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Aeronautical Frequency Management in the APAC Region

The APAC Preparatory Workshop to ITU World Radiocommunication Conference 2027 (WRC-27)

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Workshop on ITU World Radiocommunication Conference 2027
(WRC-27 Workshop)
(Bangkok, Thailand, 24-25 February 2025)

Frequency Management requirements in ANP

GENERAL REGIONAL REQUIREMENTS

- Frequency assignment planning in the Region(s) should be carried out in accordance with the provisions of Annex 10 and ICAO **Handbook** on Radio Frequency Spectrum for Civil Aviation (Doc 9718), supplemented, as necessary, by regional recommendations and technical criteria developed for this purpose.

SPECIFIC REGIONAL REQUIREMENTS

- States in the ASIA/PAC Region should coordinate, as necessary, with the ICAO Regional Office all radio frequency assignments for both national and inter-national facilities in the 190--526.50 kHz, 108-117.975 MHZ, 960-1215 MHZ and 117.975-137 MHZ bands.[ASIA/PAC/3, Conc. 11/4, 11/5 and 12/9]

Establishment of APAC practice

- The basic guidance on aeronautical radio spectrum coordination and management were specified in the Report of the Third Asia/Pacific Regional Air Navigation Meeting (Doc 9614, ASIA/PAC/3 (1993)) under Agenda Items 10, 11 and 12 and the updated guidance is provided in the ICAO **Handbook** on radio frequency spectrum requirements for civil aviation, Volume II, Frequency assignment planning criteria for aeronautical radio communication and navigation systems.

Role and function of Regional Office

- Defend ICAO position
  - Participate in APG meetings
    - As WRC decision on Agenda Items will be relying more on regional discussions, it is very important to ensure that the aviation position on various agenda items of WRC-27 is duly reflected in the States' position papers to be submitted to the APG meeting.
  - Promote ICAO position at regional forums
    - ITU Regional Radiocommunication Seminars for APAC
    - Regional Interagency Working Group (IAWG) on Information and Communication Technology (ICT)
    - co-host with APT a Webinar on 5G Implementation and Radio Altimeters
- Aeronautical Frequency Coordination
  - Coordination and selection, Resolution of interference, Frequency Lists, IC code management, SIC/SAC plan

Aeronautical Frequency Coordination

- The Third Asia/Pacific Regional Air Navigation (ASIA/PAC/3 RAN) Meeting (1993) agreed that the frequency lists prepared by the ICAO Asia and Pacific (APAC) Regional Office will be the frequency planning documents for the Regions.

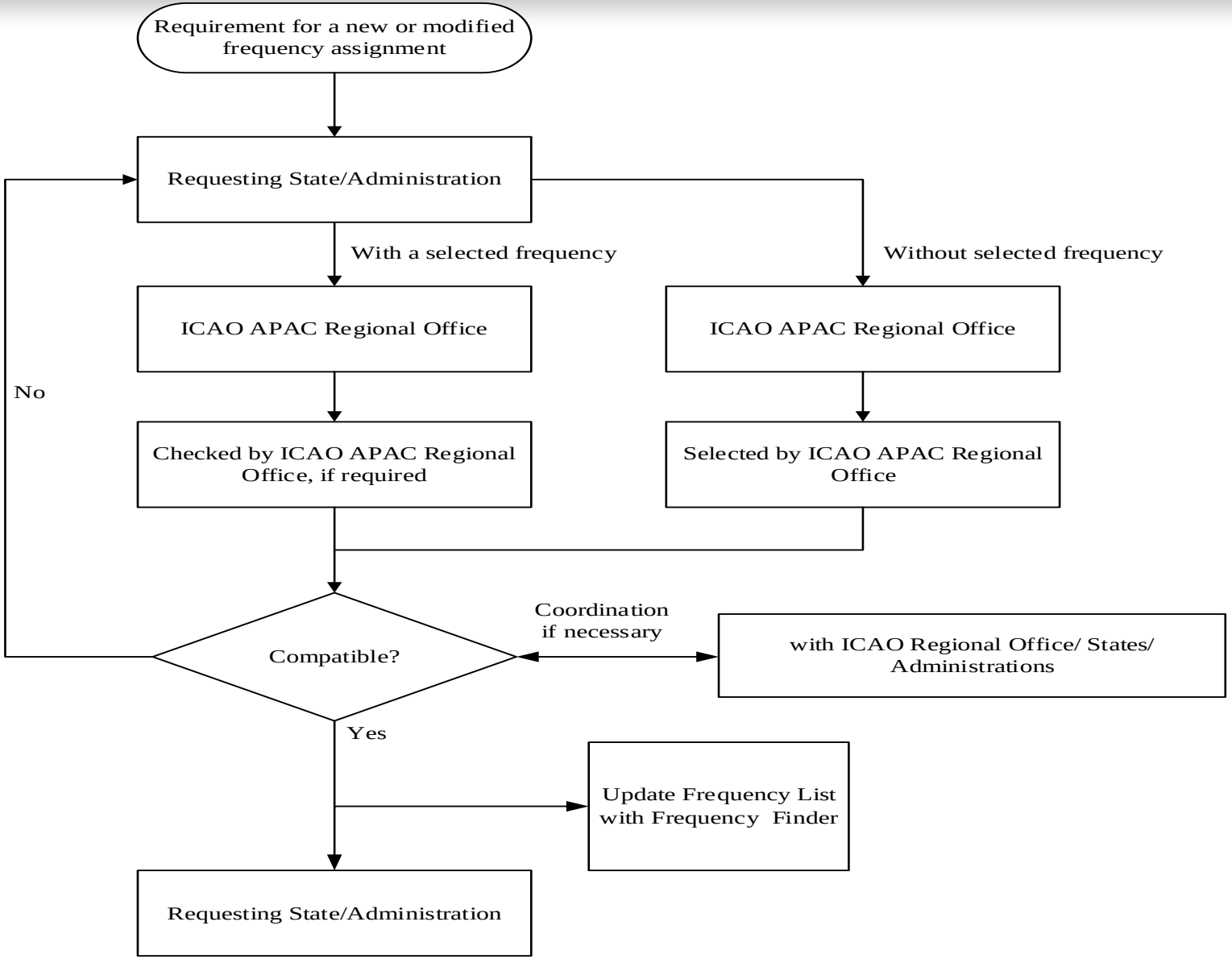
- The ICAO APAC Regional Office was charged to continue to maintain its frequency selection and coordination role, including the maintenance and promulgation of Frequency List Nos. 1, 2 and 3 at appropriate periodic intervals.

Regional Office is the focal point

- The ICAO APAC Regional Office acts as the only centralized portal for aeronautical frequency and IC coordination, providing a one-stop solution for States. The current process is based on a minimum bureaucracy and overhead when performing the frequency coordination and registration, which has served the APAC community well over the years and is expected to do so for the foreseeable future.
- The efficiency and accuracy of the process rely on the support from States to the Regional Office by submitting all frequency and SSR/IC assignments for international coordination in a timely manner.
- In any case, ICAO holds the view that frequency and IC assignments that have been coordinated with ICAO have priority over those that have not been coordinated.

Aeronautical Frequency Coordination procedure

- State Letter
- Emails between RO CNS and POC of States



Computer Tool

- ICAO APAC introduced a standalone computer software Frequency Manager to manage Frequency List 1 (NDB), 2 (NAV), 3(VHF COM), 4(HF), and SSR II code, based on geographical separation standards agreed in RANC/3 in 1993.

- The ICAO Frequency Finder tool, including its global database, was formally introduced to the APAC region in 2015.
  - Consequentially the publication of Frequency List No. 3 (117.975 - 137 MHz) has been discontinued.
  - The ICAO APAC Regional Office continues to update and publish Frequency List No.1 (190-526.5 kHz – NDB) and Frequency List No.2 (108 - 117.975 MHz and 960 - 1215 MHz; VOR/DME, ILS, and VDL Mode 4) every year.
  - Frequency Finder is now being utilized to manage and register NAV systems.
  - The publication of Frequency List No. 2 will discontinue in 2025.

Regional Efforts

- **Regional Office**
  - In 2023**, 422** frequency assignment co-ordinations/registrations (VHF COM 323, Nav 88, NDB 11)
  - In 2024, **500+** frequencies coordinated and handled by APAC

- **Spectrum Review Working Group (SRWG)**
  - To address various issues relevant to Aeronautical Radio Frequency

Interregional Coordination

- ICAO APAC introduced the Frequency Finder tool, including its global database.
- In day-to-day practice, if interregional coordination is required, it would be initiated between ICAO Regional Office.
- In recent years, Mode S IC has exercised interregional coordination between APAC and MID, as well as APAC and EUR.

POC of Frequency Affairs

- The current practice of aeronautical frequency coordination performed by the ICAO Regional Office is implemented as communication between the ICAO regional officer and the Point of Contact (POC) in different States/Administrations.

- Due to the turnover of staff in the ICAO APAC Regional Office and in the civil aviation organization of States, regular review of the POC is deemed necessary. ICAO APAC Office issued a State Letter Ref.: T 8/8.9 - AP057/21(CNS) with Subject: Focal Point for Frequency Coordination on 08 April 2021, to remind Administrations to revise and update the POC on frequency affairs.

Spectrum Review Working Group

- The CNS SG/17 held in May 2013 proposed to establish a small working group through **Decision 17/6** to investigate the need for an increase in available VHF COM channels and make a recommendation on the deployment of 8.33 kHz channel spacing.
- The CNS SG/18 meeting held in July 2014 adopted the ToR drafted by the SRWG/1 meeting through **Decision 18/19**.
- The CNS SG/24 meeting held in November 2020 adopted the proposed revision to ToR by SRWG/4 through **Decision CNS SG/24/9 (SRWG/4/4).** The keynote for this revision was to conduct a simulation on VHF COM frequency assignment and expand its scope of work to cover Navigation systems with a highlight on GBAS implementation.

VHF COM Projection/Simulation for 2030

- SRWG was established to study the issue of the requirement of 8.33 kHz channel spacing, the simulation activities of the SRWG/3 in 2015 determined that implementation of 8.33 kHz channel spacing would not be necessary until at least 2025.
- Conclusion CNS SG/24/7 drafted by SRWG/4: To conduct a new round of simulation for VHF COM frequency assignment to 2030.
- SRWG/6 discussed the available outcome of the second round of simulation and demonstrated that the **frequency requirements for up to 2030 can be satisfied within the frequency band 117.975 - 137 MHz** with certain conditions, including a **re-organization for the pools** to which frequencies are allotted may be required. In addition, heavy congestion is expected at that time throughout most of this frequency band. It was recommended that a similar analysis be undertaken 3 - 5 years from now to assess the severity of the congestion.
- SRWG/9 from 7-9 May 2025 in the ICAO APAC Office will discuss the need for another simulation.

ILS and VOR 50kHz Channel Spacing Survey

- In 2021, the SRWG/5 meeting formed an ad-hoc group to explore the feasibility of the introduction of 50 kHz channel spacing for VOR and ILS/Localizer deployments in the frequency band 108.000-117.975 MHz in the APAC region.
- The group proposed a questionnaire in SRWG/6 to survey the regional picture which revealed that certain States have already implemented or planned to implement the 50 kHz channel spacing for ILS/VOR facilities, while most of these States indicated no issues with implementation/planning.
- States should ensure the aircraft operating in their airspaces are able to support the use of 50 kHz channel spacing; also, confirm with other relevant bodies that use ILS/VOR facilities their ability to operate with such 50 kHz channel spacing.
- The SRWG/7 Meeting advised that States should follow their own preceding experience and determine accordingly their own needs to implement, and coordinate with their airspace users. No requirement is envisaged for a collective action to migrate into 50 kHz channel spacing for ILS/VOR facilities in the region.

VHF COM Frequency Allotment Plan

- Annex 10, Volume V, Chapter 4 contains a general allotment of the frequency band 117.975–137 MHz. The main subdivisions of this band are the frequency bands allocated to both international and national services and frequency bands solely allocated to national services. Specific allotments to services are to be determined regionally.
- The Asia/Pacific Regional Air Navigation Meetings (RAN) laid down the baseline for today's allotment plan.
  - RAN 1, September 1973 in Hawaii, USA, VHF COM frequency utilization based on 100 kHz channel spacing
  - RAN 2, January 1983 in Singapore, to base future assignments on a 25 kHz frequency utilization plan. Air-to-air 128.950MHz.
  - RAN 3, April 1993, in Bangkok, Thailand, adopted the updated VHF AMS frequency utilization plan, and the 25 kHz spaced channels were considered adequate for the foreseeable future.

Revision to VHF COM Frequency Allotment Plan

- **APANPIRG Conclusion 13/7** - Adoption of a regionally protected frequency for Traffic Information Broadcasts by Aircraft (TIBA): *128.95 MHz for TIBA to permit reports and relevant supplementary information of an advisory nature to be transmitted by pilots; States include TIBA in their contingency plans.*
- **Conclusion APANPIRG/26/50** – Amendment to the APAC frequency allotment plan: *considering the effect of the reduction of the guard band around the frequency 121.500 MHz and the four new channels that can be used for ATC communications.*
- **SRWG/2** proposed two measures: a) to abandon the discrimination between national and international aeronautical mobile services within the band 117.975 – 137 MHz; b) to adopt the new subband 128.900 - 131.375 MHz for ATS services in APAC, which is a part of the sub-band currently allotted to AOC (128.900 – 132.025 MHz).
- **SRWG/7** established an ad-hoc Expert group to address issues identified in the current frequency allotment plan; the outcome was reported to SRWG/8 in March 2024.

Revision to VHF COM Frequency Allotment Plan

- **Conclusion APANPIRG/35/8-** APANPIRG/35 (2024) adopted the revised **VHF COM Frequency Allotment Plan for the APAC Region**.

- The VHF COM Frequency Allotment Plan for the APAC Region is being incorporated into the Frequency Finder tool.

VHF COM Frequency Allotment Plan for APAC Region (March 2024)

Function (revised)	**Function**	**Frequencies (MHz)**
TWR 118.000-118.875MHz 124.300-124.375MHz	TWR	118.000 118.025 118.050 118.075 118.100 118.125 118.150 118.175 118.200 118.225 118.250 118.275 118.300 118.325 118.350 118.375 118.400 118.425 118.450 118.475 118.500 118.525 118.550 118.575 118.600 118.625 118.650 118.675 118.700 118.725 118.750 118.775 118.800 118.825 118.850 118.875 124.300 124.325 124.350 124.375
AS 121.550-121.975MHz	AS	**121.550 121.575** 121.600 121.625 121.650 121.675 121.700 121.725 121.750 121.775 121.800 121.825 121.850 121.875 121.900 121.925 121.950 121.975
APP 119.000-119.275MHz 119.400-120.075MHz 120.200-120.475MHz	APP	119.500 119.525 119.550 119.575 119.600 119.625 119.650 119.675 119.800 119.825 119.850 119.875 119.900 119.925 119.950 119.975
120.600-120.675MHz 120.800-120.875MHz 121.000-121.450MHz 123.800-123.875MHz 124.000-124.075MHz 124.200-124.275MHz 124.400-124.475MHz 124.600-124.875MHz 125.000-125.275MHz 125.400-125.675MHz 125.800-125.875MHz 126.000-126.075MHz 126.300-126.375MHz 126.500-126.575MHz 127.700-127.775MHz 127.900-127.975MHz	APP-L, APP-I, Also used for APP Direction finding or APP Surveillance radar	119.100 119.125 119.150 119.175 119.200 119.225 119.250 119.275 119.400 119.425 119.450 119.475 119.700 119.725 119.750 119.775 120.000 120.025 120.050 120.075 120.200 120.225 120.250 120.275 120.400 120.425 120.450 120.475 120.600 120.625 120.650 120.675 120.800 120.825 120.850 120.875 121.000 121.025 121.050 121.075 121.100 121.125 121.150 121.175 121.200 121.225 121.250 121.275 121.400 **121.425 121.450** 123.800 123.825 123.850 123.875 124.000 124.025 124.050 124.075 124.700 124.725 124.750 124.775 125.100 125.125 125.150 125.175 125.500 125.525 125.550 125.575 126.500 126.525 126.550 126.575 127.700 127.725 127.750 127.775 127.900 127.925 127.950 127.975
	APP-U	120.300 120.325 120.350 120.375 121.300 121.325 121.350 121.375 124.200 124.225 124.250 124.275 124.400 124.425 124.450 124.475 124.600 124.625 124.650 124.675 124.800 124.825 124.850 124.875 125.000 125.025 125.050 125.075 125.200 125.225 125.250 125.275 125.400 125.425 125.450 125.475 125.600 125.625 125.650 125.675

APAC Regional Aeronautical Radio Frequency Management Guidance Material

- This guidance material has been developed under a recommendation from the fourth meeting of the Spectrum Review Working Group (SRWG/4) in June 2020.
- It is for States/Administrations in the APAC region to implement the frequency assignments in a coordinated manner with ANSP, CAA and national frequency Authorities to satisfy future operational needs or the introduction of new technologies, with emphasis on communication and navigation systems.
- This guidance material describes general references in aeronautical frequency management of APAC region, including the introduction and relationships between the main participants, overview of the framework and process of aeronautical spectrum management, etc.
- APAC Regional Aeronautical Radio Frequency Management Guidance Material Edition 1.0 has been approved by CNS SG/27 in September 2023 and published at https://www.icao.int/APAC/Pages/eDocs.aspx

Addressing Interference

- Interference issues have been continuously discussed and shared on regional platforms from time to time
  - APT HF Interference and BSS (Broadcasting Satellite Service) Replanning Meeting in 1998,
  - SRWG, SURICG, CNS SG meetings presented and shared reporting FORM for radio interference, Interference in the Band 117.975 – 137 MHz, VHF Interference caused by MSSR, Potential Interference to Aeronautical Spectrum from LED Products, etc.

- APANPIRG formulated various Conclusions to address radio interference.

- The ICAO APAC Regional Office coordinated to resolve various RFI issues, including VSAT, GNSS, VHF COM, and NAV among States.

HF

- ICAO does not coordinate assignments for HF frequencies. Pre-coordination of HF frequencies could be arranged through the ICAO ASIA/PAC Office in Bangkok. Assignment of these frequencies shall be in accordance with the provisions of Appendix 27 of ITU Radio Regulations

- Despite the limited role of the ICAO in HF assignment coordination, the ICAO regional office and PIRGs acted to group aeronautical stations among the MWARA frequencies allotments in the Regional Air Navigation Plan.

- ICAO APAC tried to set up Frequency List 4, but the work has been suspended for more than 10 years.

- SRWG/7 formed an ad hoc expert group to share the experience in this region in handling HF resource utilization and provide recommendations.

HF Survey

- The ad-hoc group presented the frequency assignments in the Aeronautical HF bands that are registered with the ITU and with ICAO APAC and **proposed to combine the two databases in a single table** (New Table_HF APAC 2024) that can be used for further coordination of HF frequency assignments.
- The CNS SG/28 highlighted that the New Table_HF APAC 2024 would be used as a basis for further work on difficulties that are experienced when using frequencies from the aeronautical HF bands and requested States/Administrations to update this list with frequency assignments that are currently in use with the view to have a correct statement of frequency assignments in the aeronautical HF bands.
- The CNS SG/28 meeting noted the **Decision SRWG/8/3** – Survey on the Utilization of HF Spectrum Frequency bands and supported to conduct a survey on the Utilization of HF Spectrum Frequency bands for Aeronautical Communication and update the New Table with HF Frequency Assignments in the APAC Region

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Ref.: T 8/8.1: AP094/24 (CNS)

Subject: Survey on the Utilization of HF Spectrum bands for Aeronautical Communication in the APAC Region

Action Required: Complete the Survey by **5 November 2024**

Dear Sir/Madam,

I wish to draw your attention to the outcomes of the
of Spectrum Review Working Group (SRWG/7 & SRWG/8), wh
Twenty Eighth Meeting of the Communications, Navigation and
SG/28) of APAC Air Navigation Planning and Implementation Reg
from 1 to 5 July 2024. It was discussed during the meetings that th
spectrum for aeronautical purposes needs to be reconsidered on re

Attachment A to State letter AP094/24 (CNS)

Survey Questionnaire

The Utilization of HF Spectrum bands for Aeronautical Communications in the APAC Region

Please proceed to answer following questions until you reach to "End of Questionnaire"

1. Does your State/Administration implement the HF frequency bands between 2 850 kHz and 22 000 kHz for aeronautical communication purposes?
   ☐ YES
   ☐ NO (Proceed to Question No. 11)
2. How much Power (before the antenna) is transmitted for HF communication (e.g. A/G, Broadcast) in its current operational mode?
   Example:
   MWARA Station: xx kW peak power;
   RDARA Station: xx kW peak power; etc.
3. Are there any other users currently assigning the HF frequency band aside from the Air Navigation Service Provider (e.g., Airline operator)?
   ☐ YES
   ☐ NO (Proceed to Question No. 7)
4. In relation to the above, what kind of services that utilize the HF frequency (e.g., flight following purposes)?
5. Referring to Question No. 5, what channels do you use for this HF frequency assignment?
6. Referring to Question No. 5, how much power is transmitted to each service?
7. Does your State/Administration refer to the Appendix 27 - Radio Regulations of the Frequency Allotment Plan for the Aeronautical Mobile (R) Service and related information, in order to assign the HF frequency?

Thank You

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