SRWG/5 – **WP/14**
Agenda Item 4
15-17/03/21

International Civil Aviation Organization

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

Video Teleconference, 15 – 17 March 2021

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

DRAFT OF ASIA PACIFIC FREQUENCY MANAGEMENT GUIDANCE MATERIAL

(Presented by China)

SUMMARY

This paper presents draft of Asia Pacific Frequency Management Guidance Material.

The document include objective, scope, institutional framework, spectrum management and procedure for coordination of APAC Region, and air-ground communication frequency management.

1. INTRODUCTION

1.1 The fourth meeting of the spectrum review working group (SRWG/4) considered develop the regional guidance material on aeronautical frequency spectrum management in a shared way by States.

2. DISCUSSION

2.1 The document includes the prime objectives and scope (chapter 1), institutional framework, spectrum management and procedure for coordination of APAC Region (chapter 2), air-ground communication frequency management of HF and VHF COM (chapter 3).

2.2 The proposed document is contained in Attachment A (embedded Word file).

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a) Note the information contained in this paper and review the draft Asia Pacific Frequency Management Guidance Material.

b) discuss any relevant matter as appropriate

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Asia Pacific Frequency Management Guidance Material

Draft

International Civil Aviation Organization

AMENDMENTS

Amendments are announced in the supplements to the *Publications Catalogue*; the Catalogue and its supplements are available on the ICAO website at www.icao.int. The space below is provided to keep a record of such amendments.

RECORD OF AMENDMENTS, CORRIGENDA AND ADDENDA

AMENDMENTS		
No.	Date	Entered by

CORRIGENDA / ADDENDA		
No.	Date	Entered by

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GLOSSARY

SYMBOLS AND UNITS

ABBREVIATIONS

CNS	Communication, Navigation and Surveillance
DME	Distance Measuring Equipment
DVOR	Doppler VHF Omni-Directional Range
ICAO	The International Civil Aviation Organization
ITU	International Telecommunication Union
ILS	Instrument Landing System
SARPs	Standards And Recommended Practices
VHF	Very High Frequency

DEFINITIONS

1. The explanation to the type of service/functions

ACC-L	Area control service for flights up to FL 250
ACC-SR-I	Surveillance radar area control service up to FL 250
ACC-SR-U	Surveillance radar area control service up to FL 450
ACC-U	Area control service for flights up to FL 450
AD	Within limits of aerodrome
AFIS	Aerodrome flight information services
APP-L	Approach control service for flights below FL120
APP-I	Approach control service for flights below FL 250
APP-PAR	Precision approach radar service up to FL 40
APP-SR-I	Surveillance radar approach control service up to FL 250
APP-SR-L	Surveillance radar approach control service up to FL 120
APP-SR-LU	Surveillance radar approach control service up to FL 450
APP-U	Approach control service for flights up to FL 450
ATIS	Automatic terminal information service
CD	Clearance delivery
DF	Direction finding
ER	Requirement to utilize extended range technique, RCAG or repeater stations
RCAG	Remote controlled air-ground communication
FIR	Flight information region
FIS-L	Flight information service for flights up to FL 250
FIS-U	Flight information service for flights between FL 250 and FL 450
RCAG	Remote controlled air-ground communication
SMC	Surface movement control up to limits of aerodrome
TWR	Aerodrome control service
VOLMET	VOLMET broadcasts

2. Primary and secondary services

1）In the box of the Table in Section IV of ITU Radio Regulations, a band is indicated as allocated to more than one service, either on a worldwide or Regional basis, such services are listed in the following order:

- Services the names of which are printed in “capitals” are called “primary” services;
- Services the names of which are printed in “normal characters” are called “secondary” services.

2）Additional remarks shall be printed in normal characters (example: MOBILE except aeronautical mobile).

3）Stations of a secondary service:

- shall not cause harmful interference to stations of primary services to which frequencies are already assigned or to which frequencies may be assigned at a later date;
- cannot claim protection from harmful interference from stations of a primary service to which frequencies are already assigned or may be assigned at a later date;
- can claim protection, however, from harmful interference from stations of the same or other secondary service(s) to which frequencies may be assigned at a later date.

4）Where a band is indicated in a footnote of the Table as allocated to a service “on a secondary basis” in an area smaller than a Region, or in a particular country, this is a secondary service.

5）Where a band is indicated in a footnote of the Table as allocated to a service “on a primary basis”, in an area smaller than a Region, or in a particular country, this is a primary service only in that area or country.

□□□□□□

Chapter 1

INTRODUCTION

This guidance material has been developed under a recommendation from the fourth meeting of the spectrum review working group (SRWG/4) of APANPIRG which was held via video conferencing from 09 to 10 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.

1.1 Objective

1.1.1 Aeronautical services are recognized internationally to be prime users of radio frequencies. [Doc 9718 I chapter 1 1.2] The civil aviation community must accordingly develop and present, as necessary, its agreed policies and its quantified and qualified statements of requirement for radio frequency spectrum to ensure the continuing availability of adequate radio spectrum and, ultimately, the ongoing viability of air navigation services throughout the world. [Doc 9718 I chapter 1 1.4]

1.1.2 For the APAC Region, the Secretariat is developing, with the support of ICAO contracting states, material to support frequency assignment planning in the APAC Region.

1.1.3 In accordance with above, the prime objectives of this document are:

(a) to provide background information on the APAC Region's spectrum management institutional framework. [Doc 9718 volume 1 2.3.d]

(b) to provide a convenient record for important frequency management material, such as the criteria applied in the planning of radio frequency assignments. [Doc 9718 1 2.3.c]

(c) to provide updated frequency assignment planning criteria to secure [be sure] that aeronautical radio communication and navigation systems are protected from harmful interference on a uniform basis. [Doc 9718 II Background and purpose]

1.2 Scope

1.2.1 This guidance material describes general reference [information] 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.

1.2.2 This document is suitable for national authorities, telecommunication authorities (or telecommunication administrations), ATCs, aerodromes, and airlines which will manage~~ment~~ and use aeronautical frequencies.

Chapter 2

Background

2.1 Institutional framework

2.1.1 ITU

2.1.1.1 International Telecommunication Union (ITU) as a specialized agency in the field of telecommunications, embraces all aspects of telecommunications, whether by line or by radio transmission, has authority to set standards for systems, technical parameters and procedures. [Doc 9718 volume 1 3.1]

Note: However, other specialized agencies, such as ICAO, would not be barred from any kind of work touching upon aeronautical telecommunications including standardization activities.

2.1.1.2 A prime and highly important area for aviation concerns the regulation and use of the radio frequency spectrum for which ITU is the international body. [Doc 9718 volume 1 3.1] In addition, the agreements made under its auspices for these matters and incorporated in the Final Acts of World Radio communication Conferences (WRCs) which are held every four years. [Doc 9718 volume 1 3.2]

2.1.1.3 The internationally agreed regulation of the radio frequency spectrum is provided through the ITU Radio Regulations (RR), [Doc 9718 volume 1 3.3] which include allocations, provisions on licensing, interference resolution, safety and distress procedures and other aspects. Within the Radio Regulations, the finite useable radio spectrum, from approximately 8.3 kHz to 275 GHz, is allocated to user services in response to their recognized demands, and among three ITU world Regions in accordance with the major regional spectrum requirements for these services in the relevant region. [Doc 9718 volume 1 3.3]

2.1.2 ICAO

2.1.2.1 Pursuant to the provisions in Art 37 of the Convention on International Civil Aviation, ICAO develops Standards and Recommended Practices (SARPs) for Communication, (radio) Navigation and Surveillance (CNS) systems. These standards include technical characteristics and protection requirements to secure interference free operation of these systems and are incorporated in Annex 10.

2.1.2.2 In addition to the material in Anne 10, on a Regional level, Air Navigation Plans have been developed. These ANPs contain, based on Regional Air Navigation Agreements, provisions that States have agreed to apply on the use of aeronautical radio communication, navigation and surveillance systems, including material relevant to frequency assignment planning.

2.1.2.3 In order to provide for more detailed guidance material on the provisions in Annex 10 for CNS systems, ICAO has developed Doc 9718. Doc 9718 is (currently) published in two parts:

- Volume I which contains material relevant to the allocation and use of aeronautical frequency bands by the ITU.
- Volume II which contains material relevant to the frequency assignment planning for CNS systems.

2.1.2.4 ICAO coordinates the input to ITU discussions on aeronautical radio frequency spectrum matters. The necessary activity to support these ITU-generated functions exists at two levels: [Doc 9718 volume 1 5.3]

(a) At the worldwide level, through the work of the Air Navigation Commission, with the assistance of the FSMP (and communication divisional meetings or air navigation conferences, as required), to prepare the coordinated ICAO policies, spectrum estimates and technical inputs for ITU conferences and ITU-R study groups. The ICAO spectrum strategy, policy statements and the ICAO Position for WRCs are approved by the Council; and

(b) At the regional level, by the ICAO Regional Offices, through coordination of frequency assignment plans with States, using agreed ICAO planning criteria. This activity is supported by the Regional Planning and Implementation Groups (PIRGs).

2.1.3 National and regional authorities

2.1.3.1 Within ITU Member States, the telecommunication authorities (or telecommunication administrations) normally control and operate the mechanism which develops the national proposals for amending the Radio Regulations (RR) for submission to the ITU WRCs. [Doc 9718 volume 1 3.4]

2.1.3.2 National and regional preparatory committees function is the coordination medium to which the aviation requirements, either ICAO or regional official coordinated or nationally derived, are presented by the national aviation authorities for consideration. [Modify from Doc 9718 volume 1 3.4]

2.1.3.3 It is essential that aeronautical participation in these national and regional activities be ensured in order to support and defend aviation requirements. [Doc 9718 volume 1 3.4]

2.1.4 Relationship between ITU RR and other material and ICAO SARPS

2.1.4.1 Aviation services are recognized important users of radio spectrum to create safe and expeditious conditions to support air operations. The aeronautical mobile (route) service (AM(R)S), the aeronautical radio navigation service (ARNS) and their satellite service counterparts are important components in the mobile and radio determination families of users with (normally) exclusive allocations made on a worldwide basis to ensure global harmonization. Worldwide allocations enable international standardization of equipment and systems to support safe and global air traffic. ITU Radio Regulations (RR) are used as the framework for the relevant ICAO Annexes and the Standards and Recommended Practices (SARPs) contained therein. [Doc 9718 volume 1 3.5]

2.1.4.2 ICAO is recognized internationally as the competent international body to coordinate a worldwide policy for the operational use of the specified systems. Furthermore, the ICAO Annexes contain procedures for regular and emergency communications that are specifically developed for aviation purposes, taking account of the operational conditions. These procedures supplement the basic requirements of the Radio Regulations for procedures in aeronautical communications. [Doc 9718 volume 1 4.4.3]

2.1.4.3 The Radio Regulations and ICAO SARPs together thus form a complementary set of regulatory provisions without any overlap. The Radio Regulations must evolve within the general telecommunications environment with its many and diverse users of the radio frequency spectrum, while the ICAO SARPs respond to the operational safety aspects of air navigation and are developed and agreed by aviation within the ICAO organizational framework. [Doc 9718 volume 1 4.4.4]

2.2 Spectrum coordination and management

2.2.1 General

2.2.1.1 In using frequency bands for radio services, Members shall bear in mind that radio frequencies are limited natural resources and that they must be used rationally, efficiently and economically, in conformity with the provisions of these regulations of Radio Regulations, Annex 10 to the ICAO Convention and national and regional planning. [RR 0.3]

2.2.1.2 Frequency assignment should ensure that stations of a secondary service shall not cause harmful interference to stations of primary services to which frequencies are already assigned or to which frequencies may be assigned at a later date. [RR 5.29]

2.2.1.3 Any new assignment or any change of frequency or other basic characteristic of an existing assignment shall be made in such a way as to avoid causing harmful interference to services rendered by stations using frequencies assigned in accordance with this guidance material. [RR 4.3]

2.2.1.4 Frequency assignment should ensure the availability and protection from harmful interference of the frequencies provided for distress and safety purposes. [RR 0.7]

2.2.2 Frequency coordination and registration [doc 9718 volume 1 4.5]

2.2.2.1 The coordination and registration of frequency assignments is the prerogative of the ITU and must be performed in accordance with procedures laid down in the Radio Regulations. Frequencies are registered in the Master International Frequency Register (MIFR) maintained at ITU Headquarters in Geneva.

2.2.2.2 In exclusive aeronautical bands, actual (day-to-day) coordination of frequency assignments is being undertaken by ICAO, through the ICAO Regional Offices.

2.2.2.3 To support this coordination, the ICAO Regional Offices have developed the necessary procedures, including the relevant frequency assignment planning criteria. Coordination of frequency assignments is taking place (in most cases) with the national civil aviation authorities.

2.2.2.4 Although in some cases aeronautical frequency assignments, notably those in HF and LF/MF bands, are registered by the countries operating these services, other frequency assignments, particularly those in bands above 100 MHz, tend to be recorded only in national registers or in the ICAO Regional Air Navigation Plans. Because of this, de facto, the ICAO frequency register within ICAO.

2.2.2.5 However, it does not dispense with the more general requirement for the coordination of a frequency assignment within the ITU and the registration of this frequency assignment in the MIFR, if international protection of that assignment is necessary.

2.2.2.6 Coordination and registration of frequency assignments in the HF bands (between 2850 kHz and 22000 kHz) is only taking place through the ITU. However, ICAO is considering developing, in parallel, a relevant ICAO list of HF frequency assignments.

2.2.2.7 Coordination and registration of frequency assignments for radar stations and on-board autonomous radio navigation systems is however NOT being coordinated through ICAO.

2.2.2.8 List of frequency bands coordinated by ICAO is given in Table 1

Table 1 List of frequency bands

Symbols	Frequency range	Facility
LF/MF	190 – 495 kHz and 505 – 526.5 kHz	NDB and locator
VHF	108 – 117.975 MHz 117.975 – 137 MHz	ILS localizer (below 112 MHz), VOR and GBAS Air-ground communications
UHF	328.6 – 335.4 MHz 960 – 1215 MHz	ILS glide path DME

2.2.3 Procedure for Coordination of aeronautical frequency

2.2.3.1 The ICAO Third Asia/Pacific Regional Air Navigation (ASIA/PAC/3 RAN) Meeting in 1993 agreed that The ICAO APAC Regional Office would continue to maintain its frequency selection and coordination role, including the maintenance and promulgation of Frequency List Nos.1, 2 and 3 in a timely and periodic manner.

Note: with the successful implementation of Frequency Finder, there was no more Frequency List No. 3 published by the ICAO APAC Regional Office after the 29th Edition in January 2016, replaced by the up-to-date database in Frequency Finder.

Note: Frequency Finder is the ICAO aeronautical radio frequency management tool for VHF COM and NAV frequency assignments.

2.2.3.2 The Thirty-first Meeting of the Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG/31) in 2020 agreed that the database in Frequency Finder is visible to all Frequency Finder users. And the maintenance and promulgation of Frequency List Nos. 1 and 2 are still being conducted by the Regional Office in a timely and periodic manner. It proposes to request States to update specific characteristics for NAV facilities in the Frequency List No. 2 as well as to secure that the information in the Frequency Lists is up-to-date.

2.2.3.3 The updated Frequency Lists of Nos. 1 and 2 are published under – CNS More Documents through secure portal of ICAO APAC website webpage, or download from the database of the Frequency Finder.

2.2.3.4 Currently, states can submit to the Regional Office their requests for new or modified frequency assignments in any format (e.g. letter, email). [SRWG4 WP2 2.3]

(a) The administrative aspects of the frequency coordination can be improved by States using Frequency Finder to generate electronic submissions for new or modified frequency assignments. This option permits States to check a selected frequency to satisfy any operational need and to check the compatibility of this (proposed) frequency with other frequency assignments in the Frequency List No.3. It greatly facilitates the final coordination that is performed by the ICAO Regional Office. The electronic submission(s), in the format of an Excel file, can be sent to the ICAO Regional Office through email.

(b) The second option for States to submit to the Regional Office requests for registering new or modified frequency assignments, also by electronic means, through a locally generated Excel file that follows the template as in **Appendix A**.

(c) The third option is for States to submit to the Regional Office requests for new of modified frequency assignment by letter. The preferred format of the characteristics of these submissions is in **Appendix B**.

[Note: More details to this paragraph]

1. *flow chart,*
2. *International Coordination conditions, such as the distance between stations and country boundary,*
3. *Etc.*

Chapter 3

Aeronautical Frequency Management

3.1 Air-ground Communication Frequency

3.1.1 HF Air-ground Communication Frequency bands

3.1.1.1 HF bands (between 2850 kHz and 22 000 kHz) coordination is recommended to be carried out between States. Coordination and registration of HF frequencies is undertaken by the ITU, through the Radio Regulatory Authorities in each country. ICAO does not coordinate assignments for HF frequencies. [srwg1 wp04 2.3] ICAO is considering developing, in parallel, a relevant ICAO list of HF frequency assignments. [9718 volume 1 4.5.4] Pre-coordination of HF frequencies could be arranged through the ICAO ASIA/PAC Office in Bangkok. However, national radio regulator is required to develop a proposal for the required assignments. Such proposals should be based on the provisions of Appendix 27 to the ITU Radio Regulations, together with the information contained in the ITU International Frequency List (ILS) taking into consideration the protection requirements for HF as contained in Appendix 27. [srwg1 wp04]

3.1.1.2 Appendix 27 to the Radio Regulations（RR）contains the frequency allotment plan for the AM(R)S in the HF bands. This appendix contains the plan for HF frequency allotments to major world air route areas and to regional and domestic air route areas as well as VOLMET areas. It also includes worldwide frequency allotments, which are for the use of aircraft operating agencies for AOC, to be assigned in accordance with RR 27/217. [9718 4.2.6]

3.1.1.3 The technical characteristics for HF aviation equipment in Appendix 27 of the Radio Regulations, since they form part of the Radio Regulations, enjoy the same status as compulsory treaty obligations. [9718 4.6]

3.1.2 VHF Air-ground Communication Frequency bands

3.1.2.1 General allotment of frequency band 117.975 – 137.000 MHz shall be as shown in Table 2.

Table 2 Allotment table

Block allotment frequencies (MHz)	*Worldwide utilization*	*Remarks*
118.000 –121.450 inclusive	International and National Aeronautical Mobile Services	Specific international allotments will be determined in the light of regional agreement.
121.500	Emergency frequency	
121.550 –121.9917inclusive	International and National Aerodrome Surface Communications	Reserved for national allotments
122.000 –123.050 inclusive	National Aeronautical Mobile Services	Reserved for national allotments
123.100	Auxiliary frequency SAR	
123.150 –123.6917inclusive	National Aeronautical Mobile Services	Reserved for national allotments
123.450	Air-to-air communications	Reserved for air-to-air communication
123.700 –129.6917 inclusive	International and National Aeronautical Mobile Services	Specific international allotments will be determined in the light of regional agreement.
129.700 –130.8917 inclusive	National Aeronautical Mobile Services	Reserved for national allotments but may be used in whole or in part, subject to regional agreement,
130.900 –136.875 inclusive	International and National	Specific international

	Aeronautical Mobile Services	allotments will be determined in light of regional agreement.
136.900 –136.975 inclusive	International and National Aeronautical Mobile Services	Reserved for VHF air-ground data link communications.

3.1.2.2 In accordance with the provisions of Annex 10, the emergency channel (121.500 MHz) shall be used only for genuine emergency purposes, and where a requirement is established for the use of a frequency auxiliary to 121.500 MHz, the frequency 123.100 MHz shall be used,

3.1.2.3 Common signalling channels for VDL

(a) The frequency 136.975 MHz is reserved on a worldwide basis to provide a common signaling channel (CSC) to the VHF digital link Mode 2 (VDL Mode 2).

(b) In areas where VDL Mode 4 is implemented, the frequencies 136.925 MHz and 113.250 MHz shall be provided as common signaling channels (CSCs) to the VHF digital link Mode 4 (VDL Mode 4).

3.1.2.4 In the frequency band 117.975 – 137.000 MHz, the frequencies used for National Aeronautical Mobile Services, unless worldwide or regionally allotted to this specific purpose, shall be so deployed that no harmful interference is caused to facilities in the International Aeronautical Mobile Services.

3.1.2.5 Minimum separation between assignable frequencies in the aeronautical mobile (R) service shall be 8.33 kHz (see Annex 10, Volume V, 4.1.2.2). APAC Region has agreed to base frequency assignment planning on 25 kHz frequency separation. The APAC frequency allotment plans as in Table 3.

Table 3 APAC Regional frequency allotment plans

Function	Frequencies/Bands(MHz)
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
SMC	**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-PAR	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
APP-L, APP-I, APP/DF I, APP/SR-	119.000 119.025 119.050 119.075 119.100 119.125 119.150 119.175 119.200 119.225 119.250 119.275 119.400 119.425 119.450 119.475 119.700 119.725 119.750 119.775 120.000 120.025 120.050 120.075 120.200 120.225 120.250 120.275 120.400 120.425 120.450 120.475 120.600 120.625 120.650 120.675

	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	120.300 120.325 120.350 120.375 121.300 121.325 121.350 121.375 124.200 124.225 124.250 124.275 124.400 124.425 124.450 124.475 124.600 124.625 124.650 124.675 124.800 124.825 124.850 124.875 125.000 125.025 125.050 125.075 125.200 125.225 125.250 125.275 125.400 125.425 125.450 125.475 125.600 125.625 125.650 125.675 125.800 125.825 125.850 125.875 126.000 126.025 126.050 126.075 126.300 126.325 126.350 126.375
ACC-L or ACC/SR-L	126.100 126.125 126.150 126.175 127.500 127.525 127.550 127.575 128.300 128.325 128.350 128.375 128.700 128.725 128.750 128.775
ACC-U ACC-LU	118.900 118.925 118.950 118.975 119.300 119.325 119.350 119.375 120.500 120.525 120.550 120.575 120.700 120.725 120.750 120.775 120.900 120.925 120.950 120.975 123.700 123.725 123.750 123.775 124.500 124.525 124.550 124.575 125.300 125.325 125.350 125.375 125.700 125.725 125.750 125.775 125.900 125.925 125.950 125.975 128.100 128.125 128.150 128.175 132.100 132.125 132.150 132.175 132.200 132.225 132.250 132.275 132.300 132.325 132.350 132.375 132.400 132.425 132.450 132.475 132.500 132.525 132.550 132.575 132.600 132.625 132.650 132.675 132.700 132.725 132.750 132.775 132.800 132.825 132.850 132.875 132.900 132.925 132.950 132.975 133.000 133.025 133.050 133.075 133.100 133.125 133.150 133.175 133.200 133.225 133.250 133.275

	133.300 133.325 133.350 133.375 133.400 133.425 133.450 133.475 133.500 133.525 133.550 133.575 133.600 133.625 133.650 133.675 133.700 133.725 133.750 133.775 133.800 133.825 133.850 133.875 133.900 133.925 133.950 133.975 134.000 134.025 134.050 134.075 134.100 134.125 134.150 134.175 134.200 134.225 134.250 134.275 134.300 134.325 134.350 134.375 134.400 134.425 134.450 134.475 134.500
FIS - LU	120.100 120.125 120.150 120.175 123.900 123.925 123.950 123.975 124.100 124.125 124.150 124.175 124.900 124.925 124.950 124.975 126.700 126.725 126.750 126.775 126.900 126.925 126.950 126.975 127.100 127.125 127.150 127.175 127.300 127.325 127.350 127.375 128.500 128.525 128.550 128.575
FIS-U (GPS)	134.600 134.625 134.650 134.675 134.700 134.725 134.750 134.775 134.800 134.825 134.850 134.875 134.900 134.925 134.950 134.975 135.000 135.025 135.050 135.075 135.100 135.125 135.150 135.175 135.200 135.225 135.250 135.275 135.300 135.325 135.350 135.375 135.400 135.425 135.450 135.475 135.500 135.525 135.550 135.575 135.600 135.625 135.650 135.675 135.700 135.725 135.750 135.775 135.800
AOC	128.900 128.925 128.950 128.975 129.000 129.025 129.050 129.075 129.100 129.125 129.150 129.175 129.200 129.225 129.250 129.275 129.300 129.325 129.350 129.375 129.400 129.425 129.450 129.475 129.500 129.525 129.550 129.575 129.600 129.625 129.650 129.675 129.700 129.725 129.750 129.775 129.800 129.825 129.850 129.875 129.900 129.925 129.950 129.975 130.000 130.025 130.050 130.075 130.100 130.125 130.150 130.175 130.200 130.225 130.250 130.275 130.300 130.325 130.350 130.375 130.400 130.425 130.450 130.475 130.500 130.525 130.550 130.575 130.600 130.625 130.650 130.675

	130.700 130.725 130.750 130.775 130.800 130.825 130.850 130.875 130.900 130.925 130.950 130.975 131.000 131.025 131.050 131.075 131.100 131.125 131.150 131.175 131.200 131.225 131.250 131.275 131.300 131.325 131.350 131.375 131.400 131.425 131.450 131.475 131.500 131.525 131.550 131.575 131.600 131.625 131.650 131.675 131.700 131.725 131.750 131.775 131.800 131.825 131.850 131.875 131.900 131.925 131.950 131.975 132.000 132.025
VOLMET/ATIS	126.200 126.225 126.250 126.275 126.400 126.425 126.450 126.475 126.600 126.625 126.650 126.675 126.800 126.825 126.850 126.875 127.000 127.025 127.050 127.075 127.200 127.225 127.250 127.275 127.400 127.425 127.450 127.475 127.600 127.625 127.650 127.675 127.800 127.825 127.850 127.875 128.000 128.025 128.050 128.075 128.200 128.225 128.250 128.275 128.400 128.425 128.450 128.475 128.600 128.625 128.650 128.675 128.800 128.825 128.850 128.875
DATA LINK	136.900 136.925 136.950 136.975
AIR-TO-AIR	123.450

3.1.2.6 Frequencies should be assigned to all VHF Aeronautical Mobile Service (AMS) facilities in accordance with the principles laid out in Annex 10, Volume V and ICAO Handbook on Radio Frequency Spectrum Requirements for Civil Aviation (Doc 9718) Volumes I and II, and take into account:

(a) agreed geographical separation criteria based on 25 kHz or 8.33 kHz interleaving between channels;

(b) agreed geographical separation criteria for the implementation of VDL services;

(c) the need for maximum economy in frequency demands and in radio spectrum utilization; and

(d) a deployment of frequencies which ensures that international services are planned to be free of interference from other services using the same band. [APAC ANP VOLII 2.41]

3.1.2.7 The priority order to be followed in the assignment of frequencies to service is:

(a) ATS channels serving international services (ACC, APP, TWR, FIS);

(b) ATS channels serving national purposes;

(c) channels serving international VOLMET services;

(d) channels serving ATIS and PAR; and

(e) channels used for other than ATS purposes. [APAC ANP VOLII 2.42]

3.1.2.8 The criteria used for frequency assignment planning for VHF AMS facilities serving international requirements should, to the extent practicable, also be used to satisfy the need for national VHF AMS facilities. [APAC ANP VOLII 2.43]

3.1.2.9 Special provisions should be made, by agreement between the States concerned, for the sharing and the application of reduced protection of non-ATS frequencies in the national sub-bands, so as to obtain a more economical use of the available frequency spectrum consistent with operational requirements. [APAC ANP VOLII 2.44]

3.1.2.10 States should ensure that no air/ground frequency is utilized outside its designated operational coverage and that the stated operational requirements for coverage of a given frequency can be met for the transmission sites concerned, taking into account terrain configuration. [APAC ANP VOLII 2.45]

3.1.2.11 The criteria of Geographical separation used for Co-channel VHF assignments [Frequency list 03]
[Note: TBD]

AIR - GROUND COMMUNICATION FOR	SYMBOL	SERVICE RANGE NM	SERVICE HEIGHT m/ft	CO-CHANNEL SEPARATION NM
Aerodrome Control	TWR	25	1200/4000	175[1]
Surface Movement Control	SMC	limits of aerodrome	Surface	50[1]
Approach Control (upper)	APP-U	150	13700/45000	820[1]
Approach Control (intermediate)	APP-I	75	7600/25000	550[1]
Approach Control (lower)	APP-L	50	3650/12000	370[1]
Area Control or Flight Information (upper)	ACC-U or FIS-U	Specified area plus 50 NM	13700/45000 or 19800/65000 [3]	520[2] 630[2]
Area Control (lower)	ACC-L or ACC-SR-L	Specified area plus 50 NM	7600/25000	500[2]
Area Control or Flight Information (extended range)	ACC - ER or FIS - ER	to be specified	13700/45000 or 19800/65000[3]	1000[1] 1200[1]
VOLMET/ATIS	VOLMET or ATIS	omni - directional	13700/45000 or 19800/65000[3]	520[1] 600[1]

1 Distance between stations
2 Distance between limits of service areas
3 If required for SST operations

3.2 Navigation frequency management

3.2.1 Non-Directional Radio Beacons (NDB)

TBD

3.2.2 Instrument Landing System (ILS)

TBD

3.2.3 Doppler Very High Frequency Omni-Directional Range (DVOR)

TBD

3.2.4 Distance Measuring Equipment (DME/TACAN)

TBD

3.2.5 GBAS

TBD

3.2.6 IDENTICAL SIGNAL

TBD

Appendix A

Template for an Excel or Word file that can be used for electronic submission of one (or more) new or modified frequency assignments for NAV systems to the Regional Office

Essential characteristics should to be included in the submission to the Regional Office:

Country	
Location	
Latitude	
Longitude	
Frequency	
Channel	
VHFDOC	
VHFPwr	
DMEDOC	
DMEPwr	
Cat	
Remarks	
TRD	

In the table, the following format should be used:

Country — Country name as per ICAO directory

Location — Name of the location of the NAV facility

Latitude — Latitude in the format xxDyy'zz'' (e.g. 32D44'55'')

Longitude — Longitude in the format xxxDyy'zz'' (e.g.054D55'56'')

Facility — Select one of the following facilities

- ILS
- ILS/DME
- VOR
- VOR/DME
- DME
- TACAN
- GBAS

Frequency — xxx.yyy (e.g. 109.200 or 113.450) [MHz]

A frequency can be proposed by a State or selected by the Regional Office and is subject to a compatibility assessment with or frequency assignments in the COM list 2

Channel — DME channel (e.g. 36X or 45Y)

VHFDOC — xxx/yyy e.g. 200/250 — xxx is the range of the coverage (e.g. 200 is 200 NM); yyy is the height (FL) of the coverage (e.g. 250 is FL 250 or 25000ft)

DMEDOC — xxx/yyy e.g. 200/250 — xxx is the range of the DME coverage (e.g. 200 is 200 NM); yyy is the height (FL) of the DME coverage (e.g. 250 is FL 250 or 25000ft)

Remarks — Optional, as provided by the State

Cat — Category; either ICAO or NAT

VHFPwr — As provided by the State

DMEPwr — As provided by the State

Note: The values for VHFPwr and DMEPwr are for the effective isotopically radiated power (e.i.r.p) of the relevant facility. In the absence of such information, the following values are assumed in the frequency assignment planning process:

ILS/Localizer	30 dBW	
ILS/DME	27 dBW (e.i.r.p for the associated DME)	
VOR	Range <50 NM	e.i.r.p 17 dBW
	Range 50 – 100 NM	e.i.r.p 20 dBW
	Range 100 – 150 NM	e.i.r.p 23 dBW
	Range > 150 NM	e.i.r.p 30 dBW
VOR/DME	Range <50 NM	e.i.r.p 27 dBW (landing DME)
	Range 150 -150 NM	e.i.r.p 30 dBW (terminal DME
	Rnage >150 NM	e.i.r.p 37 dBW (en route DME)
DME only	as for DME associated with VOR.	

The e.i.r.p values for DME apply also for TACAN facilities

TRD	Runway azimuth

Appendix B

Preferred format of the characteristics of submissions

Reference of submission:

Date:

Subject: Application for xx, at xx (location name)

Contact information of the civil aviation authority of States

Suggested basic information of a submission:

Function of the proposed assignments,

Details of the facility: Manufacturer & Model (if possible),

Frequency Range (if request RO for proposal) or proposed frequency,

Transmit Power or DOC

Latitude/Longitude:

Minimum information required with reference to the following screenshot:

Country, Location, Latitude/Longitudes, Service.