International Civil Aviation Organization

FIFTH MEETING OF SPECTRUM REVIEW WORKING GROUP (SRWG/5)

Video Teleconference, 15 – 17 March 2021

Agenda Item 5: VHF Com Simulation for 2030

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)

SUMMARY

This paper presents Indian VHF projections for 2030 based on future OPERATIONAL requirements and objective review to implement 8.33 kHz channel spacing in a limited manner in APAC region due to likely VHF congestion

1. INTRODUCTION

1.1 This paper provides

a) A holistic analysis of projected and actual deployment of VHF frequencies for the period 2015-2020 to meet various ATS operational requirements.
b) The projections of VHF frequencies for the next 10 years up to year 2030.
c) Discussion on the requirement of 8.33 kHz channel spacing implementation in the APAC region to cope with the possible shortfall of suitable candidate frequencies probably beyond 2025 leading to VHF congestion.

2. DISCUSSION

2.1 The aeronautical VHF band 117.975-137 MHz [double-sideband amplitude modulation (DSB-AM)] is the vital radio communications band for line-of-sight air-ground voice communications used at all ATC Centres and Airports, for all phases of flight.

2.2 In 1947, VHF assignments for aeronautical mobile (R) in 118-132 MHz used 200 kHz spacing, providing just 70 channels. In 1958, the spacing was reduced to 100 kHz, doubling the number of channels to 140. In 1959, the upper limit of the aviation band was expanded to 136 MHz, giving another 40 channels, bringing the total to 180. In 1964, the channel spacing was halved again to 50 kHz, resulting in 360 channels being available. The channel spacing was further cut to 25 kHz in 1972, doubling the available channels to 720. In 1979, the upper limit of the aviation band was once again expanded to 137 MHz, bringing the total number of channels to 760. In 1995, the proposal was made to reduce the channel spacing to 8.33 kHz, resulting in 2280 channels.

2.3 India, way back in 2014/15 had requested for considering 8.33 KHz channel spacing implementation in APAC region to cope up with the huge demand for VHF assignments and perceived shortfall in the availability of new frequency channels with the current 25 kHz channel spacing. Based on the request, SRWG was constituted and had recommended following improvement measures to ease the congestion in the VHF band:

a) Complete revision of VHF allotment plans in the APAC region based on Frequency Handbook-Doc-9718 (Volume-II).

b) Reduction of the guard band around Aeronautical Emergency frequency 121.500 MHz and the resultant 4 channels were used for ATC Communications (APP & AS).

c) Reduction in the AOC band by carving out a new sub-band in APAC 128.900 - 131.375 MHz for ATS services.

d) Doing away with the earlier pool allocation principles.

e) Streamlining the allocation of backup frequencies by adopting backup frequency assignment guidelines in line with Section 2.7 of Part 2 “COM2 Best Practices” of Eurocontrol document.

f) Use of ICAO New Frequency Finder Tool on introduction by various states.

g) Conducted simulations based on operational needs projected by states to ascertain the VHF congestion in the Region.

2.4 In view of the above measures, SRWG was of the considered opinion that congestion for VHF frequencies using a 25 kHz channel spacing was unlikely to happen in the APAC region until 2020 and took a conscious decision to continue using 25 KHz channel spacing and review it based on the feedback by states.

2.5 It is worth noting that India had projected requirement of around 130 new frequencies for the period 2015-20, whereas the actual assignments for various services during the period increased to nearly around 204 frequencies (**Annexure refers).** Thus, the demand for VHF assignments in India for the last 5 years period has been quite phenomenal and is closely related with growth in flight operations, addition of more greenfield airports and regional connectivity scheme (RCS) to connect remote locations across the nook and corner of the country as envisaged in the New Civil Aviation Policy. Additionally, many improvements in air traffic control/management areas viz. implementation of new sectors/air space redesign, upper area harmonization etc. were also contributing factors for the actual increased requirements vis-à-vis projections.

2.6 In India, presently a total of around 1000 VHF frequencies are operational and the requirement is further expected to grow significantly in the coming years. Given the trends, 50-60 new VHF assignments per year are envisaged as of now. The total number of new frequency assignments for the period 2021-2030 in India for Civil Aviation use would be around 600, besides additional requirements for military organizations. The projections are only conservative and the actual requirements may be exponential over the period as a greater number of airports come up.

2.7 Though the projections are for a ten-year period up to 2030, but the jump may be exponential and the requirements of a greater number of frequencies may be much earlier which is difficult to time. These new frequency requirements are definitely going to affect the new assignments using the 25 kHz separation requiring a switch over to 8.33 kHz separation.

2.7 It is also relevant to note that WRC-23 Agenda Item 1.7 seeks to consider a new aeronautical mobile-satellite (R) service (AMS(R)S) allocation in the VHF band for space-based VHF communications. Any further constraints on the band will be known only when the ongoing compatibility studies at ITU-R level are completed before next WRC-23.

2.8 In conclusion, it may be inferred that the continuing trends predict VHF congestion over the period may be beyond 2023-25, which may necessitate the introduction of 8.33 kHz channel spacing in the APAC region at least for some states. Accordingly, India is of the opinion that SRWG should deliberate and simulate a transition scenario for voice communication within APAC region from the current 25 kHz to 8.33 kHz channel spacing by taking into consideration the lead time for implementation and equipage.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a) note the information contained in this paper; and

b) discuss any relevant matter as appropriate

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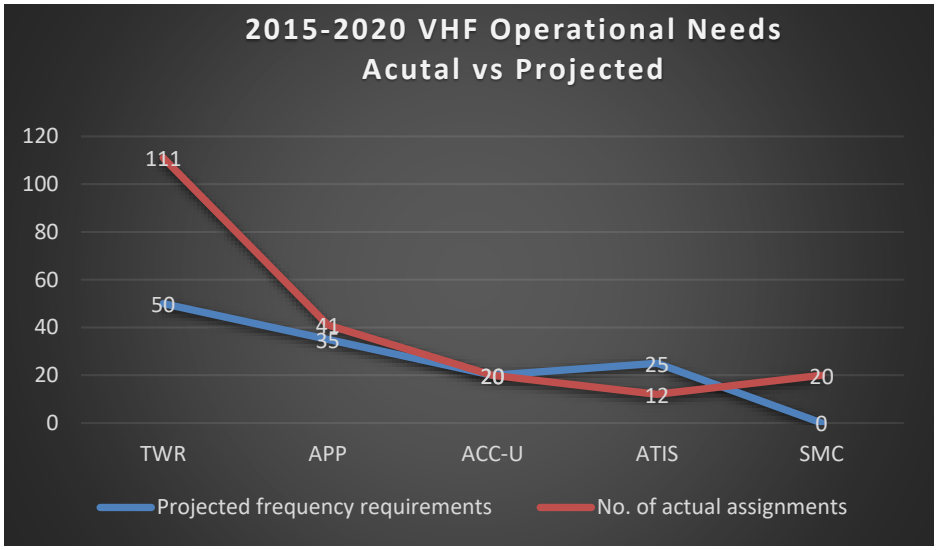
Annexure

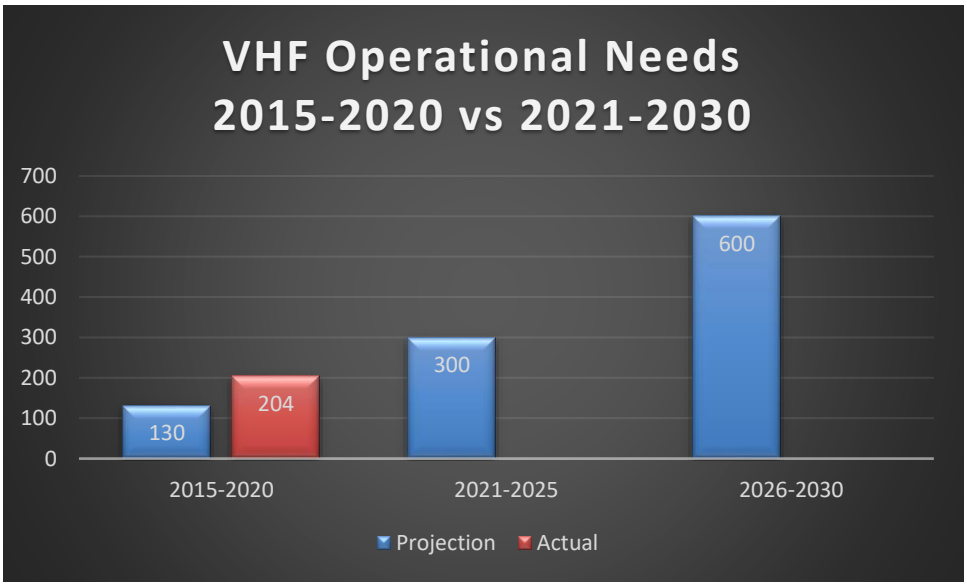
Table-1: Projected VHF assignments for the period 2015-2020

Period	Service	Projected frequency requirements	Remarks
2015-2020	TWR	50	includes backup
	APP-L	30	includes backup
	APP-U	5	only main
	ACC-U	20	includes backup
	ATIS	25	no Backup
Total		130	--

Table-2: Actual VHF assignments for the period 2015-2020

Service	**No. of actual assignments**
TWR	50
TWR Backup	61
APP	22
APP Backup	19
SMC	11
SMC Backup	03
ACC	16
ACC Backup	03
ATIS	12
CD	06
OCC Backup	01
Total	**204**


2015-2020 VHF Operational Needs
Acutal vs Projected
120
100
80
60
40
20
0
111
50
41
35
20
25
12
20
0
TWR
APP
ACC-U
ATIS
SMC
Projected frequency requirements
No. of actual assignments


VHF Operational Needs
2015-2020 vs 2021-2030
700
600
500
400
300
200
100
0
130
204
300
600
2015-2020
2021-2025
2026-2030
Projection
Actual