



International Civil Aviation Organization

SECOND MEETING OF SPECTRUM REVIEW WORKING GROUP (SRWG/2)

Bangkok, Thailand 12 – 14 May 2015

Agenda Item 5: Recommendations for improvement of VHF frequency planning

IMPLEMENTATION OF BACK-UP FREQUENCIES

(Presented by the Secretariat)

SUMMARY

This paper proposes guidance material on the use of backup frequencies based on the practices in the EUR Region.

1. Introduction

1.1 In the APAC Region, increased requirements for using back-up frequencies is being brought forward by States. With the view to seek a harmonized use of backup frequencies and avoiding un-due pressure on the available channels for air/ground communications in the VHF-COM band, guidance to States on the use of back-up frequencies has been considered necessary within the SRWG.

1.2 Information was received from EUROCONTROL on the methods use in the EUR Region on how back-up frequencies are to be implemented and used in the EUR Region. The material in this paper is based on the practices in the EUR Region and proposes to incorporate guidance on using back-up frequencies in the *Handbook on Radio Frequency Spectrum Requirements for Civil Aviation, Volume II, Frequency assignment planning criteria for aeronautical radio communication and navigation systems (Doc 9718)*

2. Operational use of back-up frequencies

2.1 Back-up frequencies are to be implemented and used in cases where the air-ground communication channel is not available due to radio frequency interference. Such interference may be caused by a variety of sources including intentional interference, unintentional interference (e.g. from badly designed FM broadcast stations), stuck microphone in an aircraft or unusual propagation conditions (e.g. ducting).

2.2 Very often, these cases of radio interference are experienced only locally (in an area smaller than the Designated Operational Coverage of the frequency assignment that is in operational use). Very often, the actual operational use of a back-up frequency is complicated because the aircraft that is experiencing radio frequency interference cannot be contacted (at least on the main frequency that is in use) while other aircraft in the DOC that do not experience radio frequency interference have

no need to use or re-tune to a back-up frequency. A further assessment on the operational use of back-up frequencies is outside the framework of this paper.

3. Technical and operational requirements and implementation of backup frequencies.

3.1 Backup frequencies should be implemented and used to mitigate the loss of air-ground communication channels, primarily due to radio-frequency interference. Backup frequencies should not be used to mitigate loss of a communication channel due to malfunctioning of ground systems. Malfunctioning of ground systems should be addressed by implementing proper equipment redundancy (e.g. stand-by transmitter/receiver operating in the main frequency, back-up power supply, ground infrastructure (communication routes to remote stations) redundancy).

3.2 The number of back-up frequencies should be kept to the minimum necessary. Where possible, backup frequencies should be implemented to provide backup communication channels for more than one service (e.g. a single backup frequency should be used to provide backup for both TWR and APP services) on the understanding that not all frequencies are being interfered at the same time.

3.3 Backup frequencies should be provided only for ATC services (AS, TWR, APP, ACC, FIS, and VOLMET). Frequencies for Aeronautical Operational Control (AOC) and other uses should not be required to provide continuity of communications through backup frequencies. Preferably, a safety case should be presented to justify or clarify the [number of] backup frequencies required.

Note: Safety cases may assist in future updating or clarifying the provisions on the requirements for backup frequencies within the Region.

3.4 Wherever operationally possible, backup frequency should be shared with other ATC centers.

4. Proposal

4.1 On the principles in paragraph 2 and 3, material has been developed and is presented in **Appendix A** of this paper on the use of backup frequencies with the purpose to:

- a) Seek agreement on this material for application in the APAC Region; and
- b) To propose incorporation of the material in the *Handbook on Radio Frequency Spectrum Requirements for Civil Aviation, Volume II, Frequency assignment planning criteria for aeronautical radio communication and navigation systems (Doc 9718)*

4.2 Incorporation of material on the use of backup frequencies in the Handbook, Volume II facilitates implementation of these provisions on a global basis in other Regions.

5. Action proposed

5.1 The SRWG is invited to:

- a) Agree on the material in this paper;
- b) Agree to submit the proposed guidance material on the use of backup frequencies to the CNS-SG for further consideration;
- c) Recommend to the CNS SG to incorporate the proposed guidance material in the *Handbook on Radio Frequency Spectrum Requirements for Civil Aviation, Volume II, Frequency assignment planning criteria for aeronautical radio communication and navigation systems (Doc 9718)*; and
- d) To recommend the Secretariat to coordinate the proposed policy for implementing and using backup frequencies with other ICAO Regions.

Note: It is recommended that, where necessary, operational procedures are in place addressing the use of backup frequencies.

GUIDANCE ON THE IMPLEMENTATION AND USE OF BACKUP FREQUENCIES

1. Assessment for the need for backup frequencies.

1.1 Backup frequencies may be operationally required to provide an alternative air/ground communication channel in cases where the main operational radio frequency is not available.

Examples include intentional interference, unintentional interference (e.g. badly designed FM broadcasting stations), stuck microphone, phony air traffic controllers.

1.2 Implementation of backup frequencies should be limited only to the following ATC services:

- Aerodrome Surface communications AS
- Tower services TWR
- Approach services APP-L, APP-I and APP-U
- Area control services ACC-L, ACC-U
- Meteorological information VOLMET
- Flight Information services FIS-L, FIS-U

Other air/ground communication services such as ATIS, AFIS, generic unspecified air-to-air (A/A), generic unspecified air-to-ground (A/G) services, generic unspecified General Purpose (GP) services and aeronautical operational control services (AOC) do not require backup communication channels.

1.3 Backup frequencies should not be provided when communication channels are lost due to malfunctioning of the ground infrastructure. Adequate backup facilities in cases of malfunctioning of the ground infrastructure (or parts thereof) should be in place.

Examples are equipment failure, power loss and loss of ground communication links to remote transmitter / receiver sites.

1.4 The assessment of the required number of backup frequencies should be kept to a minimum. Where possible, it should be based on experience (e.g. number of days per year that a communication channel is not available).

1.5 Where operationally feasible, arrangements should be in place to share backup frequencies either between different services (at the same ATC center) or between different facilities (e.g. different aerodromes or different ACC/FIS services from different ATC centers).

1.6 In the ICAO COM list, backup frequencies are as such identified.

2. Backup frequency for short distance communications

2.1 Short distance communications that may require backup frequencies include AS, TWR and APP services

2.2 Backup frequencies should only be implemented at aerodromes serving commercial air transport and with more than 40.000 movements per year.

2.3 The number of backup frequencies for the combined services in 2.1 above should not exceed two (with a maximum of one backup frequency for TWR and one backup frequency for APP services).

Note: a single backup frequency can in principle be used to provide for a backup communications channel for both a TWR and an APP service or for a TWR and an AS service.

2.4 Adjacent ATS units are encouraged and where possible, operationally feasible and spectral efficient to make suitable arrangements to share backup frequencies.

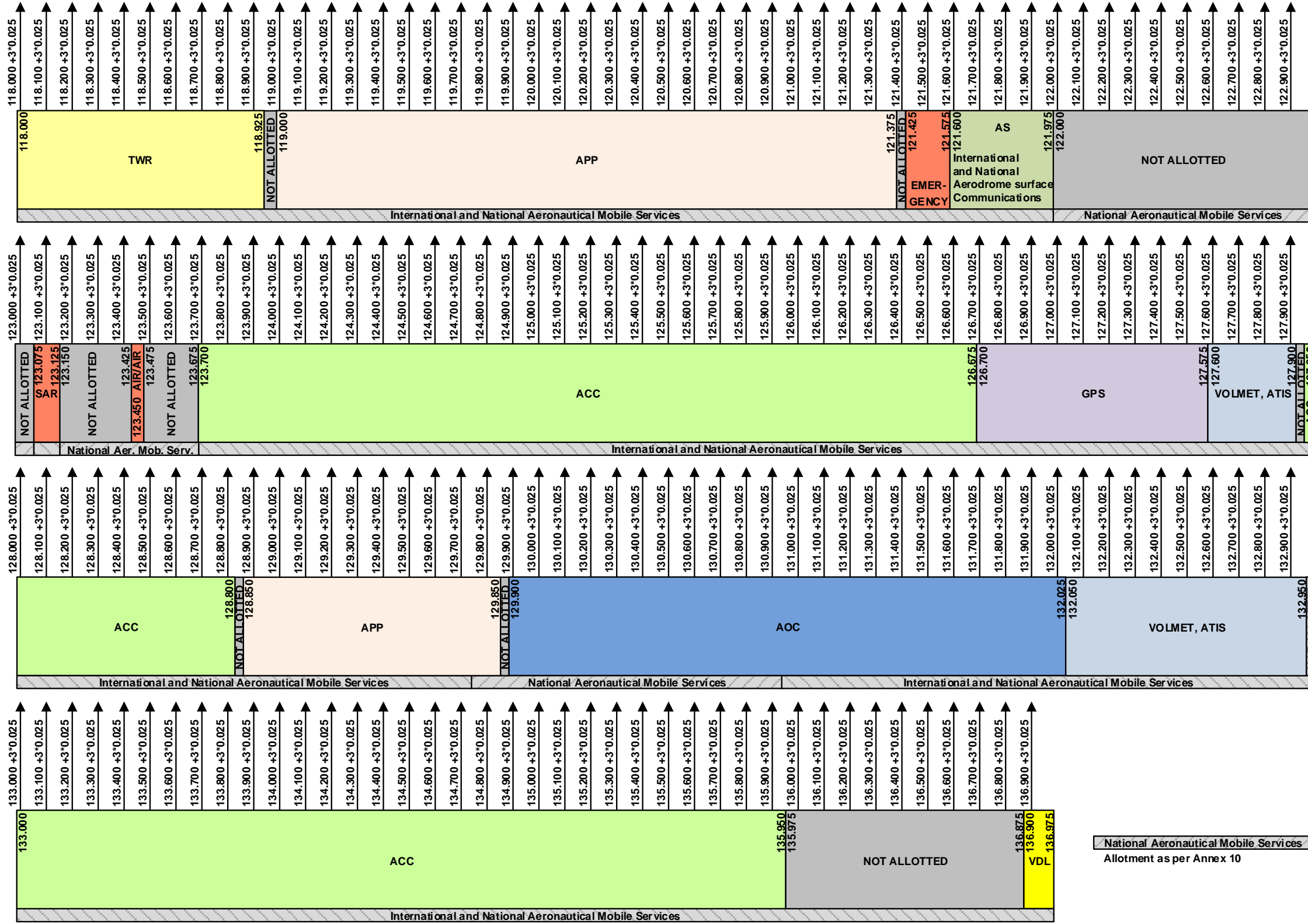
3. Backup frequencies for long distance communications

3.1 A study or safety case should be presented to justify the number of backup frequencies required for ACC and FIS services.

3.1 Adjacent ATS units are encouraged and where possible, operationally feasible and spectral efficient to make suitable arrangements to share backup frequencies.

Regional Allotment Plans

VHF COM Frequency Allotment Plan for CAR / SAM (Re. CAR/SAM ANP)

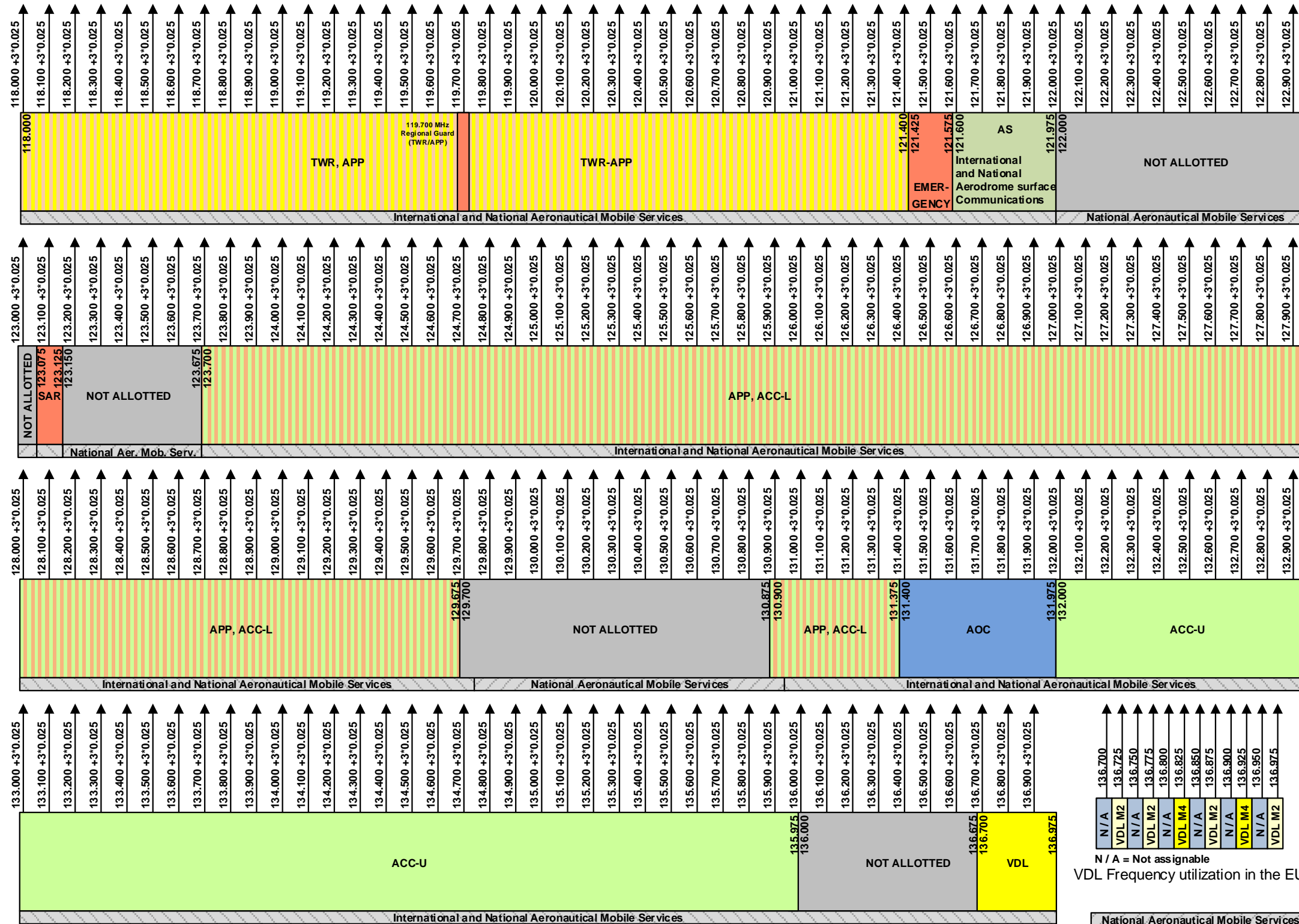


National Aeronautical Mobile Services
Allotment as per Annex 10

LEGEND

TWR	APP	ACC	GPS	VOLMET ATIS	AS	Special frequencies	Not allotted	AOC	VDL
Aerodrome Control Service	Approach Control Service	Area Control Service	General Purpose	VOLMET broadcasts Automatic Terminal	Aerodrome Surface (Surface Movement Control)	(not assignable)		Aeronautical Operational Control	(VHF Digital Link)

VHF COM Frequency Allotment Plan for EUR (Re. EUR ANP)



136.700	N/A
136.725	VDL M2
136.750	N/A
136.775	VDL M2
136.800	N/A
136.825	VDL M4
136.850	N/A
136.875	VDL M2
136.900	N/A
136.925	VDL M4
136.950	N/A
136.975	VDL M2

N/A = Not assignable
VDL Frequency utilization in the EUR Region

National Aeronautical Mobile Services
Allotment as per Annex 10

TWR	APP	ACC	AS	Special frequencies (not assignable)	Not allotted	AOC	VDL
Aerodrome Control Service	Approach Control Service	Area Control Service	Aerodrome Surface (Surface Movement Control)			Aeronautical Operational Control	(VHF Digital Link)

In the EUR Region the following special allotments apply also:
 122.100 MHz: Regional guard supplementary TWR/APP
 122.500 and 123.500 MHz: Regional light aviation
 136.825 and 136.875 MHz: AOC (VDL Mode 2 and 4)