



*International Civil Aviation Organization*

**ICAO 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

**INTRODUCTION OF 50 KHZ CHANNEL SPACING IN THE APAC REGION**

(Presented by Secretariat)

**SUMMARY**

This information paper presents material on the use of 50 kHz channels for the ILS/Localizer and VOR.

**1. INTRODUCTION**

1.1 Annex 10, Volume V contains certain provision on the use of the frequency band 108 – 117.975 MHz for the ILS / Localizer, the VOR and the GBAS/VDB systems. These provisions are, for the ease of reference, reproduced in Appendix A to this paper.

1.2 This paper concentrates on the ways and means that are available for the introduction of 50 kHz channel spacing in Regions that are considering such introduction.

1.3 The introduction of SARPs to accommodate 50 kHz channel spacing for the ILS/Localizer and the VOR was agreed in 1972 at the Seventh Air Navigation Conference.

**2. DISCUSSIONS**

Scope of the provisions in Annex 10, Volume V

2.1 The provisions in Annex 10, Volume V concentrate on the following areas:

- Block allotments of ILS/Localizer, VOR and GBAS/VDB frequencies
- Implementation of 50 kHz channels for the ILS/Localizer and the VOR
- Frequency deployment / operational criteria to be satisfied in frequency assignment planning

2.1.1 This information paper concentrates on the implementation of 50 kHz channels.

2.1.2 To date, 50 kHz channel spacing has not been introduced in the APAC (as well as the AFI, CAR, MID and SAM Regions)

Implementation of 50 kHz channels for Localizer and VOR

2.2 For the introduction of 50 kHz channels for the Localizer and the VOR, the provisions in Annex 10 recognizes two options:

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2.2.1 General use of 50 kHz channels. General use requires that all Localizer and VOR receivers on board an aircraft are capable of tuning to these channels and operate in accordance with the equipment characteristics as specified in Doc. 97181, Volume II.

2.2.2 Restricted use of 50 kHz channels. Restricted use of 50 kHz channels is intended to refer to the limited use of 50 kHz channels by only suitably equipped aircraft and in a manner that

a. The performance of ILS and VOR equipment NOT capable of operating on 50 kHz channels is protected from harmful interference

b. A general requirement for aircraft to be equipped with 50 kHz Localizer receivers is not imposed

c. Operational performance of receivers capable only to operate on 100 kHz channels is not derogated;

See note to Annex 10, volume V, Section 4.2, paragraph 4.2.3.1

2.3 In both cases (General use or Restricted use) Annex 10, volume V, requires a Regional Agreement. Such a Regional Agreement can be formulated through a Conclusion from the relevant Regional Planning and Implementation Regional Group (PIRG).

2.3.1 No such Regional Agreement has been established to date for any Region.

2.3.2 In Europe, frequency assignment planning is solely based on 50 kHz frequency assignment planning criteria.

2.4 **Regional Implementation of 50 kHz channels**

Region	ILS	VOR
AFI	none	none
APAC	23	33
CAR	none	none
MID	17	4
SAM	none	none

Way forward.

2.5 Considering that the implementation of 50 kHz channels has taken place in some Regions without the need for any formal Regional Agreement, it may be argued that such implementation can be agreed on a Regional level without the need for a formal Regional Agreement.

2.6 Considering the long period that has elapsed since the introduction of 50 kHz channel spacing characteristics, it may be argued that general use of equipment only capable to tune to 100 kHz channels. States and possibly also IATA may provide relevant information.

2.7 Most likely, the frequency coordination of 50 kHz channels for ILS and VOR are based on relevant provisions that were concluded at the Third ASIA/PACIFIC RAN meeting from 1993. These criteria do not include provisions for frequency assignment planning on adjacent channels. Further clarification would support region-wide use of 50 kHz channels.

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<sup>1</sup> Doc. 9718 Volume II, is the *Handbook on radio frequency spectrum requirements for Civil Aviation, Frequency assignment planning criteria for Aeronautical Radio Communication and Navigation Systems*

**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 matters as appropriate

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## Appendix A

### Extract from Annex 10, Volume V on the utilization of frequencies in the band 108 - 117.975 MHz

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#### 4.2 Utilization in the frequency band 108 – 117.975 MHz

4.2.1 The block allotment of the frequency band 108 – 117.975 MHz shall be as follows:  
— *Band 108 – 111.975 MHz:*

- a) ILS in accordance with 4.2.2 and Annex 10, Volume I, 3.1.3;
- b) VOR provided that:
  - 1) no harmful adjacent channel interference is caused to ILS;
  - 2) only frequencies ending in either *even tenths* or *even tenths plus a twentieth* of a megahertz are used.
- c) GNSS ground-based augmentation system (GBAS) in accordance with Annex 10, Volume I, 3.7.3.5, provided that no harmful interference is caused to ILS and VOR.

*Note.— ILS/GBAS geographical separation criteria and geographical separation criteria for GBAS and VHF communication services operating in the 118 – 137 MHz band are under development. Until these criteria are defined and included in the SARPs, it is intended that frequencies in the band 112.050-117.900 MHz will be used for GBAS assignments.*

— *Band 111.975 – 117.975 MHz:*

- a) VOR;
- b) GNSS ground-based augmentation system (GBAS) in accordance with Annex 10, Volume I, 3.7.3.5, provided that no harmful interference is caused to VOR.

*Note 1.— Guidance material relating to the distance separation required to prevent harmful interference between ILS and VOR when using the band 108 – 111.975 MHz is found in Section 3 of Attachment C to Annex 10, Volume I.*

*Note 2.— Guidance material relating to the distance separation required to prevent harmful interference between VOR and GBAS when using the band 112.050 – 117.900 MHz is found in Section 7.2.1 of Attachment D to Annex 10, Volume I.*

4.2.2 For regional assignment planning, the frequencies for ILS facilities shall be selected in the following order:

- a) localizer channels ending in *odd tenths* of a megahertz and their associated glide path channels;

b) localizer channels ending in *odd tenths plus a twentieth* of a megahertz and their associated glide path channels.

4.2.2.1 ILS channels identified by localizer frequencies ending in an *odd tenth plus one twentieth* of a megahertz in the band 108 – 111.975 MHz shall be permitted to be utilized on the basis of regional agreement when they become applicable in accordance with the following:

- a) for restricted use commencing 1 January 1973;
- b) for general use on or after 1 January 1976.

*Note.*— See Note to 4.2.3.1.

4.2.3 For regional assignment planning, the frequencies for VOR facilities shall be selected in the following order:

- a) frequencies ending in *odd tenths* of a megahertz in the band 111.975 – 117.975 MHz;
- b) frequencies ending in *even tenths* of a megahertz in the band 111.975 – 117.975 MHz;
- c) frequencies ending in *even tenths* of a megahertz in the band 108 – 111.975 MHz;
- d) frequencies ending in *50 kHz* in the band 111.975 – 117.975 MHz, except as provided in 4.2.3.1;
- e) frequencies ending in *even tenths plus a twentieth* of a megahertz in the band 108 – 111.975 MHz except as provided in 4.2.3.1.

4.2.3.1 Frequencies for VOR facilities ending in *even tenths plus a twentieth* of a megahertz in the band 108 – 111.975 MHz and all frequencies ending in *50 kHz* in the band 111.975 – 117.975 MHz shall be permitted to be utilized on the basis of a regional agreement when they have become applicable in accordance with the following:

- a) in the band 111.975 – 117.975 MHz for restricted use;
- b) for general use in the band 111.975 – 117.975 MHz at a date fixed by the Council but at least one year after the approval of the regional agreement concerned;
- c) for general use in the band 108 – 111.975 MHz at a date fixed by the Council but giving a period of two years or more after the approval of the regional agreement concerned.

*Note.*— “Restricted use”, where mentioned in 4.2.2.1 a) and 4.2.3.1 a), is intended to refer to the limited use of the frequencies by only suitably equipped aircraft and in such a manner that:

- a) the performance of ILS or VOR equipment not capable of operating on these frequencies will be protected from harmful interference;
- b) a general requirement for the carriage of ILS or VOR airborne equipment capable of operation on these frequencies will not be imposed; and
- c) operational service provided to international operators using 100 kHz airborne equipment is not derogated.

4.2.4 To protect the operation of airborne equipment during the initial stages of deploying VORs utilizing 50 kHz channel spacing in an area where the existing facilities may not fully conform with the Standards in Annex 10, Volume I, Chapter 3, all existing VORs

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within interference range of a facility utilizing 50 kHz channel spacing shall be modified to comply with the provisions of Annex 10, Volume I, 3.3.5.7.

4.2.5 *Frequency deployment.* The geographical separation between facilities operating on the same and adjacent frequencies shall be determined regionally and shall be based on the following criteria:

- a) the required functional service radii of the facilities;
- b) the maximum flight altitude of the aircraft using the facilities;
- c) the desirability of keeping the minimum IFR altitude as low as the terrain will permit.

*Note.*— *Guidance material on this subject is contained in the Attachments to this Annex.*

4.2.6 **Recommendation.**— *To alleviate frequency congestion problems at locations where two separate ILS facilities serve opposite ends of the same runway or different runways at the same airport, the assignment of identical ILS localizer and glide path paired frequencies should be permitted, provided that:*

- a) the operational circumstances permit;*
- b) each localizer is assigned a different identification signal; and*
- c) arrangements are made whereby the localizer and glide path not in operational use cannot radiate.*

*Note.*— *The Standards in Annex 10, Volume I, 3.1.2.7.2 and 3.1.3.9, specify the equipment arrangements to be made.*

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