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Aeronautical Frequency Management in the APAC Region

Frequency Finder Workshop

9-13 October 2023, Bangkok

Presented by the Secretariat

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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-23 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.



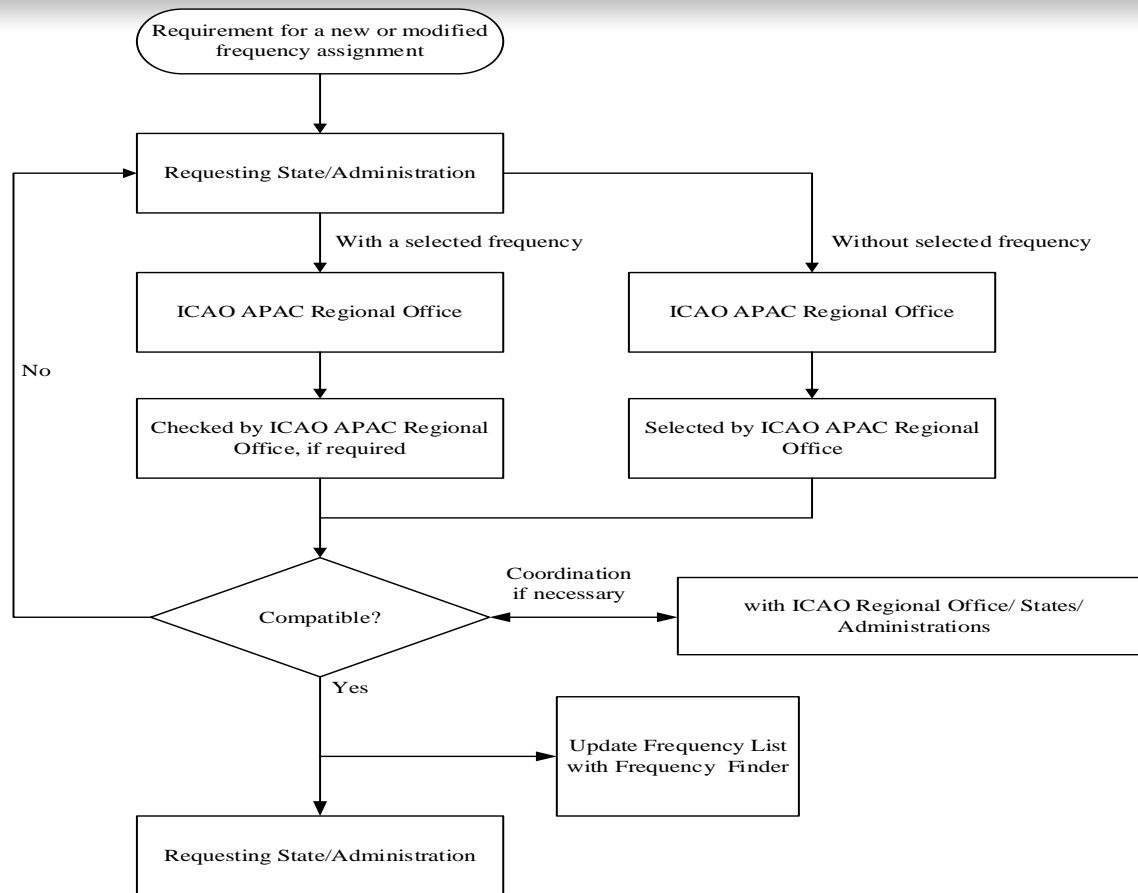
Regional Office is focal point

- 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 standard agreed in RANC/3 in 1993.
- The ICAO tool Frequency Finder, 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 the 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 for the management and registration of NAV systems. The publication of Frequency List No. 2 is expected to discontinue in 2024.



Regional Efforts

➤ Regional Office

- 500+ frequencies coordinated and handled by APAC in 2022.

➤ Spectrum Review Working Group(SRWG)

- To address various issues relevant to Aeronautical Radio Frequency

State/Administration	Frequencies Handled
China	>100
India	>100
Indonesia	>100
Hong Kong China	10-20
Malaysia	10-20
Pakistan	10-20
Bangladesh	<10
Bhutan	<10
Brunei Darussalam	<10
French Polynesia	<10
Japan	<10
Lao PDR	<10
Nepal	<10
Republic of Korea	<10
Singapore	<10
Sri Lanka	<10
Viet Nam	<10
Grand Total	~530



Interregional Coordination

- ICAO APAC introduced 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, only Mode S IC have been exercised interregional coordination between APAC and MID, as well as APAC and EUR, EUROCONTROL involved as the service provider in both cases.



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 ICAO APAC Regional Office and in 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 is to conduct simulation on VHF COM frequency assignment and expand its scope of work to cover Navigation systems with 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 to undertake a similar analysis in 3 - 5 years from now to assess the severity of the congestion.



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 in implementation/planning. States should ensure the aircrafts 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 on 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 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 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 sub band 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 current frequency allotment plan, the outcome is to be reported to SRWG/8 in March 2024.

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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 be 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 VSAT interference issue between two States, VHF COM interferences among six States in 2022.

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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 of the limited role of ICAO in HF assignment coordination, ICAO regional office and PIRGs acted for grouping 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 suspended for more than 10 years.
- SRWG/7 formed an ad hoc expert group to share the experience in this Region on handling HF resource utilization and provide recommendations.



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