



ICAO

International Civil Aviation Organization

Fourth Meeting of Spectrum Review Working Group (SRWG/4)

Bangkok, Thailand, 9 - 10 June 2020

Agenda Item 3: Frequency coordination process and improvement for the Asia/Pacific Region

REVIEW OF REGIONAL PROCESS

(Presented by Secretariat)

SUMMARY

This paper presents an overview of the frequency coordination process that is being used in the APAC Region. It presents some measures that could be implemented to improve the efficiency of the current process.

The paper also addresses the need to explore the spectrum capacity to implement future requirements for VHF-COM systems as well as for NAV systems in the light of determining the need to reduce in particular the channel spacing in the VHF band 108 – 117.975 MHz for ILS Localizer and VOR to 50 kHz.

Finally, the paper proposes to develop a frequency assignment plan that would include all requirements for VHF-COM and for NAV systems, including GBAS/VDB, for the period up to around 2030.

1. INTRODUCTION

1.1 During the SRWG/1 meeting, under **Agenda Item 5: Improvement of VHF frequency assignment procedure**, secretariat presented WP04 *Aeronautical Frequency Spectrum Coordination and Management in the APAC Region*, which reviewed current practices and coordination procedure for aeronautical facilities and services operating in the aeronautical frequencies bands of 190-526.5 kHz – NDB; 108-117.975 MHz and - 960 – 1215MHz - VOR/DME and ILS, VDL Mode 4 and VHF Frequency Bands from 117.975 to 137MHz. The paper also addressed issues observed in the coordination process for frequencies assignments.

1.2 The current practice of frequency coordination is concentrated on the following main principles:

- a) Frequency coordination is performed by the Regional Office
- b) States can submit to the Regional Office their requests for new or modified frequency assignments in any format (e.g. letter, email)

1.3 The introduction and use of the ICAO **Frequency Finder** tool for the coordination of frequency assignments within the APAC Region as well as with adjacent Regions has presented the opportunity to improve the efficiency in the frequency coordination and frequency assignment processes while keeping the main principles for frequency coordination as in paragraph 1.2.

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1.4 This paper proposes a more streamlined process based on the implementation of Frequency Finder for the coordination of frequency assignments within the APAC Region with the goal to improve the efficiency in frequency coordination.

2. DISCUSSION**2.1 Current coordination process**

2.1.1 The current process for frequency coordination has served the APAC community well over the years and is expected to do so for the foreseeable future. It is based on a minimum bureaucracy when performing the frequency coordination and registration.

2.2 Distribution of Frequency List No. 3

2.2.1 With the introduction of the global database and the availability of Frequency Finder by all states in the APAC Region, the latest version (real time) of the Regional Frequency List No. 3 (for the APAC Region) is now available and offers States the opportunity to verify the frequency assignments that have been registered by ICAO via Regional Office with their actual use. ICAO APAC Regional Office has been no longer disseminating paper copies to States of the traditional Frequency List No. 3 since 2017. States can also, when proposing new or modifying existing frequency assignments, check the compatibility of such changes before submitting requests for frequency assignments to ICAO APAC Office.

2.3 Administrative aspects in the frequency coordination

2.3.1 The administrative aspects of the frequency coordination can be improved by States using either the option offered with 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.

2.3.2 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** to this paper (embedded).

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

2.4 Technical aspects of the frequency coordination

2.4.1 The technical aspects of the frequency coordination are contained in the ICAO Handbook on Radio Frequency Requirements for Civil Aviation (Doc. 9718), Volume II. This Handbook, which is being modified to incorporate frequency assignment planning material for navigation systems (ILS, VOR, DME and GBAS/VDB), provides guidance material relevant to the implementation of SARPs for these systems in Annex 10 (and replaces the current guidance material as in the relevant Attachments to Annex 10. The implementation of this material has been regulated through the ANP for the APAC Region. (Re. ANP, Volume II, Part 2, paragraphs 2.41 and 2.46).

Note: SRWG/4 – /IP/02 contains specific technical material relevant to frequency assignment planning for VHF-COM and NAV systems.

2.4.2 The technical material in the Handbook, Volume II, offers Regions to improve on frequency assignment planning using the specific [operational] needs for NAV and COM facilities. Examples here are the (future) need to implement 8.33 kHz channel spacing for VHF COM systems and possibly 50 kHz channel spacing for ILS/Localizer and VOR facilities. Also, a revision of the frequency allotment table for the APAC Region for VHF-COM systems may improve efficient frequency assignment planning as well as provide additional spectrum for communication services operating in [congested] sub-bands of the frequency band 117.975 – 137MHz.

2.4.2.1 With respect to the specific operational needs in the APAC Region, while taking into account the need to implement new services in a cost-effective manner, it is proposed that:

- a) The spectrum capacity for future ILS/VOR/DME facilities operating with 100 kHz channel spacing be examined
- b) If necessary, the spectrum capacity for future ILS/VOR/DME facilities with using 50 kHz channel spacing be examined
- c) The spectrum capacity for future GBAS/VDB facilities be examined.

2.4.2.2 Based upon the outcome of the spectrum capacity studies as in 2.4.2.1, ICAO should be invited to undertake the development of a frequency assignment plan for COM and NAV systems that takes into consideration the operational needs, as promulgated by States, for a period until [2030].

2.5 With the aforementioned information and discussion, the meeting is expected to consider the following draft conclusion:

Draft Conclusion SRWG/4/X - Frequency requirements for VHF-COM systems and ILS, VOR, DME and GBAS/VDB facilities	
What: To develop a rolling frequency assignment plan for VHF-COM and ILS, VOR, DME and GBAS/VDB facilities that is aimed at satisfying the operational needs from States until [2030].	Expected impact: <input type="checkbox"/> Political / Global <input type="checkbox"/> Inter-regional <input type="checkbox"/> Economic <input type="checkbox"/> Environmental <input checked="" type="checkbox"/> Ops/Technical
Why: To secure adequate spectrum for these facilities for the near future	Follow-up: <input checked="" type="checkbox"/> Required from States
When: 13-Nov-20	Status: Draft to be adopted by PIRG
Who: <input checked="" type="checkbox"/> Sub groups <input checked="" type="checkbox"/> APAC States <input checked="" type="checkbox"/> ICAO APAC RO <input type="checkbox"/> ICAO HQ <input type="checkbox"/> Other: XXXX	

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

- a) note the information contained in this paper;
- b) provide comments on the administrative aspects of frequency coordination
- c) review the need for the introduction of 50 kHz channel spacing for Localizer and VOR system
- d) agree to the conclusion in paragraph 2.5.

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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**

NAV systems.xlsx



NAV Systems.docx

In the spread sheet *NAV systems.xlsx* 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
	<i>Note: The values for VHFPwr and DMEPwr are for the effective isotropically 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:</i>
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.
	<i>The e.i.r.p values for DME apply also for TACAN facilities</i>
TRD:	Runway azimuth

Country	Location	Latitude	Longitude	Facility	Frequency	Channel	VHFDOC	VHF pwr	DMEDOC	DMEpwr	Cat	Remarks	TRD
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Template for a Word file that can be used for electronic or paper (letter) submission of one (or more) new or modified frequency assignments for NAV systems to the Regional Office

Essential characteristics 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 VHF_{Pwr} and DME_{Pwr} are for the effective isotropically 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)

Range >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 Azimuth of the runway that is served by the ILS

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/Longitude, Service.

The screenshot shows a web form titled "Station" with the following fields and values:

- Region:** APAC
- Key:** D 420458
- Cat:** (empty)
- Channel spacing:** 25 kHz, 8.33 kHz
- Country:** (empty)
- Location:** (empty)
- Latitude:** D ' " N S
- Longitude:** D ' " E W
- Frequency:** 0.000
- Service:** (empty)
- Stat:** (empty)
- DOC:** Drop down disabled, MOD Range (NM), MOD Height (feet)
- ER family:** Example: ER-BOT-1
- PolyID:** (empty)
- Required fields:** FIR SECTORNAME
- Remarks:** (empty)
- Upload Status:** DN

A "TEST" button is located at the bottom left of the form.