A Review of VHF COM Frequency Allotment Plan and Utilization in the Mid Region

General Company for Air Navigation Services - Iraq

International Standards

- Two primary international bodies govern the use of aeronautical frequencies and establish regulations and standards for this purpose:
  - International Telecommunications Union (ITU).
  - International Civil Aviation Organization (ICAO).

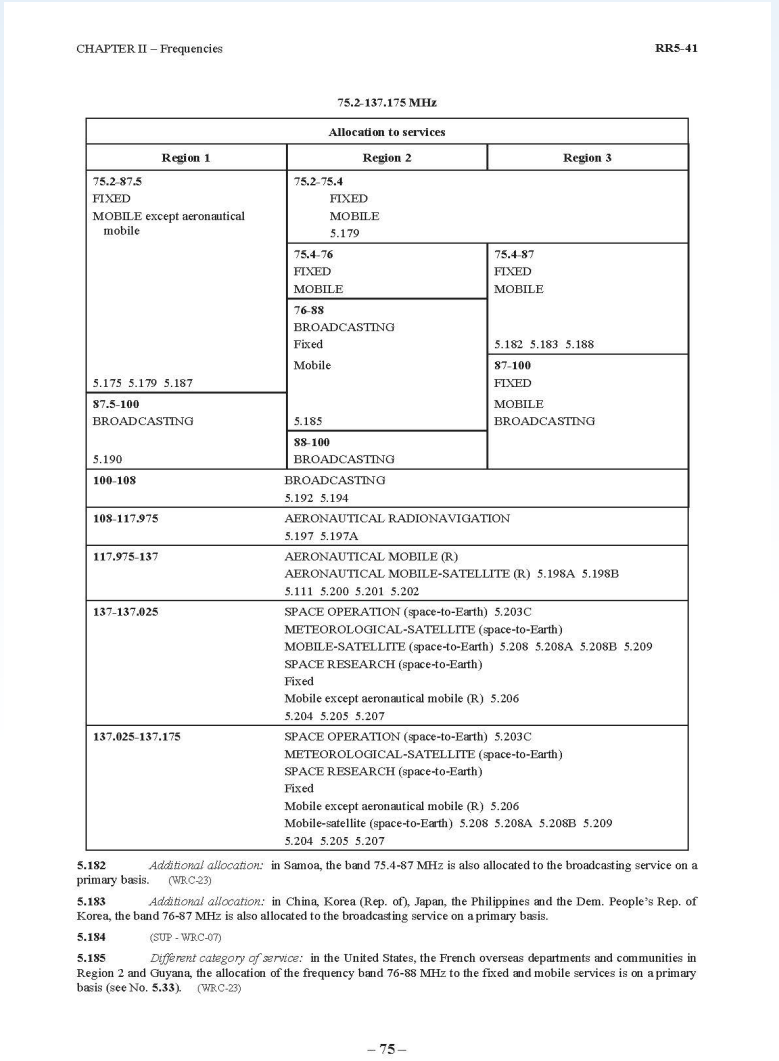
ICAO

ITU Radio Regulations

- The RR is a legally binding international treaty that establishes the framework for the allocation and use of radio frequencies worldwide.
- The Radio Regulations (RR) contain the Table of Frequency Allocations, which defines the radio services and their corresponding frequency allocations.

ITU Radio Regulations

- To facilitate frequency allocation, the ITU divides the world into three regions.
- Frequency allocations can be made on a worldwide or regional basis. Sub-regional or country allocations are typically specified in footnotes to the Table of Frequency Allocations.
- Some frequency bands are allocated to multiple radio services, while others are exclusively allocated to a single service.
- Most of aeronautical services with exclusive allocations made on a worldwide basis to ensure global harmonization.



CHAPTER II – Frequencies RR5-41

75.2-137.175 MHz

Allocation to services		
Region 1	**Region 2**	**Region 3**
75.2-87.5 FIXED MOBILE except aeronautical mobile 5.175 5.179 5.187	**75.2-75.4** FIXED MOBILE 5.179	
	75.4-76 FIXED MOBILE	**75.4-87** FIXED MOBILE
	76-88 BROADCASTING Fixed Mobile 5.185	5.182 5.183 5.188
		87-100 FIXED MOBILE BROADCASTING
87.5-100 BROADCASTING 5.190	**88-100** BROADCASTING	
100-108	BROADCASTING 5.192 5.194	
108-117.975	AERONAUTICAL RADIONAVIGATION 5.197 5.197A	
117.975-137	AERONAUTICAL MOBILE (R) AERONAUTICAL MOBILE-SATELLITE (R) 5.198A 5.198B 5.111 5.200 5.201 5.202	
137-137.025	SPACE OPERATION (space-to-Earth) 5.203C METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) 5.208 5.208A 5.208B 5.209 SPACE RESEARCH (space-to-Earth) Fixed Mobile except aeronautical mobile (R) 5.206 5.204 5.205 5.207	
137.025-137.175	SPACE OPERATION (space-to-Earth) 5.203C METEOROLOGICAL-SATELLITE (space-to-Earth) SPACE RESEARCH (space-to-Earth) Fixed Mobile except aeronautical mobile (R) 5.206 Mobile-satellite (space-to-Earth) 5.208 5.208A 5.208B 5.209 5.204 5.205 5.207	

5.182 *Additional allocation:* in Samoa, the band 75.4-87 MHz is also allocated to the broadcasting service on a primary basis. (WRC-23)

5.183 *Additional allocation:* in China, Korea (Rep. of), Japan, the Philippines and the Dem. People's Rep. of Korea, the band 76-87 MHz is also allocated to the broadcasting service on a primary basis.

5.184 (SUP - WRC-07)

5.185 *Different category of service:* in the United States, the French overseas departments and communities in Region 2 and Guyana, the allocation of the frequency band 76-88 MHz to the fixed and mobile services is on a primary basis (see No. **5.33**). (WRC-23)

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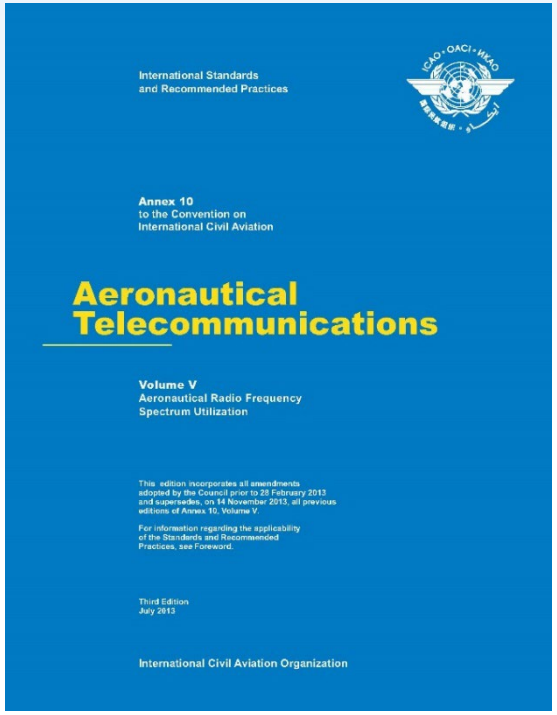
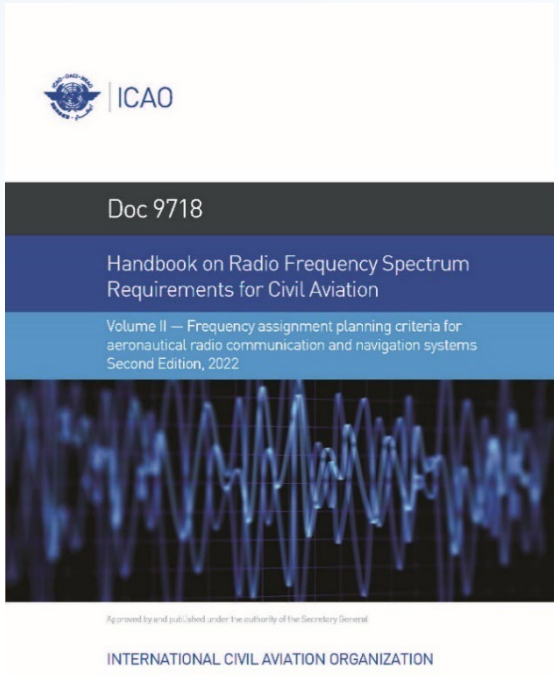
ICAO SARPs

- Key ICAO SARPs and guidance material related to frequencies can be found in Annex 10 and Document 9718 (Handbook on Radio Frequency Spectrum Requirements for Civil Aviation).





Aeronautical Mobile (R) Service
in the band (118.0 – 136.975 MHz)

- The 118-137 MHz band is one of the most important and widely used frequency bands for AM(R)S.

- It is primarily used for line-of-sight VHF air/ground voice communications, and to some extent, VHF air/ground data communications.

- Single channel simplex is the mode of operation, & Double sideband amplitude modulation voice is the major modulation method.

ICAO Allotment table

- The International Civil Aviation Organization (ICAO) coordinates radio communications of the aeronautical mobile (R) service with international aeronautical operations and this Organization should be consulted in all appropriate cases in the operational use of the frequencies in the Plan.

- ICAO has allotted the 118-137 MHz band to both **national** and **international services**. (see Annex 10, Volume V, Chapter 4, Table 4-1). (The table was reproduced in the next slide).

General allotment table			
	Block allotment frequencies (MHz)	Worldwide utilization	Remarks
a)	118.000 – 121.450 inclusive	International and National Aeronautical Mobile Services	Specific international allotments will be determined in the light of regional agreement. National assignments are covered by the provisions in Annex 10, Volume V, Chapter 4, 4.1.4.8 and 4.1.4.9.
b)	121.500	Emergency frequency	See Annex 10, Volume V, Chapter 4, 4.1.3.1. In order to provide a guard band for the protection of the aeronautical emergency frequency, the nearest assignable frequencies on either side of 121.500 MHz are 121.450 MHz and 121.550 MHz.
c)	121.550 – 121.9917 inclusive	International and National Aerodrome Surface Communications	Reserved for ground movement, pre-flight checking, air traffic services clearances, and associated operations.
d)	122.000 – 123.050 inclusive	National Aeronautical Mobile Services	Reserved for national allotments. National assignments are covered by the provisions of Annex 10, Volume V, Chapter 4, 4.1.4.8 and 4.1.4.9.
e)	123.100	Auxiliary frequency SAR	See Annex 10, Volume V, Chapter 4, 4.1.3.4. In order to provide a guard band for the protection of the aeronautical auxiliary frequency, the nearest assignable frequencies on either side of 123.100 MHz are 123.050 MHz and 123.150 MHz.
f)	123.150 – 123.6917 inclusive	National Aeronautical Mobile Services	Reserved for national allotments, with the exception of 123.450 MHz which is also used as an air-to-air communications channel (see g)). National assignments are covered by the provisions of 4.1.4.8 and 4.1.4.9.
g)	123.450	Air-to-air communications	Designated for use as provided for in 4.1.3.2.
h)	123.700 – 129.6917 inclusive	International and National Aeronautical Mobile Services	Specific international allotments will be determined in light of regional agreement. National assignments are covered by the provisions in Annex 10, Volume V, Chapter 4, 4.1.4.8 and 4.1.4.9.
i)	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, to meet the requirements mentioned in Annex 10, Volume V, Chapter 4, 4.1.6.1.2.
j)	130.900 – 136.875 inclusive	International and National Aeronautical Mobile Services	Specific international allotments will be determined in light of regional agreement. National assignments are covered by the provisions in Annex 10, Volume V, Chapter 4, 4.1.4.8 and 4.1.4.9.
k)	136.900 – 136.975 inclusive	International and National Aeronautical Mobile Services	Reserved for VHF air-ground data link communications.

ICAO Allotment table *(continue)*

- Frequency assignments for international use are those that are required as per regional Air Navigation Plan. These frequencies are identified by “ICAO” in the frequency assignment plan. Other frequencies are for national use and are identified as “NAT” in the frequency assignment plan.

- In practice, not much consideration is given to the allotments for national/international use.

- In addition to the global allotment table in Annex 10, each ICAO region has its own regional allotment plan. These plans may provide additional customization options for regional frequency management.

Regional frequency allotment tables

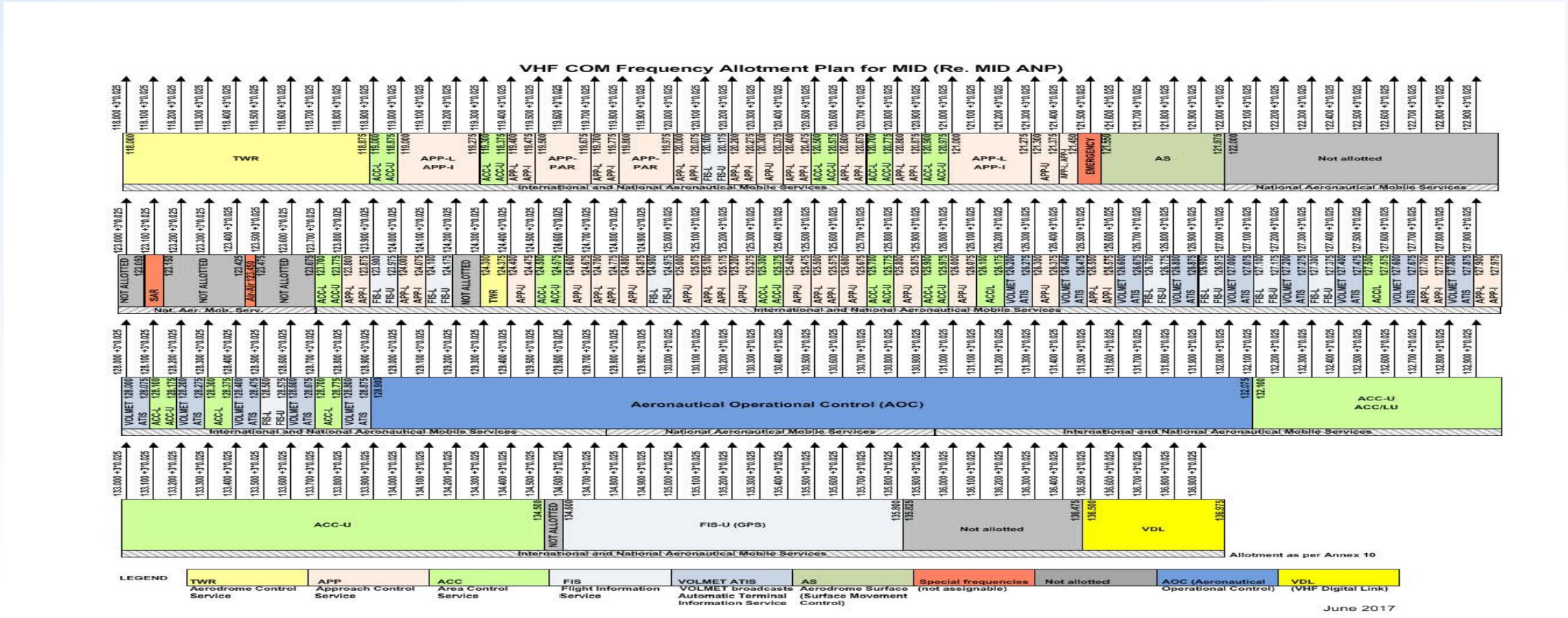
- Regional frequency allotment tables are part of the ICAO Regional Air Navigation Plan, and published as a supplement to ICAO Doc 9718 Vol 2.

- Regional allotment table allot most of the channels available in the band (118.0 – 136.975 MHz) to one or more of the defined services in ICAO Doc 9718, Vol 2, Chapter 2, par 2.6.1).

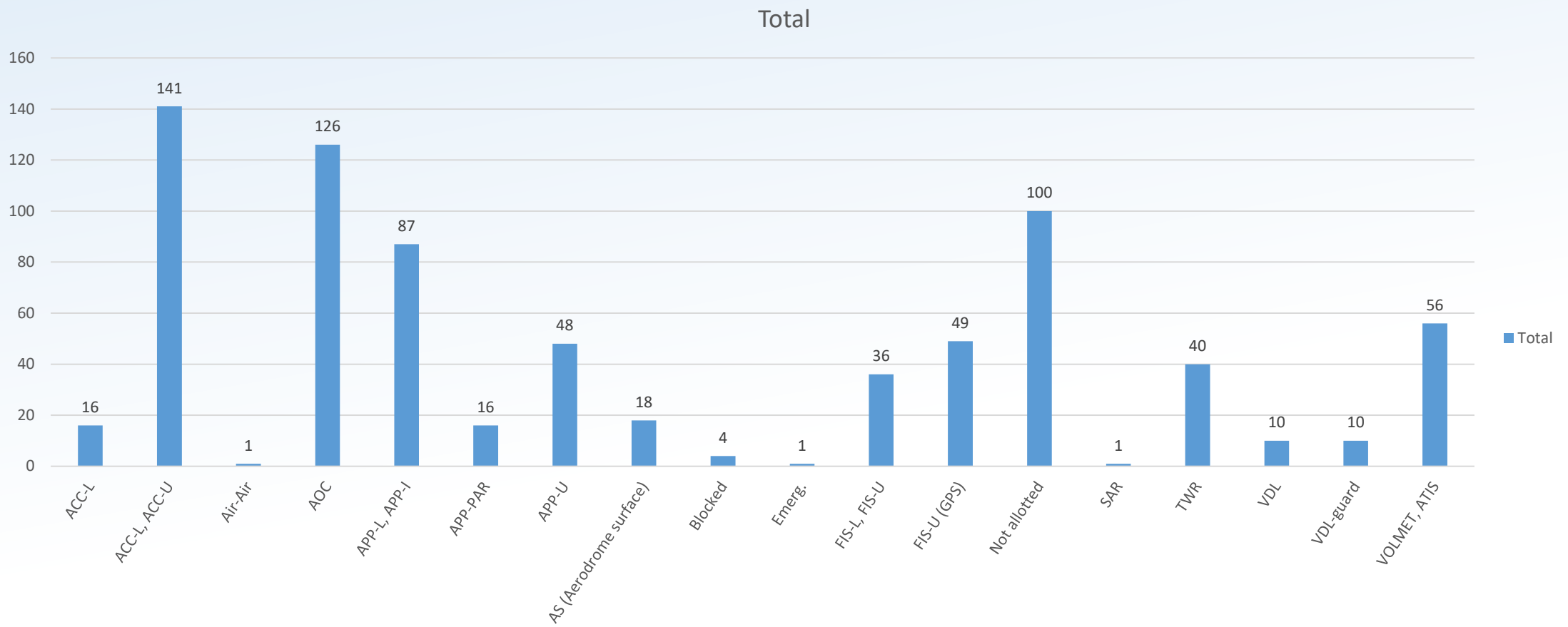
- Not allotted channels could be used for National Aeronautical Mobile Services.

- The standard channel spacing in most regions is 25 kHz. In the EUR region, **8.33 kHz channel spacing** has been implemented, which offers more available frequency channels.

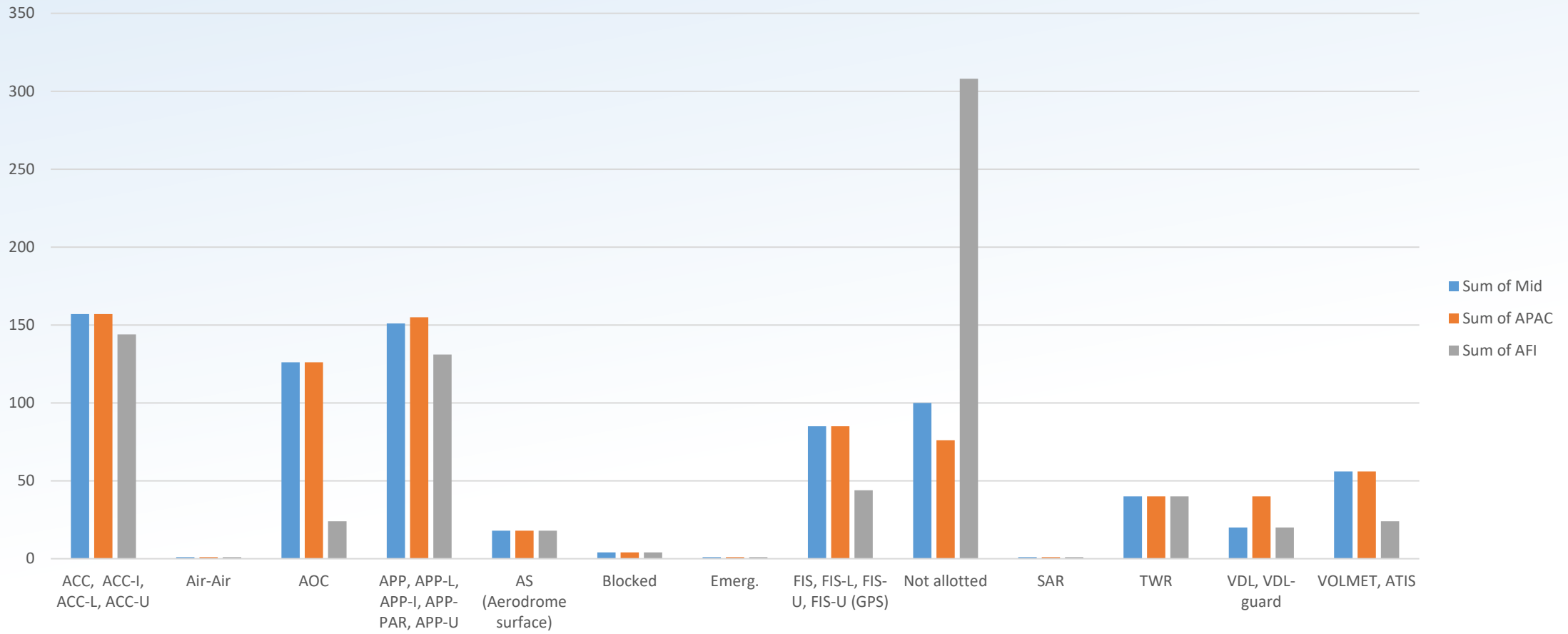
Mid Region Allotment Plan



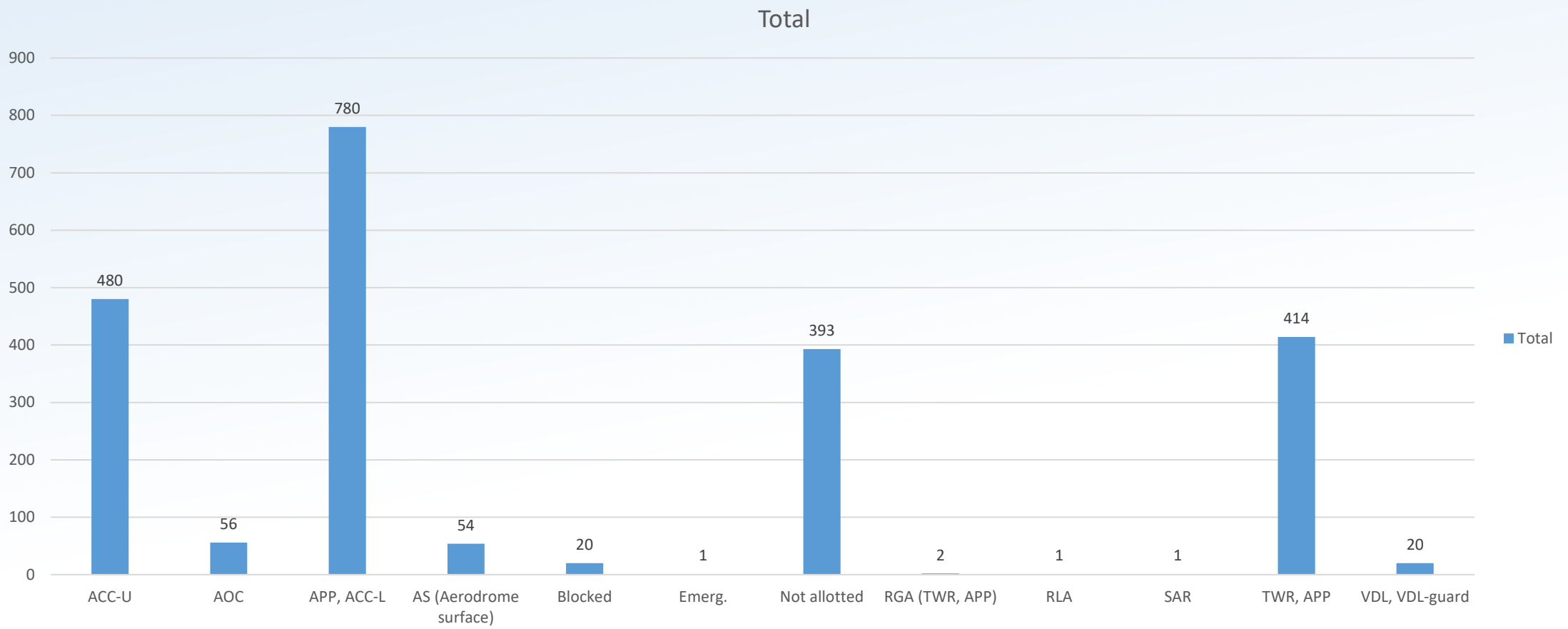
Allotted channels for each Service



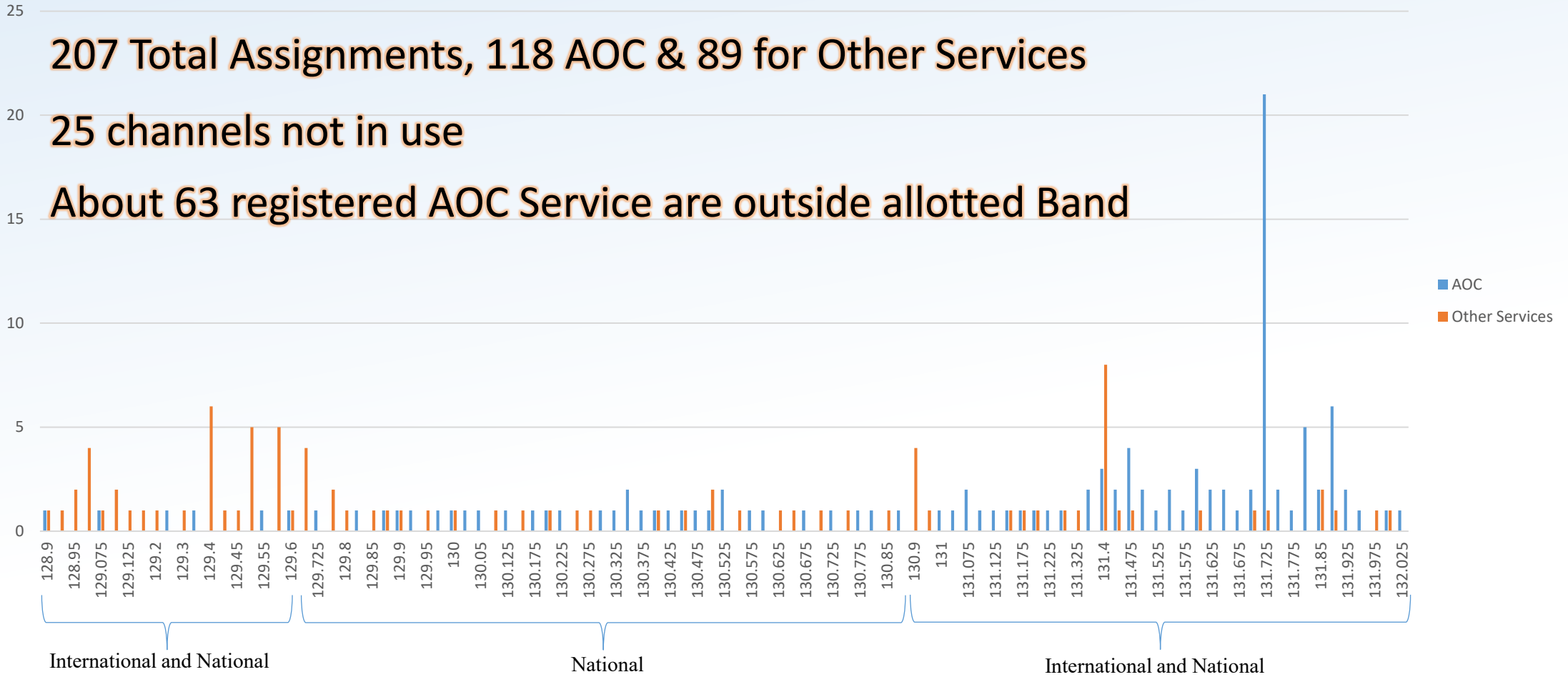
Allotted channels for Mid vs APAC vs AFI



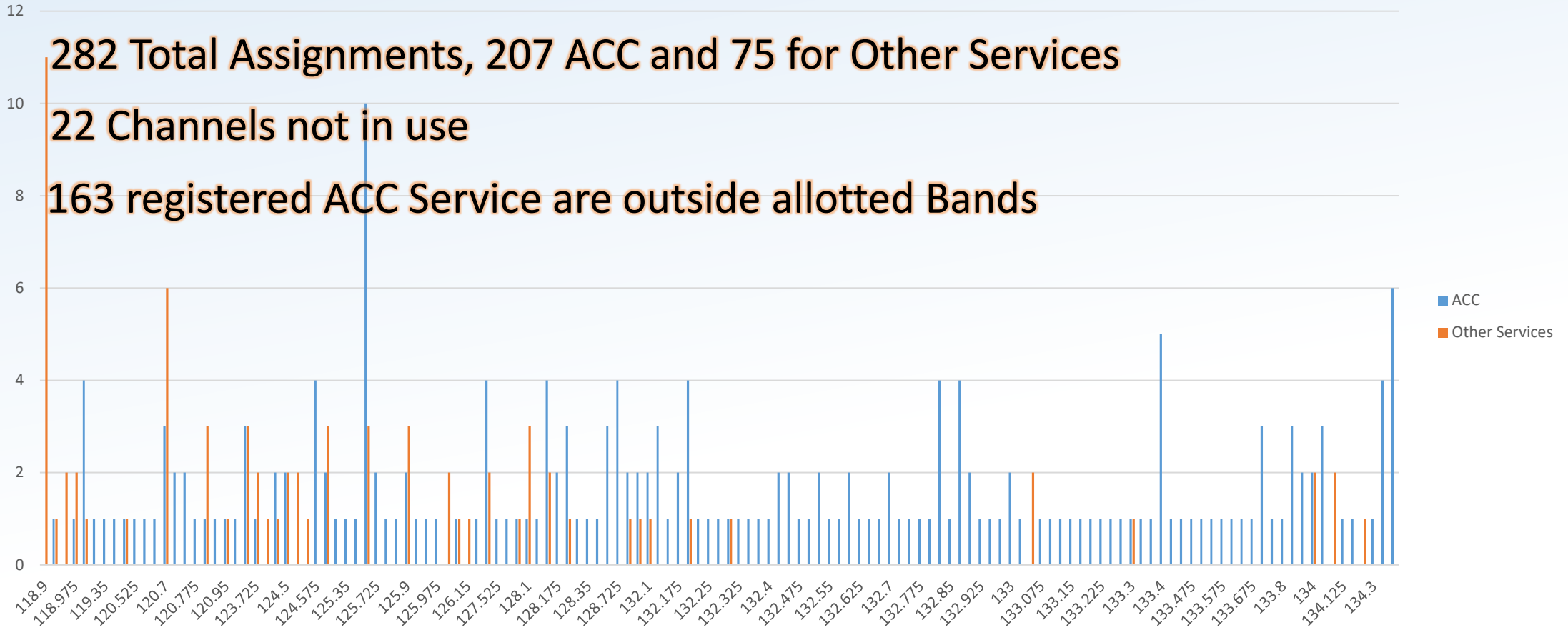
Europe Allotment Plan



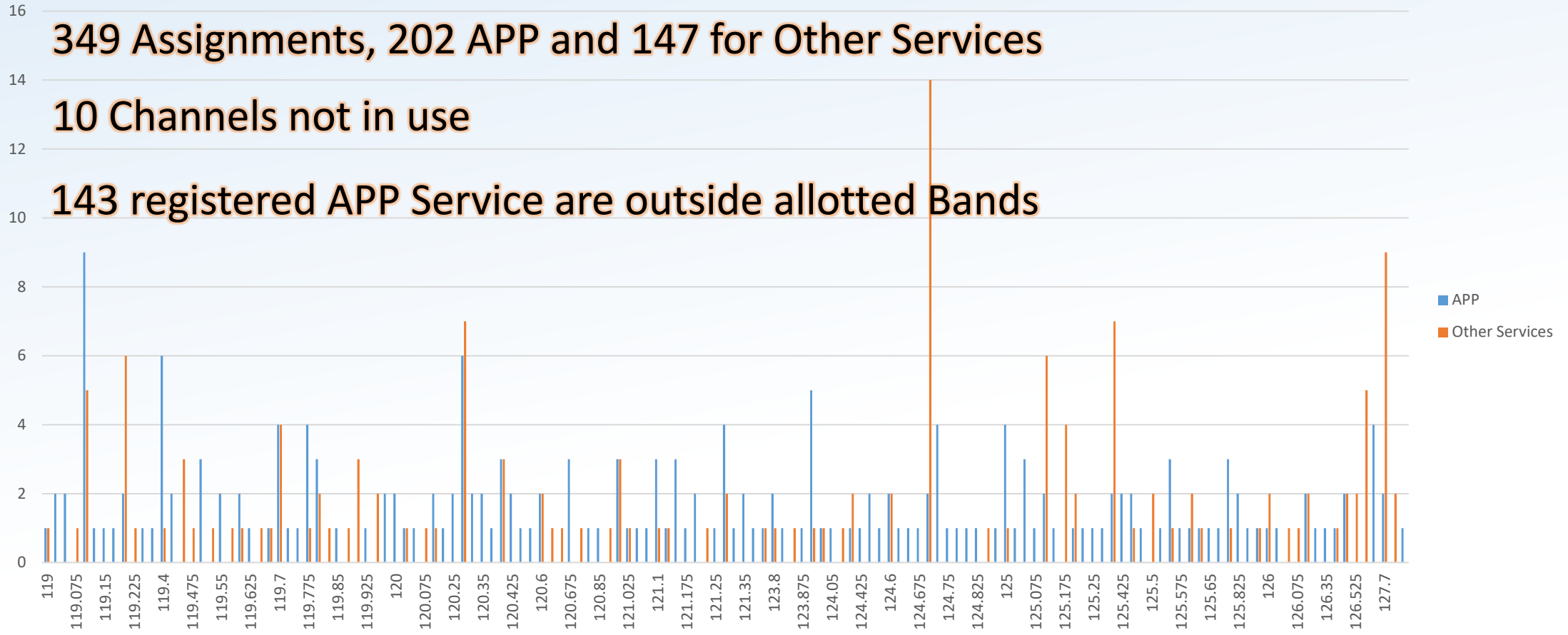
AOC band Utilization



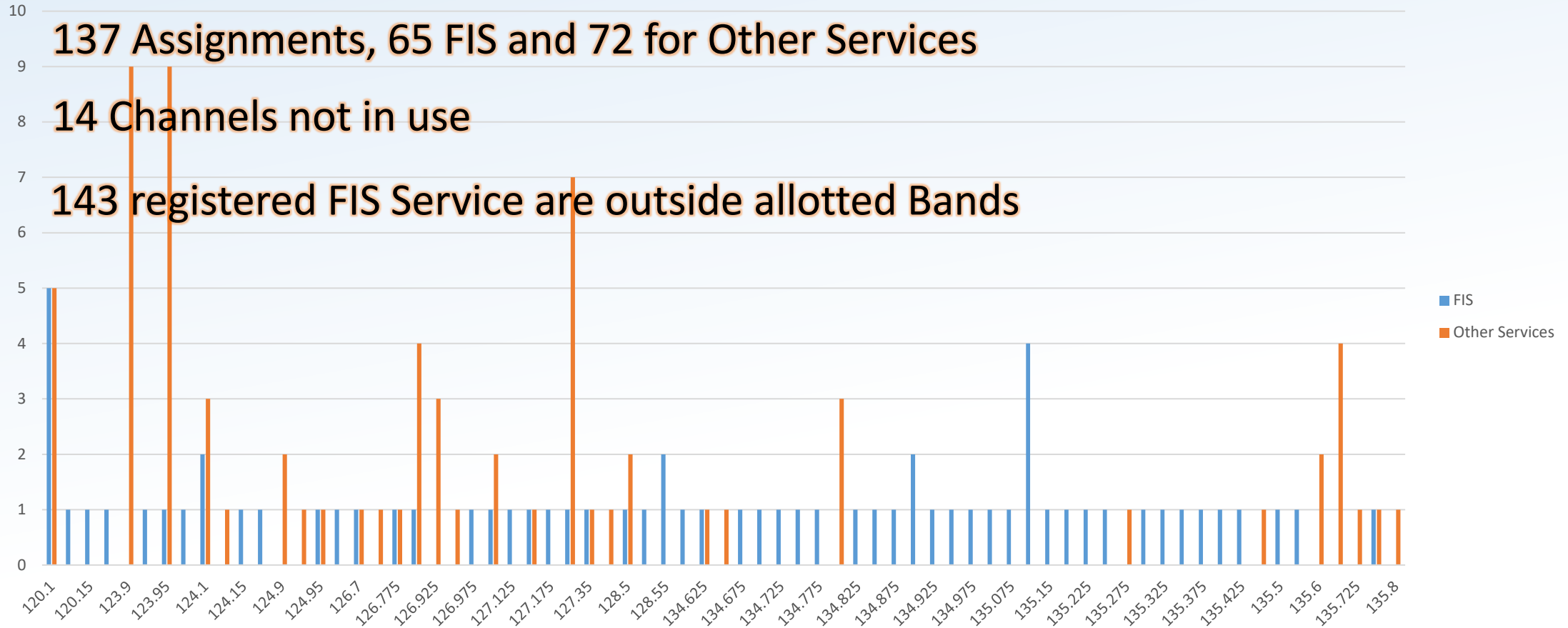
ACC bands Utilization



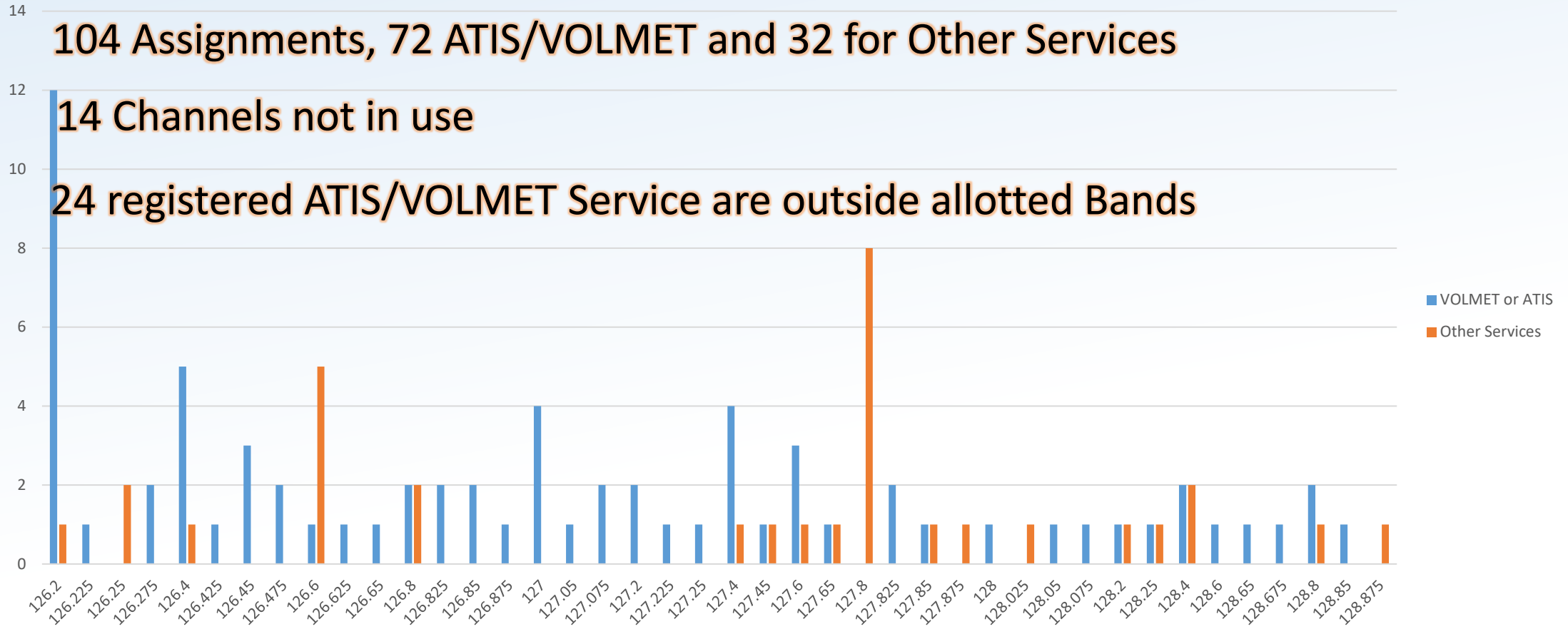
APP Bands Utilization



FIS Bands Utilization



VOLMET/ATIS Bands Utilization



Notes

- There are many channels assigned to services in different allotment band.
- Some allotted services for Mid region have no assignments in the ICAO database like; APP-PAR and FIS-U (GPS).
- The frequency allocation for AOC service in the Mid region is 3.125 MHz, resulting in 126 available channels. In contrast, the European allocation for AOC is approximately 600 kHz, providing 56 channels with an 8.33 kHz spacing.*(16 Blocked channels)*
- The Mid region currently has 181 frequency assignments for AOC service. In comparison, the APAC region has 953 assignments, and Europe has 1998.

Notes *(continue)*

- There are several duplicate assignments in the VHF com list for the same stations.
- Numerous extended-range facilities are recorded in the database without the corresponding ER family name being specified in the designated field.
- A significant number of frequency assignments have a larger Designated operational Coverage (DOC) than the actual geographic area of the designated sector.

Notes *(Continue)*

- The ITU allocated the 117.975-137 MHz frequency band to the aeronautical mobile-satellite (R) service (AMS(R)S) at WRC-23, sharing it with the existing AM(R)S. This may necessitate new frequency allotments for the AMS(R)S service in the future. However, the mid-region has many not in use channels that could potentially accommodate these new frequency assignments.

Suggestions

- Consider the reduction of the AOC band to (130.9 – 132.025 MHz) (46 Channels), and change the band (128.9 – 129.675 MHz)(32 Channels) to (XXX) service, and the band (129.7 – 130.875 MHz) (48 Channels) to (**NOT Allotted**) to allow the channels be used for any service.

- Consider simplifying the VHF COM Frequency Allotment Plan by converging the various allotments of “sub-services” to the main service.

Suggestions *(continue)*

- Consider adding the area services polygons data for the mid region to the Frequency Finder tool to enhance FF Functionality and improve efficient frequency assignment planning.
- Utilize the Frequency Finder tool to conduct a comprehensive assessment of channels availability for each service within the entire Mid region.

Thank you