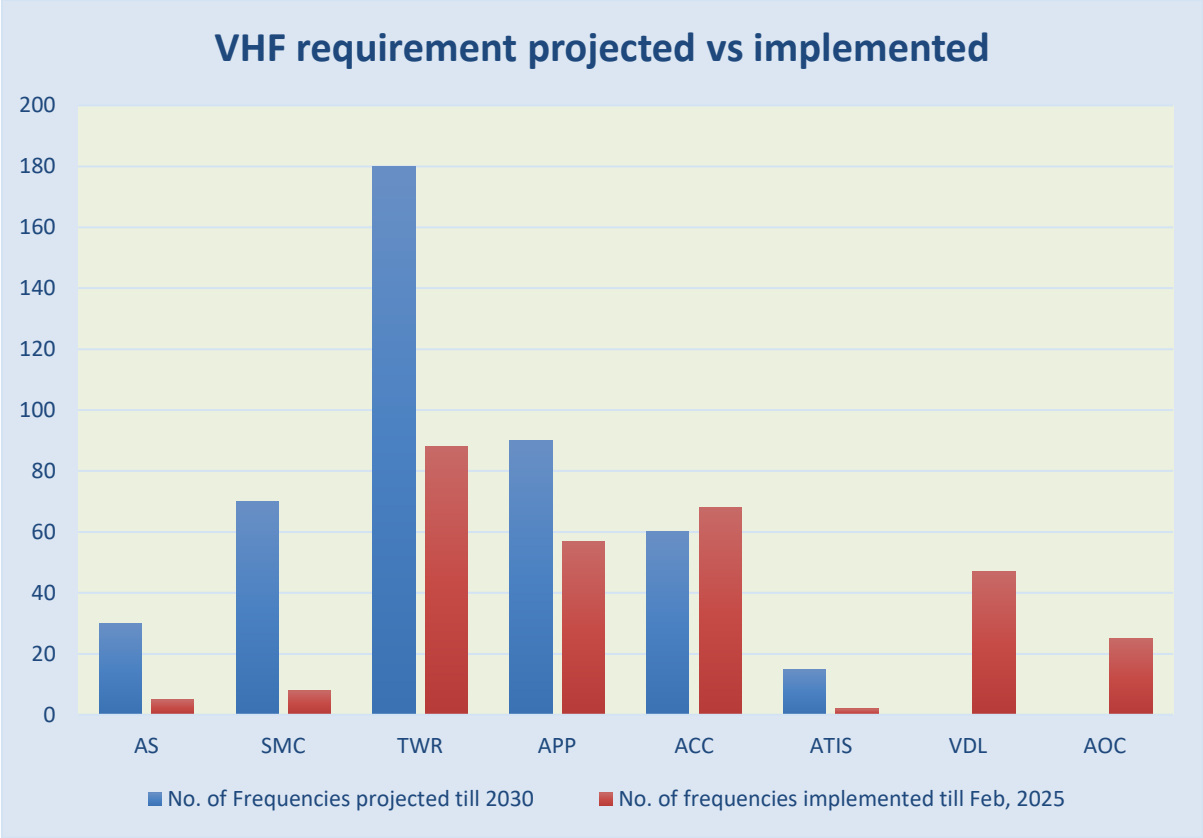
Table 2 –Frequency assignments in India for 2021 – Feb, 2025

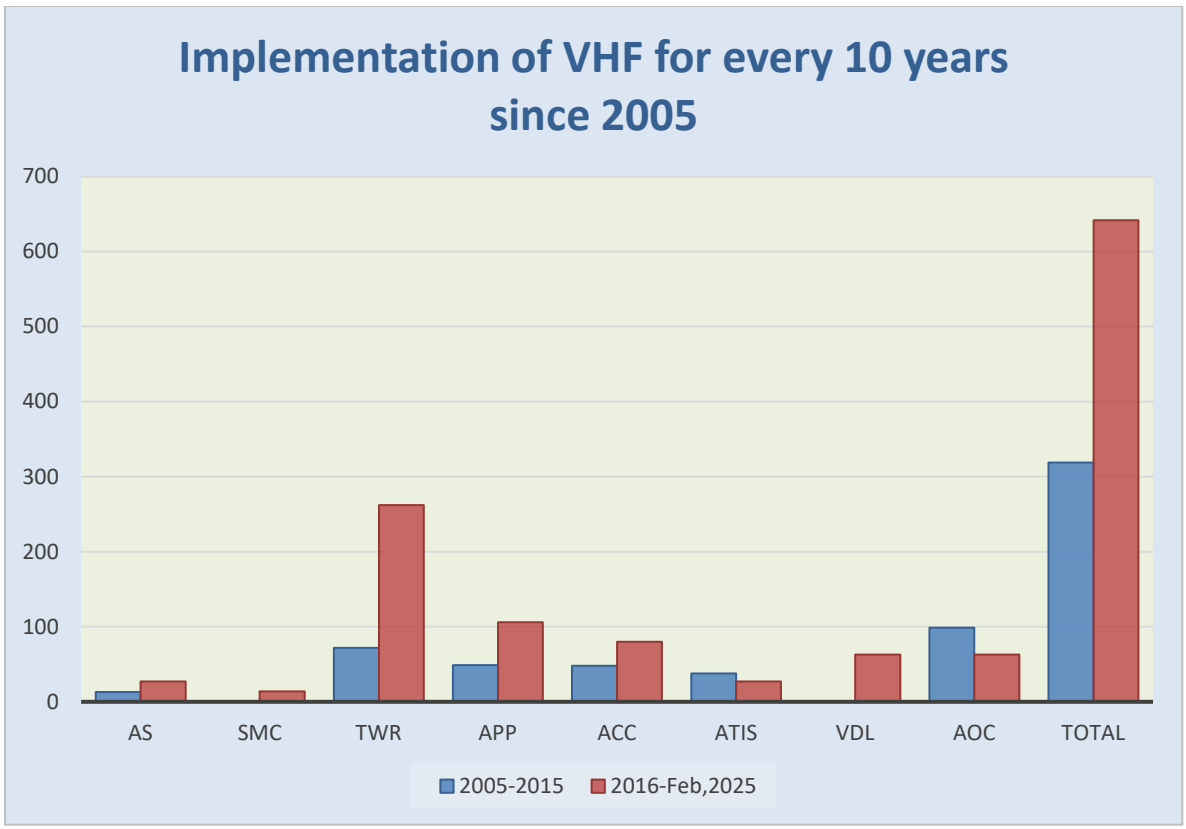
1.5 300 (67.42%) of total projected 445 VHF spots, has already been implemented from 2021 to Feb, 2025

1.6 The availability of sufficient 25 kHz channels in the APAC Region for the next 5 years will avoid a mandatory implementation of channels with 8.33 kHz channel spacing in India. Implementation of radio equipment with 8.33 KHz spacing is costly for aircraft operators.

1.7 The results of this analysis are expected to provide for an indication of the spectrum availability in the band 117.975 – 137 MHz for air-ground communication systems. Therefore, as

considered necessary, the analysis presented in this paper includes a review of potentially more requirements to get an indication of the severity of the future congestion that may be expected with the increased use of the RF spectrum.





2. DISCUSSION

2.1.a) ***Requirement for AS & SMC frequency spots***: A total of 100 frequency assignments were requested with a DOC of 5 NM / 100 ft. The analysis for this requirement is reviewing the possibility to accommodate these requirements in the APAC pool for Aerodrome Surface (AS) communications. As per the projection of AS & SMC frequency spots in last two decades (2005-2015 & 2016-2025) demand has been on the increasing trend. Out of the required 100 frequency spots, 13 frequencies are implemented after withdrawn 03 frequencies from 2021-Feb, 2025 and in view of the decadal trend, the remaining are expected to be implemented by 2030 for the upcoming greenfield airports.

2.1.b) For this analysis the current location of stations for AS/SMC communications in the COM list 3 were considered. The distribution of these facilities across the territory of India. The ICAO COM list 3 includes 63 assignments for AS/SMC services at 32 different locations.

2.1.c) For the purpose of the spectrum capacity analyses the number of these 32 locations for new stations was multiplied by four, resulting in a total of 128 new stations. For these stations, a search was undertaken to accommodate a frequency in the pool for AS services. The analysis took into account more than the required total of 100 frequency assignments.

2.1.d) A total of up to 100 frequency assignments was requested and all of these can be accommodated in the pool for AS services. It must be noted however, that these assignments cause heavy congestion or even saturation in the AS pool and, by 2030 measures may be required to increase the capacity of the spectrum capacity in the pool for AS communications. This can be arranged by making an additional allotment for AS services using 25 kHz channels or by introducing 8.33 kHz channel spacing to support this application.

2.2.a) ***Requirement for frequency assignments for TWR services***: A total of 180 frequency assignments were requested with a DOC of 25 NM / 4000 ft. The analysis for this requirement is reviewing

the possibility to accommodate these requirements in the APAC pool for Tower (TWR) services. As per the projection of TWR frequency spots in last two decades, frequencies implemented between 2016-Feb,2025 is appx. Three times more than the frequencies implemented between 2005-2015. Out of the required 180 frequency spots, 88 are implemented between 2021-Feb,2025 and in view of the decade projection, the remaining are expected to be implemented by 2030 for the upcoming greenfield airports.

2.2.b) For this analysis, the current locations of frequency assignments for TWR communications were considered. The distribution of these facilities across the territory of India. The ICAO COM list 3 includes 425 frequency assignments for TWR services at 211 different locations.

2.2.c) The results that were achieved with this analysis are expected to cause severe congestion or saturate the band 118.000 – 118.875 MHz in India and the surrounding areas of the territory of India. Beyond 2030 additional spectrum should be made available for TWR frequencies to accommodate further growth in the spectrum use. The APAC Region may consider to use for this purpose [part of] the band 122.000 – 123.675 MHz which is currently not allotted to any service.

2.3.a) ***Requirement for frequency assignments APP services***: A total of 90 frequency assignments is requested with a DOC of 150 NM / 45000 ft. The analysis for this requirement is reviewing the possibility to accommodate these requirements in the APAC pool for APP. As per the projection of APP frequency spots in last two decades, frequencies implemented between 2016-Feb,2025 is appx. Twice of the frequencies implemented between 2005-2015. Out of the required 90 frequency spots, 57 are implemented between 2021-Feb,2025 and in view of the decade projection, the remaining are expected to be implemented by 2030 for the upcoming greenfield airports.

2.3.b) The analysis was considering the frequency assignments currently in the ICAO database for APP services. In India, a total of 217 frequency assignments for APP were identified. These assignments are in use at 100 different locations. These locations are spread through the territory of India. These 100 stations were duplicated and added as new stations (2 times) creating a requirement for 200 stations with a DOCs of 50/120, 75/250 and 150/450 as for different APP services.

2.4.a) ***Requirement for frequency assignments for ACC services***: A total of 60 frequency assignments is requested with a DOC of 200 NM / 45000 ft. The analysis for this requirement is reviewing the possibility to accommodate these requirements in the APAC pool for ACC-U. As per the projection of ACC frequency spots in last two decades, frequencies implemented between 2016-Feb,2025 & between 2005-2015 is on increasing trend. Total 68 ACC frequencies are implemented after withdrawn 03 frequencies between 2021-Feb,2025, however, 60 frequencies for ACC-U were required.

2.4.b) The analysis was using the frequency assignments currently in the ICAO database for ACC services. In India, a total of 230 frequency assignments for ACC were identified. These 230 assignments are in use at 56 different locations throughout the territory of India.

2.4.c) When considering the (severe) congestion in the ACC pool it is proposed to consider to extend this pool into (parts of) the frequency band 136.000 – 137.000 MHz. This frequency band has to date only very limited assignments for VDL. To improve the efficiency of VDL assignments, the introduction of a channel plan for VDL is proposed that takes, in an efficient manner, into account the need for a one channel guard band between VDL frequency assignments. This may become necessary when VDL is used for ATC data communications.

2.5.a) ***Requirement for frequency assignments for ATIS services***: A total of 15 frequency assignments is requested for ATIS with a DOC of 200 NM / 45000 ft. The analysis for this requirement is reviewing the possibility to accommodate these requirements in the APAC pool for VOLMET/ATIS. As per the projection of ATIS frequency spots in last two decades, frequencies implemented between 2016-Feb,2025 & between 2005-2015 is on slight decreasing trend. Out of the required 15 frequency spots,

Total 13 ATIS frequencies are implemented & 11 frequencies are withdrawn between 2021-Feb,2025 and in view of the decade projection, the remaining are expected to be implemented by 2030 for the upcoming greenfield airports.

2.5.b) This pool is shared with frequencies for VOLMET which has a (standard) DOC of 150/450. Both services provide for a broadcast service.

2.6 END NOTES

2.6.1 Based on the implementation till Feb, 2025

2.6.1 a) Until about 2030 the requirements brought forward by India can be satisfied within the frequency band 117.975 – 137 MHz using equipment that is designed for 25 kHz frequency separation. The analysis as presented however does not take into account an increase in the use of this band in countries adjacent to India. When the increase in adjacent countries is significant, the potential for satisfying all of the requirements from India is reduced. This is manifested in particular for aeronautical services with a large DOC that includes higher flight levels.

2.6.2 b) A new review of the spectrum requirements is proposed to take place around 3 years from now. Such a review should take into consideration the actual number of new frequency assignments that would be placed into operation use at that time, as well as provide for a better opportunity to assess the spectrum requirements for a period of up to 2 years from that time.

2.6.3 The analysis is valid under the assumptions or conditions with which it was performed. Changing these may give different results. Overall, it is expected that this may not necessarily significantly change the end results as presented.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a) note the information contained in this paper;

b) agree to undertake an updated spectrum capacity analysis for the APAC Region in 2028; and

c) discuss any relevant matter as appropriate

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