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8.33 Implementation Support Group

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Abstract

The 8.33kHz VCS Implementation Guidelines aims to provide in a single document recommendations regarding institutional provisions, flight planning, operational procedures, aircraft retrofit, safety, frequency management and State's management aspects for the deployment of 8.33kHz channel spacing communications.

Keywords

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EXECUTIVE SUMMARY

The Commission Implementing Regulation (EU) No 1079/2012 (VCS Regulation) laying down the requirements for a coordinated introduction of air-ground voice communications based on 8.33kHz channel spacing applies to all voice communication radios operating in the aeronautical VHF band, to flight data processing systems serving general air traffic and to all flights operating as general air traffic. The regulation consists of interoperability, performance and deployment obligations, with relevant application dates for ANSP's, operators and other users of radios, for Member States and for the Network Manager.

From 01 January 2018 an airspace user operator shall not operate an aircraft in airspace where carriage of radio is required (in the airspace in which EU Member States are providing air traffic services) unless the aircraft radio requirement has the 8.33kHz channel; spacing capability (Art 5(4)).

In accordance with the Commission Implementing Regulation (EU) No 1079/2012 (VCS Regulation), EU Member States shall ensure that by 31 December 2018 at the latest all frequency assignments used for aeronautical VHF communications are converted to 8.33kHz channel spacing with the exceptions of the assignments that remain in 25kHz as being used for EMG (121.5MHz), Search and Rescue (123.1MHz), ACARS and VDL (Art. 2(4)) and as a result of a safety assessment. Frequency assignments used to accommodate state aircraft are exempted from conversion (Art. 6(10)).

The 8.33kHz VCS User Guide is intended for any person engaged in air traffic services, aircraft operations, regulation, aviation industry and other related sectors, that may be impacted by the introduction of 8.33kHz channel spacing for VHF communications

The document aims to provide recommendations regarding institutional provisions, flight planning, operational procedures, aircraft retrofit, safety, frequency management and State's management aspects for the deployment of 8.33kHz channel spacing communications

The document is structured in two parts:

- **Part 1** Operational Considerations.
- **Part 2** Guidelines for implementation

For completeness the following annexes are attached to this document, detailing where necessary specific information related to the deployment of 8.33VCS

- **Annex A** Aeronautical Information.
- **Annex B** Classes of airspace
- **Annex C** Frequency Tables.
- **Annex D** Frequently Asked Questions
- **Annex E** Radio Equipment carriage requirements
- **Annex F** **8.33VCS Safety Considerations**
- **Annex G** 8.33VCS National Coordinators
- **Annex H** 8.33 States

GLOSSARY OF TERMS

'8.33 National Coordinator':the competent person, authority or organization within the Member State responsible for the monitoring and coordinating the 8.33VCS deployment activities with all stakeholders in accordance with the requirements derived from the VCS Regulation

'Advisory airspace': an airspace of defined dimensions, or designated route, within which air traffic advisory service is available

'Aerodrome': a defined area (including any buildings, installations and equipment) on land or water or on a fixed, fixed off-shore or floating structure intended to be used either wholly or in part for the arrival, departure and surface movement of aircraft;

'Aerodrome control service': air traffic control service for aerodrome traffic;

'Aerodrome control tower': a unit established to provide air traffic control service to aerodrome traffic;

'Aerodrome traffic': all traffic on the manoeuvring area of an aerodrome and all aircraft flying in the vicinity of an aerodrome. An aircraft operating in the vicinity of an aerodrome includes but is not limited to aircraft entering or leaving an aerodrome traffic circuit;

'Aeronautical Information Publication (AIP)': a publication issued by or with the authority of a State and containing aeronautical information of a lasting character essential to air navigation;

'Aeronautical mobile service': a mobile service between aeronautical stations and aircraft stations, or between aircraft stations, in which survival craft stations may participate; emergency position-indicating radio beacon stations may also participate in this service on designated distress and emergency frequencies;

'Aeronautical station': a land station in the aeronautical mobile service. In certain instances, an aeronautical station may be located, for example, on board ship or on a platform at sea;

'Aeroplane': a power-driven heavier-than-air aircraft, deriving its lift in flight chiefly from aerodynamic reactions on surfaces which remain fixed under given conditions of flight;

'**Aircraft':** any machine that can derive support in the atmosphere from the reactions of the air other than the reactions of the air against the earth's surface;

'Aircraft Operator': a person, organisation or enterprise engaged in, or offering to engage in, an aircraft operation.

'Air-ground communication': two-way communication between aircraft and stations or locations on the surface of the earth

'Air-ground control radio station': an aeronautical telecommunication station having primary responsibility for handling communications pertaining to the operation and control of aircraft in a given area;

'Air traffic': all aircraft in flight or operating on the manoeuvring area of an aerodrome

'Air traffic control clearance': authorisation for an aircraft to proceed under conditions specified by an air traffic control unit;

'Air traffic control instruction': directives issued by air traffic control for the purpose of requiring a pilot to take a specific action

'Air traffic control unit': a generic term meaning variously, area control centre, approach control unit or aerodrome control tower;

‘Air traffic service (ATS)’: a generic term meaning variously, flight information service, alerting service, air traffic advisory service, air traffic control service (area control service, approach control service or aerodrome control service);

‘Air traffic services airspaces’: airspaces of defined dimensions, alphabetically designated, within which specific types of flights may operate and for which air traffic services and rules of operation are specified;

‘Alerting service’: a service provided to notify appropriate organisations regarding aircraft in need of search and rescue aid, and assist such organisations as required;

‘Alternate aerodrome’: an aerodrome to which an aircraft may proceed when it becomes either impossible or inadvisable to proceed to or to land at the aerodrome of intended landing

‘Area control service’: air traffic control service for controlled flights in control areas

‘Controlled aerodrome’: an aerodrome at which air traffic control service is provided to aerodrome traffic regardless whether or not a control zone exists;

‘Controlled airspace’: an airspace of defined dimensions within which air traffic control service is provided in accordance with the airspace classification

‘Controlled flight’: any flight which is subject to an air traffic control clearance;

‘Control zone’: a controlled airspace extending upwards from the surface of the earth to a specified upper limit;

‘Current flight plan (CPL)’: the flight plan, including changes, if any, brought about by subsequent clearances

‘Filed flight plan (FPL)’: the flight plan as filed with an ATS unit by the pilot or a designated representative, without any subsequent changes;

‘Flight crew member’: a licensed crew member charged with duties essential to the operation of an aircraft during a flight duty period

‘Flight information centre’: a unit established to provide flight information service and alerting service

‘Flight information service’: a service provided for the purpose of giving advice and information useful for the safe and efficient conduct of flights;

‘Flight plan’: specified information provided to air traffic services units, relative to an intended flight or portion of a flight of an aircraft;

‘IFR’: the symbol used to designate the instrument flight rules;

‘IFR flight’: a flight conducted in accordance with the instrument flight rules;

‘Manoeuvring area’: that part of an aerodrome to be used for the take-off, landing and taxiing of aircraft, excluding aprons

‘Movement area’: that part of an aerodrome to be used for the take-off, landing and taxiing of aircraft, consisting of the manoeuvring area and the apron(s);

‘Pilot-in-command’: the pilot designated by the operator, or in the case of general aviation, the owner, as being in command and charged with the safe conduct of a flight;

‘Radio mandatory zone (RMZ)’: an airspace of defined dimensions wherein the carriage and operation of radio equipment is mandatory;

‘Radiotelephony’: a form of radio communication primarily intended for the exchange of information in the form of speech;

‘Repetitive flight plan (RPL)’: a flight plan related to a series of frequently recurring, regularly operated individual flights with identical basic features, submitted by an operator for retention and repetitive use by ATS units;

‘**Runway’:** a defined rectangular area on a land aerodrome prepared for the landing and

take-off of aircraft;

‘**Sailplane’:** a heavier-than-air aircraft which is supported in flight by the dynamic reaction of the air against its fixed lifting surfaces, the free flight of which does not depend on an engine, including also hang gliders, paragliders and other comparable craft;

‘Special VFR flight’: a VFR flight cleared by air traffic control to operate within a control zone in meteorological conditions below VMC

‘Strayed aircraft’: an aircraft which has deviated significantly from its intended track or which reports that it is lost;

‘Traffic information’: information issued by an air traffic services unit to alert a pilot to other known or observed air traffic which may be in proximity to the position or intended route of flight and to help the pilot avoid a collision;

‘Unidentified aircraft’: an aircraft which has been observed or reported to be operating in a given area but whose identity has not been established;

‘**VFR**’: the symbol used to designate the visual flight rules;

‘VFR flight’: a flight conducted in accordance with the visual flight rules;

ACRONYMS AND ABBREVIATIONS

8.33 NC	8.33 National Coordinator
8.33 kHz State	A State enforcing the mandatory carriage of 8.33 kHz radio communication equipment
ACC	Area Control Centre
ACG	ATM/CNS Consultancy Group
ACK	Acknowledgement Message
AEEC	Airlines Electronic Engineering Committee
ADEP	Aerodrome of Departure
AIC	Aeronautical Information Circular
AIP	Aeronautical Information Publication
AMCP	Aeronautical Mobile Communication Panel
AMS	Aeronautical Mobile Service
ANSP	Air Navigation Service Provider
AO	Aircraft Operator
ARINC	Aeronautical Radio, Inc.
ATC	Air Traffic Control
ATS	Air Traffic Services
CFMU	Central Flow Management Unit
CHG	Modification Message
CIP	Convergence and Implementation Programme
DSB	Double Side Band
EANPG	European Air Navigation Planning Group
EASA	European Aviation Safety Agency
EC	European Commission
ECAC	European Civil Aviation Conference
EOBT	Estimated Off Blocks Time
ETSI	European Telecommunication Standardisation Institute
EU	European Union
EUR RAN	European Regional Air Navigation (Meeting)
EUR Region	European Region
EUROCAE	European Organisation for Civil Aviation Equipment
EUROCONTROL	European Organisation for the Safety of the Air Navigation
FIR	Flight Information Region
FL	Flight Level
FM	Frequency Management issues
FMG	Frequency Management Group (ICAO)
FPL	Flight Plan (Message)

GAT	General Air Traffic
HOSP	Hospital Flight
IATA	International Air Transport Association
ICAO	International Civil Aviation Organisation
IFPS	Integrated Initial Flight Plan Processing System
IFPZ	IFPS Zone
ITU	International Telecommunication Union
JAA	Joint Aviation Authorities
LoA	Letter of Agreement
MATSE	Meeting on the Air Traffic System in Europe
MOPS	Minimum Operational Performance Standards
MS	Member States
MTBF	Mean Time Between Failure
OAT	Operational Air Traffic
PSO	Programme Support Office
RFL	Requested Flight Level
RMP	Radio Management Panel
RPL	Repetitive Flight Plan
RRP	Rerouting Proposal Message
RTCA	Requirements and Technical Concepts for Aeronautics
SAR	Search And Rescue
SARPS	Standards and Recommended Practices
SCG	Stakeholder Consultation Group
TOR	Terms of Reference
UIR	Upper Information Region
UTC	Universal Time Co-ordinated
VDL	VHF Digital Link
VDR	VHF Digital Radio
WG	Working Group

REFERENCE DOCUMENTATION

1. Commission Implementing Regulation (EU) No 1079/2012 laying down requirements for voice channels spacing for the Single European Sky (amended by IR No 657/2013)
2. Commission Regulation (EU) 677/2011 laying down detailed rules for the implementation of air traffic management network functions
3. Commission Implementing Regulation (EU) 923/2012 laying down the common rules of the air and operational provisions regarding services and procedures in air navigation (SERA)
4. Commission Regulation (EU) 965/2012 laying down technical requirements and administrative procedures related to air operations
5. ICAO Doc 7030 European (EUR) Regional Supplementary Procedures (ed.5 Amendment 9)
6. ICAO Doc 4444 Procedures for Air Navigation services Air Traffic Management (PANS ATM)(ed. 15)
7. ICAO Annex 10 to the Convention on International Civil Aviation Aeronautical Communications (ed.6)
8. ICAO EUR Doc 011 Frequency Management Manual for Aeronautical Mobile and Aeronautical Radio Navigation Services (Oct. 2015)
9. EUROCONTROL Integrated Initial Flight Plan Processing System (IFPS) User Manual (current edition)
10. EUROCONTROL Common Format Letters of Agreement between Air Traffic Services Units (ed. 4.0)
11. EUROCONTROL Guidelines on 8.33kHz channel spacing for military operations (ed. 1.0)
12. EUROCONTROL Guidelines on the use of UHF for Air Traffic Control (ed. 1.0)
13. EUROCONTROL Radio Frequency Function Group (RAFT) Manual
14. EUROCONTROL Safety Case Development Manual

PART I: OPERATIONAL CONSIDERATIONS

1. INTRODUCTION

1.1 8.33kHz Voice Channel Spacing

Radio frequency spectrum is a scarce and finite resource. Europe is experiencing increasingly long delays to satisfy frequencies demand in the aeronautical mobile radio communication service VHF band (i.e. 117.975 to 137 MHz). Taking into account the limitations for increasing the allocated spectrum and/or frequency reuse, the main means to overcome this frequency congestion in the medium to long term is to reduce the spacing between channels from 25 kHz to 8.33 kHz, thereby fitting a greater number of channels into the existing frequency band.

The original ICAO decisions concerning the requirement for 8.33 kHz channel spacing were made in 1994 and 1995. The non-binding nature of these decisions meant that certain stakeholders had only partially committed to the implementation of 8.33 kHz. Therefore in 2005 the European Commission issued a Mandate to EUROCONTROL for the development of a draft implementing rule on Air-ground Voice Channel Spacing (A-VCS IR) to support the deployment of 8.33 kHz in Europe.

After consultation with stakeholders the European Commission decided to adopt a phased approach, first addressing the deployment of 8.33 kHz above FL195. Provisions for 8.33 kHz above FL195 were published in Commission Regulation (EC) No 1265/2007 (the A-VCS IR) on 27 October 2007.

1.2 8.33kHz Voice Channel Spacing (8.33VCS) below FL195

Despite the deployment of 8.33VCS in the airspace above FL 195, Europe is continuing to suffer from a shortage of voice communication frequencies, and the situation is expected to worsen in the coming years. The consequences of this shortage would be significant: increase in air traffic delays, inability to implement safety improvements and loss of flexibility for introducing operational enhancements resulting in a constrained European economic development.

Extending the use of 8.33kHz voice channel spacing below flight level 195 is the only proven way of meeting the European aeronautical mobile communication frequency needs in the medium to long term.

To foster this extension, the Commission Implementing Regulation (EU) No 1079/2012 (VCS Regulation) laying down the requirements for a coordinated introduction of air-ground voice communications based on 8.33kHz channel spacing has been adopted. It applies to all voice communication radios operating in the aeronautical VHF band, to flight data processing systems serving general air traffic and to all flights operating as general air traffic. The regulation consists of requirements for interoperability and performance, as well as deployment obligations, with relevant application dates for ANSP's, operators and other users of radios, for Member States and for the Network Manager.

2. INSTITUTIONAL PROVISIONS

The introduction of 8.33 kHz VCS in the European airspace and the extension of the applicability area is supported by a number of institutional provisions. These include ICAO recommendations, European (Implementing Rule) and national legislations, and agreed EUROCONTROL objectives

2.1 ICAO

The original decisions and recommendations to introduce 8.33 kHz as a solution for VHF congestion in the ICAO EUR Region were taken in 1994 at the Special European Regional Air Navigation meeting (EUR RAN) and in 1995 at the Special Communications / Operations Division meeting (SP COM/OPS/95).

The carriage and operation of 8.33 kHz channel spacing capable radio communication equipment became mandatory in the ICAO EUR region on 7th October 1999 for aircraft operating above FL245.

The decisions to expand the 8.33 kHz mandatory carriage requirement in the ICAO EUR region to lower flight levels (below FL245) were taken at EANPG 44 in December 2002, in a progressive way (initially above FL195 and at a later date down to the ground)

To incorporate the mandatory carriage requirement of 8.33 kHz above FL195 within the ICAO EUR Region, ICAO has approved the Amendment to the Regional Supplementary Procedures – Doc 7030/4 EUR/NAT-S 04/10 – EUR RAC/3 (reference ICAO State letter PFA/SUP/EUR/2004/0410 – 07-0061.SLG).

Note: the process for amending the DOC 7030 following the new requirements derived from the VCS Regulation is ongoing. A proposal for amendment is expected to be submitted to ICAO EUR Region COG 66th meeting (September 2017)

2.2 European Commission

In 2005, the European Commission issued a mandate to EUROCONTROL for the development of a draft implementing rule on Air-Ground Voice Channel Spacing to provide a suitable regulatory framework for the European deployment of the 8.33 kHz technology. This mandate was addressed in two parts:

- the deployment of 8.33 kHz channel spacing in the airspace above flight level 195 This first part was completed with the publication of the Commission Regulation (EC) No 1265/2007 in the Official Journal of the European Union on 27 October 2007.
- the extension of the deployment of 8.33 kHz channel spacing to the airspace below flight level 195

Commission Implementing Regulation (EU) No 1079/2012, amended by Commission Implementing Regulation (EU) No 657/2013 of 10 July 2013 lays down requirements for the coordinated introduction of air-ground voice communications based on 8.33kHz channel spacing. It extends to the lower airspace (below FL195) the requirements, covered in Regulation (EC) No 1265/2007, for the coordinated introduction of air-ground based voice communications based on 8.33 kHz channel spacing

2.3 States

The States within the ICAO EUR Region are responsible for their national 8.33 kHz implementations and for the amendments of their respective regulations. The IR 1079/2012 is applicable to the EU Member States and through international agreements

to Norway and Switzerland; however several neighbouring states may decide to transpose and therefore apply the VCS Regulation requirements in their own airspaces. For a complete list of States deploying 8.33kHz channel spacing communications below FL 195 please consult Annex F of the current document.

Advance notification to airspace users is provided by States via the publication of an Aeronautical Information Circular (AIC). The individual States are required to amend their National Aeronautical Information Publications (AIP) to reflect the 8.33 kHz carriage requirements, eventual exemptions from equipage and the rules for handling State aircraft (Annex A of this document provides 8.33 related proposed content for all aeronautical publications)

Since the deployment of 8.33VCS communications below FL195 requires enhanced local/national coordination, to ensure the success of such activities, the EC through the EU Member States Single Sky Committee, invited the Member States to nominate a competent person, authority or organisation as "8.33 VCS National Coordinator"

The nominated "8.33 VCS National Coordinator" has the following main responsibilities, within its State:

- To monitor and coordinate the 8.33 deployment activities of all stakeholders in accordance with the requirements derived from the VCS Regulation. Stakeholders to be coordinated include:
  - Air Traffic Service providers (military & civil)
  - Civil aviation authority (and if applicable military aviation authorities)
  - Airspace users, e.g.:
    - Aircraft operators,
    - General aviation users and associations
    - State aircraft operators
  - National Frequency Manager (cf. Radio Frequency Function)
  - State regulatory bodies
- To collect and provide the Network Manager with consolidated local implementation plans and regular implementation status reports,
- To ensure the timely approval of the State's 8.33 VCS temporary derogations and/or exemptions to be granted in accordance with Article 14 of the VCS Regulation, and the relevant dissemination thereof in accordance with Article 13.6 of the VCS Regulation. In addition to the obligations stemming from the Regulation, this responsibility includes notifying the Network Manager of the State's exemption plans and associated justification materials (e.g. potential network impact assessment, safety case, etc.)
- To ensure that the State performs appropriate risk assessments and risk mitigations for all 8.33 kHz related activities, and communicate them to the Network Manager via the 8.33 VCS Implementation Support Group.
- To represent the State in the 8.33VCS Implementation Support Group
- To ensure that all State's stakeholders impacted by the 8.33VCS implementation are properly and timely informed about the requirements derived from the VCS Regulation

2.4 Network Manager

As part of the Network Manager Radio Frequency Function (NM-RFF) mandate (Annex B of the IR 677/2011), the Network Manager was tasked with the coordination of scarce resources, in particular radio frequencies within the aviation frequency bands used for general air traffic (GAT).

Following the assessment of the 8.33VCS deployment status in Europe in 2015, at the end of the intermediate phase (as prescribed by the IR 1079/2012) the EC tasked the

Network manager to take an active and central role in the "coordination of the implementation of 8.33 kHz voice channel spacing capability below FL195" by:

- monitoring and steering the implementation of 8,33 kHz VCS channels on both ground and air;
- providing a central coordination and information function on the granted exemptions and derogations under the specific provisions of the Regulation;
- building and providing awareness, raising and implementing support capabilities, notably as regards the VCS IR implementation status

Consequently an 8.33 VCS Implementation Support Project was established within the NM which, in collaboration with the Member States and the Radio Frequency Function, addresses the detailed tasks supporting the timely deployment of 8.33VCS below FL195. The Network Manager reports regularly to the Network Management Board and the Single Sky Committee on the progress of this project.

3. CARRIAGE REQUIREMENTS

According to the IR 1079/2012[1] the radio equipment on board the aircraft, if operated after 01.01.2018 within the ICAO EUR region airspace in which EU Member State (MS) provide air traffic services[2], have to have 8.33VCS capability (Art. 5(4)).

The regulation does not amend the current requirements for radio carriage (i.e. number of radio stations) on board the aircraft depending on the type of aircraft and airspace of operations. Current requirements defined within the ICAO, EASA and national framework are applicable when operating an aircraft within the EU Member States airspace.

3.1 Airspace

The ICAO Doc 7030 requires all states within the ICAO EUR region to enforce the mandatory requirement for 8.33kHz equipage of aircraft operating above FL 195. If local exemptions apply to this requirement they shall be identified in the State's AIPs.

With the adoption of the IR 1079/2012 regulation EU Member states, Norway and Switzerland are required to ensure that by 31.12.2018 all frequency assignments (with the exception of the ones concerned by the exemptions) are converted to 8.33 kHz channel spacing.

Note: Forthcoming editions of the ICAO Doc 7030 (e.g. version 5) will address the mandatory requirement of 8.33kHz channel spacing compatible equipage for aircraft operating within the EU MS, including in the airspace below FL195

3.2 Aircraft Equipage

From 01/01/2018 an operator shall not operate an aircraft in the airspace where carriage of radio is required unless the aircraft radio equipment has the 8.33kHz channel spacing capability. This requirement applies also to aircraft operating above FL 195, in the EUR region, unless specific exemptions are applicable. Member States, may take local measures granting exemptions from equipage and frequency assignment conversions for cases resulting from a safety requirement or with a limited impact on the network. Frequency assignments designated to accommodate non-8.33kHz equipped state aircraft may also be exempted from conversion

The number of radio communication systems required on board and conditions applicable depending on the operations and aircraft type are described by the IR 965/2012 (for further details an extract related to radio equipage requirements is provided in Annex D)

3.3 State Aircraft

The arrangements described in the VCS Regulation include regulatory provisions related to 8.33kHz radios State aircraft equipage and measures to ensure the handling of non-equipped State aircraft by the Air Traffic Service (ATS) Providers:

- Transport-type State aircraft operating flights above FL 195 shall be equipped with radios having the 8.33 kHz channel spacing capability.

[1] Please refer to the Regulation to see the full regulatory legal text

[2] According to the Regulation 549/2004 by "Air Navigation Service Providers" is understood any public or private entity providing air navigation services for general air traffic; with the understanding that the "Air Navigation Services" consist of air traffic services; communication, navigation and surveillance services; meteorological services for air navigation; and aeronautical information services

- Where procurement constraints prevent compliance with paragraph 1, transport-type State aircraft operating flights above FL 195 shall be equipped with radios having the 8.33 kHz channel spacing capability by 31 December 2012 at the latest.
- non-transport-type State aircraft operating flights above FL 195 shall be equipped with radios having the 8.33 kHz channel spacing capability.
- When procurement constraints prevent compliance with paragraph 3, non-transport- type State aircraft operating flights above FL 195 shall be equipped with radios having the 8.33 kHz channel spacing capability by 31 December 2015 at the latest.
- New State aircraft entering into service from 1 January 2014 shall be equipped with radios having the 8.33 kHz channel spacing capability.
- from 1 January 2014, whenever the radios installed on-board the State aircraft are subject to radio upgrades, the new radios have the 8.33 kHz channel spacing capability
- All State aircraft shall be equipped with radios having the 8.33 kHz channel spacing capability by 31 December 2018 at the latest.

When operating as GAT, the lack of dual independent 8.33 kHz airborne radios, and operations with single VHF and UHF radio configurations, can be hazardous when operating in areas without UHF coverage and a VHF radio failure occurs (some countries do not have UHF coverage and alternative handling can only be ensured on VHF 25 kHz).

For State aircraft, specific VHF 8.33 kHz equipage aspects, like the required number of independent radio sets for fighters, are not yet clearly harmonised at European level. Some military stakeholders would prefer to fill-in a flight plan as “8.33 kHz compliant” and not as “Exempted State aircraft”. In the last case they may face operational restrictions dictated by safety limits. Military operators continue to raise recurrent questions on the possibility to claim compliance when a State aircraft is only equipped with one VHF 8.33 kHz radio and one independent UHF transceiver (which could serve as a “back up” where coverage exists).

3.4 Exemptions

Temporary derogations from airborne carriage obligations above FL 195 can be granted for flights operated under Visual Flight Rules (VFR) (VCS Regulation Art 14(1)) Also in case of limited impact on the network or as a result of a safety requirement aircraft may be granted exemptions from the equipage requirements (VCS Regulation Art 14(2))

State aircraft expected to be withdrawn from operations by 31/12/2025 are exempted from the requirement of equipping with 8.33kHz channel spacing capable radios. Specific exemptions apply for state aircraft which cannot be equipped in line with the provisions of the VCS regulation due to compelling technical, budgetary and/or procurement constraints.

4. FLIGHT PLANNING

This chapter covers: flight planning procedures, Flight Plan Messages (FPL) and Repetitive Flight Plans (RPL); the Integrated Initial Flight Plan Processing System (IFPS) procedures and processes, including compliance and non-compliance checks, for 8.33 kHz equipped or non-8.33 kHz equipped aircraft operating under IFR.

Chapter 4.3 below provides flight planning procedures related to VFR operated flights, however, it is noted that local requirements may differ from state to state regarding the flight planning requirements for this category of operations.

The IFPS does not process messages relating to flights operating completely under VFR conditions. However, those flights planning to operate under mixed IFR/VFR conditions within the IFPZ (Integrated Initial Flight Plan Processing System Zone) shall submit any flight plan and associated messages to the IFPS. In this case the IFPS will process only those parts of that flight operating under IFR conditions. It shall remain the responsibility of the FPL message originator to ensure distribution of the flight plan and any associated messages (e.g. change (CHG), delay (DLA) messages) for those parts of that flight operating under VFR conditions.

The IFPS does not process messages relating to flights operating under completely Operational Air Traffic (OAT) conditions. However, those operators planning flights under mixed OAT/GAT conditions within the IFPZ shall submit any flight plan and associated messages to the IFPS. In this case the IFPS will process only those parts of that flight operating under General Air Traffic (GAT) conditions. It shall remain the responsibility of the message originator to ensure distribution of the flight plan and any associated messages for those parts of that flight operating under OAT conditions.

The inclusion of all equipment and capability information in the flight plan (FPL and/or RPL) is mandatory for IFR operated flights within the ICAO EUR region.

The aircraft operator shall ensure that the information provided in the flight plan (i.e. 8.33 kHz equipage information or the presence of the exemption indicator) is consistent with the aircraft to be used and airspace with applicability of GAT 8.33 kHz requirement.

The pilot-in-command is ultimately responsible for ensuring that the radio communication equipment appropriate for the flight to be conducted is available and operational on board the aircraft

4.1 GAT Flights operated under IFR

Detailed complete description of flight planning procedures for GAT/IFR in relation with 8.33 kHz can be found in the latest version of the Integrated Initial Flight Plan Processing System (IFPS) User Manual which can be accessed through the EUROCONTROL web site. https://www.public.nm.eurocontrol.int/PUBPORTAL/gateway/spec/index.html

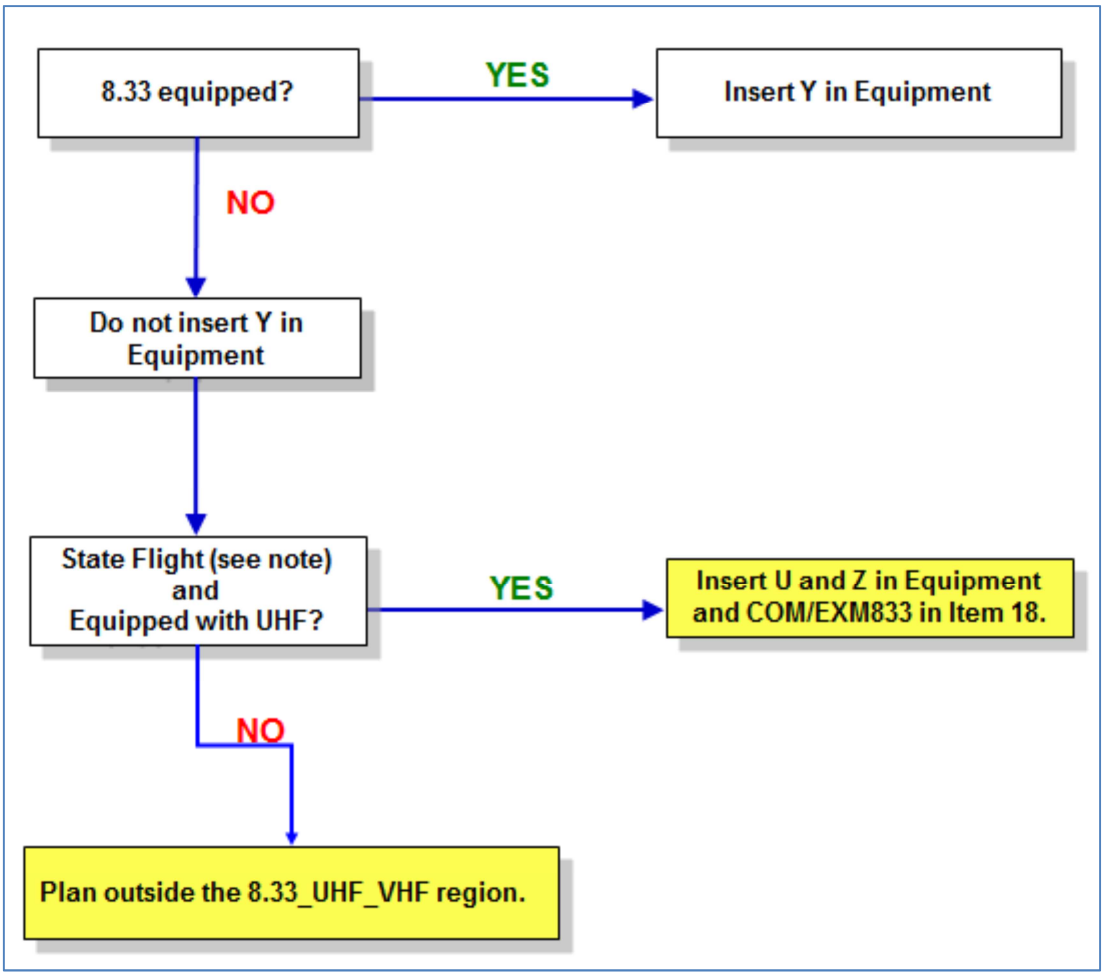
All IFR/GAT flights or parts thereof operating in 8.33 kHz airspace above FL195 within the IFPZ (Integrated Initial Flight Plan Processing System Zone) or below FL195 in the airspaces where 8.33 kHz is implemented, are required to carry the 8.33 kHz radio equipment, except where exemptions apply (as defined in the national AIP of the State concerned) and as specified by the terms of those exemptions.

Whenever an aircraft is equipped with an 8.33 kHz radio, the letter ‘Y’ shall be inserted in Item 10: Equipment, of the filed flight plan.

If the aircraft is not equipped with 8.33kHz radios but the aircraft is exempted from the carriage of the 8.33 kHz radios, the letter ‘Y’ shall not be inserted in Item 10: Equipment. In this case the following indications must be included:

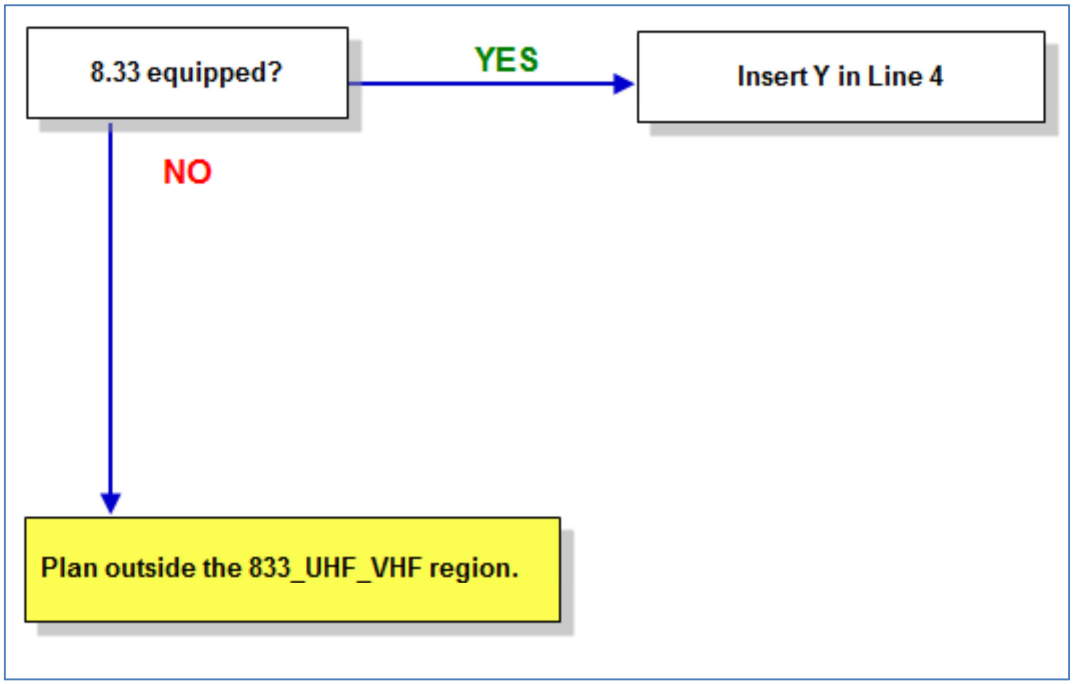
- ‘COM/EXM833’ shall be inserted in the Item 18
- ‘Z’ shall be inserted in Item 10a of the filed flight plan.

Only those State aircraft that are not equipped with 8.33 kHz capable radios, but are equipped with UHF, shall be permitted to fly in 8.33 kHz airspace where UHF coverage is provided or special procedures are implemented. To indicate such, the letters ‘U’ and ‘Z’ shall be inserted in Item 10a Equipment and ‘COM/EXM833’ shall be inserted in Item 18 of the filed flight plan.



Flight plan (FPL) 8.33 equipment indications

Note: Special flight planning indications apply for non-8.33kHz equipped State aircraft which are equipped with UHF. See the State aircraft chapter below



Repetitive Flight plan (RPL) 8.33 equipment indications

Whenever the status of the 8.33 kHz radio capability changes prior departure, the change shall be notified to the IFPS by means of a modification message (CHG) or by filing a new flight plan.

Flight plans and associated messages for all IFR flights, including the IFR portions of mixed IFR/VFR flights, entering, over flying or departing the IFPS zone (IFPZ), shall be addressed only to the two integrated initial flight plan processing system (IFPS) addresses for that portion of the flight within the IFPZ. (for further details see ICAO EUR Doc 7030/4)

4.2 GAT Flights operated as State aircraft

Whenever a State aircraft is equipped with the 8.33 kHz channel spacing radios, the letter 'Y' shall be inserted in Item 10: Equipment, of the filed flight plan.

State aircraft not equipped with 8.33 kHz capable radios but having operational UHF radio equipment on board are permitted to fly in 8.33 kHz airspace where UHF coverage is provided or special procedures are implemented (for further details regarding these situations and specific procedures and requirements consult the national AIP of the State concerned). The flight plans for such aircraft shall contain the letters 'U' and 'Z' inserted in Item 10a Equipment and 'COM/EXM833' shall inserted in Item 18

For State aircraft IFR operated flights, in addition to the current processing, IFPS shall include in the acknowledgement message (ACK) transmitted to the flight originator for such flights the following comment:

'THIS FLIGHT MAY REQUIRE SPECIAL HANDLING BY ATC DUE TO 8.33 kHz CARRIAGE REQUIREMENTS'

Where the status of the 8.33 kHz radio capability changes, such a change shall be notified to the IFPS by means of a modification message (CHG) or by filing a new flight plan

Note For ATM purposes and with reference to Article 3(b) of the Chicago Convention, only aircraft used in military, customs and police services shall qualify as State aircraft. Accordingly:

- Aircraft on a military register, or identified as such within a civil register, shall be considered to be used in military service and hence qualify as State aircraft.
- Civil registered aircraft used in military, customs and police service shall qualify as State aircraft.
- Civil registered aircraft used by a State for other than military, customs and police service shall not qualify as State aircraft.

4.3 Flights operated under VFR

Requirements for submitting flight plans for flights operated exclusively under VFR are not harmonised at the European level. For the specific national flight planning requirements please consult the States Aeronautical Information Publications (AIP) especially en-route part (ENR 1.1.1):

Operators should comply with: the instructions for completion of the flight plan form and the repetitive flight plan listing form given in Appendix 2 of ICAO Doc 4444; and any constraints identified in relevant AIPs.

Generally a flight plan for a flight operated exclusively under VFR must be filled in (usually at least 1 hour in advance) for:

- Any flight that will cross a state boundary
- Any flight intended to be operated in airspaces classes C through F wishing to participate in an Air Traffic Control, Traffic Information or Air Traffic Advisory Service.

It is generally advisable to file a flight plan for operating exclusively under VFR if the flight involves flying:

- Over the sea,
- Over sparsely populated areas where search and rescue operations would be difficult
- Into an area in where search and rescue operations are in progress

Across Europe, the rules for VFR flight plan addressing are often complicated and vary from country to country, by destination and departure locations. Most of the states are recommending that the flight plan is filled in and submitted electronically. The requirements for addressing flight plan messages can be found in each national AIP under ENR 1.11. (the AIPs for all countries crossed by the flight are to be referred to in this case)

There are three options available to indicate the status of the radio communication, in the FPL (for the complete definition of the FPL equipment indications see ICAO Doc 4444 Appendix 2):

- The letter ‘N’ to indicate that no radio communication, is carried or the equipment is unserviceable or
- The letter ‘S’ to indicate that the standard radio communication is carried and serviceable.
- If the letter ‘S’ is used, standard equipment is considered to be VHF (25kHz channel spacing) unless it is followed or replaced by the letter ‘Y’ (8.33kHz channel spacing capability).

4.4 Flight Planning Procedures

It is required that an operator does not plan a flight in an area in which 8.33kHz channel

spacing equipment is required if the aircraft is not properly equipped unless the flight is subject to an exemption.

4.5 IFPS Procedures

Where a flight is not compliant with 8.33 kHz requirements, the FPL message will fail automatic processing and be passed for manual processing by the IFPS staff.

For IFR flights, exceptionally and subject to the IFPS duty supervisor's discretion, it may be necessary to re-route a flight for reasons of 8.33 kHz-compliance. Special procedures apply in this case in determining the proposed route avoiding the area in which 8.33kHz channel spacing radio equipment is required.

4.5.1 System Processing

Two 8.33 kHz regions are defined in the NM Central Airspace and Capacity Data (CACD) which the IFPS uses to perform the 8.33 kHz flight plan checks. The regions for the 8.33 kHz checking mechanism are:

8.33 Region Indicator	Description
833_EUR_IFPS	Composed of all those airspaces inside the IFPZ within which 8.33 kHz equipped flights, State flights with UHF and non-equipped exempted flights are allowed.
833_VHF_UHF	Composed of all those airspaces inside the IFPZ within which only 8.33 kHz equipped flights and State flights with UHF are allowed.

When processing a received IFR flight plan, the IFPS is performing a crosscheck between the concerned airspaces crossed by the flight profile and the radio communication equipment indicated in:

- Item 10: Equipment and/or
- Item 8: Type of Flight and/or
- Item 18: other information, provided in the submitted message.

A set of Operational Reply Messages (ORMs) – ACK (acknowledge), MAN (manual handling), REJ (rejection), are used by the IFPS to indicate to the message originator the status of the processing of a submitted message.

The following cases are applicable:

- If Item 10: Equipment of the submitted message contains 'Y', then that flight is considered to be compliant.
- If Item 10: Equipment of the submitted message does not contain 'Y', but contains 'Z' and 'U' and the exemption indicator 'COM/EXM833' is present in Item 18: Other Information, and the flight is a STATE flight, then that flight shall be considered compliant.
- If Item 10: Equipment of the submitted message does not contain 'Y' but contains the exemption indicator 'COM/EXM833' and the flight is not penetrating the 833_UHF_VHF region, then that flight shall be considered compliant.
- In all the other cases, the flight shall be considered not compliant and shall fail automatic processing.

When a flight is deemed to be non-compliant by the IFPS, the following is applied in order of priority:

- Whenever the flight is indicated as a 'STS/SAR' or 'STS/HOSP' flight then it is accepted and the following comment is added in the operational reply message from IFPS: 'FLIGHT PLAN IS NOT COMPLIANT WITH 8.33KHZ RADIO EQUIPMENTS; EXPECT SIGNIFICANT OPERATIONAL PENALTY'.
- In case the flight plan is sent for manual processing by the IFPS staff and the 8.33kHz error is manually ignored then the following comment is added in the operational reply message from IFPS: 'THIS FLIGHT DOES NOT COMPLY WITH 8.33 RADIO EQUIPMENT'.

Special handling procedures are applicable for handling change messages to a current flight plan.

From NM System Release 20.5 onwards a third 8.33 region will be defined within the NM Central Airspace and Capacity Data (CACD) which the IFPS uses to perform the 8.33 kHz flight plan checks.

8.33 Region Indicator	Description
833_Warning	Composed of all those airspaces inside the IFPZ for which 8.33kHz radio carriage is not required, but which will gradually be added to the 833_EUR_IFPS or 833_VHF_UHF. Non-equipped flights are allowed, but a comment will be sent with the ACK message warning of the equipage requirement

Any non-8.33 equipped IFR flight, crossing the 833_Warning area and deemed compliant by the IFPS cross check will receive a comment in the ACK message indicating the imminent equipage requirements. (see 4.5.4 below)

4.5.2 ANSPs related procedures

As part of the Central Airspace and Capacity Data (CACD) provision mechanism States or ANSPs responsible have to take all the measures necessary to provide the required environment information to the NM regarding the new parts of airspace requiring 8.33kHz equipage due to conversion of the communication assignments.

The coordination with the ANSPs is done via the National ENV Coordinator and/or the local ENV Coordinator(s) and/or the RAD coordinator(s).

It is recommended that each state takes the necessary action to implement at the level of the concerned ANSPs (including aero clubs managing aerodromes) a system of equipment checking for all the VFR flight plans received. It is essential, especially in the area in which 8.33kHz compliant radio equipage is required, that the lack of appropriate equipment is detected early and procedures are put in place to mitigate for radio communication problems

4.5.3 Special status flights

The sub-field status STS may be used in a flight plan or associated message by those aircraft operators requiring special handling by ATS for that flight. Only the following STS are accepted by IFPS for IFR GAT flight plans:

- 'STS/ALTRV' - for a flight operated in accordance with an altitude reservation.
- 'STS/ATFMX' - for a flight approved for exemption from ATFM slot allocation.
- 'STS/FFR' - for a Fire-fighting flight.
- 'STS/FLTCK' - for a Flight check for calibration of NAVAIDs.

- 'STS/HAZMAT' - for a flight carrying hazardous material.
- 'STS/HEAD' - for a flight with HEAD of STATE status.
- 'STS/HOSP' - for a medical flight declared by medical authorities.
- 'STS/HUM' - for a flight operating on a humanitarian mission.
- 'STS/MARSA' - for a flight for which a military entity assumes responsibility for separation of military aircraft.
- 'STS/MEDEVAC' - for a life critical medical emergency evacuation.
- 'STS/NONRVSM' - for a non-RVSM capable flight intending to operate in RVSM airspace.
- 'STS/SAR' - for a flight engaged in a search and rescue mission.
- 'STS/STATE' - for a flight engaged in military, customs or police services.

Other reasons for special handling by ATS shall be denoted under the designator RMK/.

Medical flights specifically declared by the medical authorities and aircraft engaged in search and rescue missions, are not automatically exempted from the 8.33 kHz mandatory carriage requirements. However, these special flights, if operated as IFR GAT, will not be rejected by the IFPS whenever 'STS/HOSP' or 'STS/SAR' are identified by the IFPS system in the filed flight plan.

Note that the above special status flights are not automatically exempted from the 8.33kHz channel spacing radio equipment carriage requirements. Specific conditions apply for handling an 8.33kHz exempted aircraft (please refer to the States AIP for specific procedures)

4.5.4 8.33kHz non-equipped warning message

To improve the awareness of the airspace users regarding the 8.33kHz channel spacing radio equipment requirements from December 2016 a warning comment will be added to the ACK message in response to a valid compliant flight plan. The IFPS system will identify the FIRs crossed by the flight profile and a comment will be sent to all flight plan originators for flights not having the letter 'Y' inserted in the item 10 of the flight plan. Subject to further development, the comment will have the following structure:

'MANDATORY 8.33KHZ RADIO EQUIPMENT REQUIRED FROM 01/01/2018. *[FIR list]* FIR MAY REQUIRE 8.33KHZ RADIO CARRIAGE BEFORE THIS DATE. CHECK AIP/AIC.'

4.6 Special situations

Some States within the area of mandatory carriage have not implemented 8.33 kHz channel-spacing operations in their airspace and area of responsibility (even in the airspace above FL195).

4.7 Exempted aircraft

TBD

Note: this chapter will be developed further following up on States exemption policies and requests for implementation of specific handling of exempted flight plans in the IFPS

5. OPERATIONAL PROCEDURES

5.1 General

The arrangements described in the IR 923/2012 European Rules of the Air (SERA) document include provisions related to the requirements for communications. According to these requirements (SERA 5052) an IFR flight operating outside controlled airspace but within or into areas, or along routes, designated by the competent authority shall maintain an air-ground voice communication watch on the appropriate communication channel and establish two-way communication, as necessary, with the air traffic services unit providing flight information service.

An IFR flight operating outside controlled airspace and required by the competent authority to maintain an air-ground voice communication watch on the appropriate communication channel and establish two-way communication, as necessary, with the air traffic services unit providing flight information service, shall report position, as specified in SERA.8025 for controlled flights.

Generally the communication provisions within a controlled airspace are as such (SERA.8035 Communications)

(a) An aircraft operated as a controlled flight shall maintain continuous air-ground voice communication watch on the appropriate communication channel of, and establish two-way communication as necessary with, the appropriate air traffic control unit, except as may be prescribed by the relevant ANSP in respect of aircraft forming part of aerodrome traffic at a controlled aerodrome.

(b) (1) The requirement for an aircraft to maintain an air-ground voice communication watch shall remain in effect when CPDLC has been established

In case of communication failures, the Member States shall comply with the appropriate provisions that have been adopted under the Chicago Convention.

Note: It is expected that at the European level, the Commission will propose common European procedures by the end of 2017 at latest, for implementation in Union law.

Whenever a flight is operated within a Radio Mandatory Zone (RMZ) (SERA 6005)

(1) VFR flights operating in parts of Classes E, F or G airspace and IFR flights operating in parts of Classes F or G airspace designated as a radio mandatory zone (RMZ) by the competent authority shall maintain continuous air-ground voice communication watch and establish two-way communication, as necessary, on the appropriate communication channel, unless in compliance with alternative provisions prescribed for that particular airspace by the ANSP.

(2) Before entering a radio mandatory zone, an initial call containing the designation of the station being called, call sign, type of aircraft, position, level, the intentions of the flight and other information as prescribed by the competent authority, shall be made by pilots on the appropriate communication channel

Also according to the ICAO EUR Doc 7030, an aircraft flying within uncontrolled airspace may be requested to maintain a continuous watch on the appropriate air-ground frequency of the ATS unit serving the flight information region within which the aircraft is flying.

5.2 Communication procedures

The radiotelephony communication procedures are established in accordance with ICAO Annex 10, Volume II, Chapter 5. It is essential, in the context of 8.33kHz VCS deployment that all Flight crews (including GA pilots), ATS personnel and other ground personnel are thoroughly familiar with the appropriate radiotelephony procedures.

The introduction of 8.33 kHz channel spacing has resulted in a 6-digit channel numbering scheme, where the 8.33 kHz channel designators differ from the actual frequency; e.g. 8.33 kHz channel 132.035 tunes the frequency 132.0333 MHz.

The ICAO Annex 10 VII prescribes the procedure for a 6-digit pronunciation of both 8.33 kHz and 25 kHz channels in VHF radio telephony communications, except in the case of both the fifth and sixth digits being zeros, in which case only the first four digits should be used. The following examples illustrate the application of this procedure:

Channel (8.33 kHz/25 kHz)	**Transmitted as**
118.000 (25 kHz)	ONE ONE EIGHT DECIMAL ZERO
118.005 (8.33 kHz)	ONE ONE EIGHT DECIMAL ZERO ZERO FIVE
118.010 (8.33 kHz)	ONE ONE EIGHT DECIMAL ZERO ONE ZERO
118.025 (25 kHz)	ONE ONE EIGHT DECIMAL ZERO TWO FIVE
118.100 (25 kHz)	ONE ONE EIGHT DECIMAL ONE

Note: the initial proposed use of the term "CHANNEL" in conjunction with 8.33 kHz channels has been discontinued.

However, caution must be exercised with respect to the indication of transmitting channels in VHF radiotelephony communications when all six digits of the numerical designator are used in airspace where communication channels are separated by 25 kHz, because on aircraft installations with a channel separation capability of 25 kHz or more, it is only possible to select the first five digits of the numerical designator on the radio management panel. Additional training may be required for pilots to cover for the use of the radio equipment in such situations.

ATS should maintain in addition to the VHF 2-way radio communications, a continuous watch on the appropriate VHF emergency channels and if available UHF, in order to ensure that air traffic controllers are informed about distress transmissions in the area of responsibility

5.2.1 Phraseology

The following phraseology is to be used in the context of 8.33kHz channel spacing

Circumstance	Phraseology
To request confirmation of 8.33 kHz capability	CONFIRM EIGHT POINT THREE THREE
To indicate 8.33 kHz capability	* AFFIRM EIGHT POINT THREE THREE

To indicate lack of 8.33 kHz capability	* NEGATIVE EIGHT POINT THREE THREE
To request UHF capability	CONFIRM UHF
To indicate UHF capability	* AFFIRM UHF
To indicate lack of UHF capability	* NEGATIVE UHF
To request status in respect of 8.33 kHz exemption	CONFIRM EIGHT POINT THREE THREE EXEMPTED
To indicate 8.33 kHz exempted status	*AFFIRM EIGHT POINT THREE THREE EXEMPTED
To indicate 8.33 kHz non-exempted status	* NEGATIVE EIGHT POINT THREE THREE EXEMPTED
To indicate that a certain clearance is given because otherwise a non-8.33 equipped and/or non-exempted aircraft would enter the airspace of mandatory carriage	DUE EIGHT POINT THREE THREE REQUIREMENT

* Denotes pilot transmission.

5.3 Special situations

To be able to mitigate against the risk of a non-8.33 kHz compliant aircraft, air traffic controllers must know the 8.33 kHz equipage status of aircraft under their control. In the event that an aircraft is not 8.33 kHz compliant, this will usually be indicated on the flight progress strip and/or the radar track label Should the ATC be uncertain about the 8.33 kHz equipage status of any aircraft or the UHF status of a State aircraft, confirmation regarding the status of the equipage must be received before handling the aircraft over to a sector in which 8.33kHz channel spacing communication only is possible.

5.3.1 Non 8.33 equipped State Aircraft handling

Air traffic service providers shall ensure that the remaining non-8.33 kHz equipped State aircraft can be accommodated, provided that they can be safely handled within the capacity limits of the ATM system on UHF or 25 kHz VHF assignments (VCS Regulation Art.9(12)).

States are required (VCS Regulation Art 9(13)) to publish in their National AIP and Mil AIP, special procedures put in place for the handling of the remaining non-8.33 kHz equipped State aircraft

ATS personnel are expected to ascertain on first contact the communications capabilities of State aircraft planned to operate in the airspace in which 8.33kHz channel spaced communications are applicable.

The 225-400 MHz band (“NATO UHF Band”) is mainly used by military Air Defence to control aircraft flying within segregated airspace and when performing military air operations (e.g. air policing, air interception) and by military ATC to control military traffic.

In each NATO Member State, the management of this UHF band is delegated by spectrum regulators to military frequency management agencies designated National Allied Radio Frequency Agencies (NARFA). NATO Member States have delegated the coordination/management activities for this portion of the frequency spectrum to the NATO Committee that deals with frequency management matters.

The NATO Spectrum and C3 Infrastructure Branch (SC3IB), at NATO Headquarters,

responds to frequency requests and coordinates the air-ground and air-air frequency assignments to civil and military ANSPs. This branch supports the abovementioned Committee during the periodic reorganisations of the UHF band leading to a more efficient utilisation. This is a prerequisite to be able to meet the UHF usage demand since the band is already relatively congested.

5.3.2 Non 8.33 equipped VFR flights

VFR flights operated in a Radio Mandatory Zone (RMZ) are not exempted from the 8.33kHz mandatory carriage requirements. Specific exemptions may be applicable in certain states; these exemptions and the conditions of application and handling procedures by air traffic services should be clearly indicated in the State AIP

However, situations may occur in which, due to unintentional deviation, weather constraints, etc. an aircraft operated in an uncontrolled airspace (and outside of a RMZ), being equipped with 25kHz radio enters a controlled airspace in which the communications are performed in 8.33kHz spaced channels.

In case of an unintentional deviation, depending on the environment constraints (e.g. controlled traffic density, type of airspace, etc.) the air traffic controller should attempt to enter in radio contact with the aircraft. These may imply attempts to contact the aircraft on a known control frequency (e.g. previous sector, etc.) or the emergency frequency (121.5MHz). In case of no response to the ATC calls, current existing procedures for loss of communications should be applicable..

In the case of intentional deviation (e.g. due to weather), the pilot, while not equipped with an 8.33kHz capable radio, depending on the environmental constraints shall attempt to contact air traffic services by applying local procedures specified in the State AIP. If an emergency is the reason for the deviation, the EMG frequency (121.5MHz) shall be used to communicate with ATS. Subject to a local safety case, provisions may be put in place allowing the availability of a “back-up” frequency assignment in 25kHz spacing for GA accommodation in case of unplanned intentional deviation inside controlled airspace. Procedures for the use of this frequency must be clearly indicated and published in the State AIP.

In any circumstances, pilots should not attempt to dial on a 25kHz radio an 8.33kHz channel (trying to match the channel number with a frequency) as there is a high likelihood that such transmissions will potentially block or interfere with 8.33kHz channels spaced communications.

5.3.3 Non 8.33 equipped Medical and SAR flights

Medical flights specifically declared by the medical authorities, and aircraft engaged in search and rescue missions, are not exempt from the 8.33 kHz mandatory carriage requirement.

Special procedures for handling the flight plans of Medical and SAR flights, intended to be operated under IFR, have been implemented to ensure that the processing is not delayed unnecessarily.

Note: It is likely that a certain number of HOSP/SAR flights may also be State aircraft being equipped with UHF communication facilities. In this case, the flight may qualify for the exemption applicable to State aircraft, where UHF is available, and operators may insert ‘STS/EXM833’ in Field 18, ‘U’ in Field 10 and ‘M’ in Field 8. The aircraft will then be handled as UHF equipped State aircraft.

The communication capability of HOSP or SAR flights which have failed to indicate them, and which are planned to operate in airspace where the carriage and operation of 8.33

kHz radios is mandatory, must be verified by ATC as soon as possible. At the latest, ATC in the 25 kHz sector immediately before an 8.33 kHz sector should verify, on first contact, the 8.33 kHz status of such aircraft.

If the requirement is such that the aircraft cannot be handled either on an active 25kHz frequency or on UHF, States, should put in place procedures for the use of the SAR frequency (123.1MHz). These procedures should be clearly indicated in the State AIP

5.4 Contingency procedures

The complete in flight contingency procedures are described in the SERA document (SERA11010). The procedures applicable in case of an unidentified aircraft operating within a controlled airspace (i.e. this situation is typical to airspace infringement) are prescribed as follows:

- As soon as an air traffic services unit becomes aware of an unidentified aircraft in its area, it shall endeavour to establish the identity of the aircraft whenever this is necessary for the provision of air traffic services or required by the appropriate military authorities in accordance with locally agreed procedures. To this end, the air traffic services unit shall take such of the following steps as are appropriate in the circumstances:
    - attempt to establish two-way communication with the aircraft;
    - inquire of other air traffic services units within the flight information region about the flight and request their assistance in establishing two-way communication with the aircraft;
    - inquire of air traffic services units serving the adjacent flight information regions about the flight and request their assistance in establishing two-way communication with the aircraft;
    - attempt to obtain information from other aircraft in the area;
    - the air traffic services unit shall, as necessary, inform the appropriate military unit as soon as the identity of the aircraft has been established.
- In the case of a strayed or unidentified aircraft, the possibility of the aircraft being subject of unlawful interference shall be taken into account. Should the air traffic services unit consider that a strayed or unidentified aircraft may be the subject of unlawful interference, the appropriate authority designated by the State shall immediately be informed, in accordance with locally agreed procedures

5.5 Coordination procedures

The pilot is ultimately responsible for ensuring that the radio communication equipment is appropriate to the flight to be conducted (this includes also the airspace requirements compatibility) is fitted and operational on board the aircraft.

Specific procedures must be put in place for the areas in which air traffic services are provided for non-8.33kHz channel spaced capable equipped aircraft immediately adjacent to areas in which mandatory carriage of 8.33 radio is required. These procedures will have to cover the cases of exempted flight coordination between the two areas as well as for the cases of unintentional or intentional airspace penetration of non-equipped flights.

It is essential that all information concerning the radio equipment, and status of flight in case the aircraft is not equipped with 8.33kHz capable capability is known to the air traffic services handling the flight.

5.5.1 ATC procedures

Specific handling procedures of non-8.33 equipped flights for coordination between air traffic services areas shall be developed and published in the Letters of Agreement (LoA) established between the air traffic services concerned. These will have to cover coordination and transfer of flights, special procedures for coordination and VFR traffic handling. (chapters D3, D5, and Annex G of the current LoA EUROCONTROL common template)
The following general procedures are provided as a non-exhaustive guidance to air traffic service providers. They will have to be adapted and completed with local procedures dependent on the local environment, traffic characteristics and equipment specific requirements.

A non-equipped aircraft must operate in accordance with the specific conditions for exemption applicable within the next area and if it does not, an alternative clearance must be co-ordinated

When preparing to transfer a non-equipped flight into an area in which 8.33kHz equipage exemptions are applicable, the transferring unit (ATC sector, FIS, etc.) must be sure of the aircraft's radio capability or compliance with the conditions for exemption. The coordination procedure will have to include all the elements necessary for the accepting unit to be able to accept the coordination and the transfer of the flight.

If the next area does not have put in place exemptions from the carriage of 8.33kHz radio on board the aircraft (i.e. no exemptions are applicable except for UHF equipped State aircraft), the transferring unit must be sure of the aircraft's 8.33 kHz or UHF radio capability before transfer of control and if it is not appropriate, an alternative clearance must be coordinated.

A non-equipped aircraft shall only be accepted for transfer (following a coordination) if its status is compliant with any exemptions in place in the accepting unit or, if the fight is a UHF equipped aircraft and UHF communications are provided in the area of responsibility.

5.5.2 ATC system enabled coordination

It is essential that information regarding 8.33kHz status of relevant aircraft is available for display to the air traffic services personnel. This information is normally available from the flight plan or following a coordination process with an adjacent unit.

Normally, for an IFR flight, if the departure aerodrome is outside the IFPS Zone and the information regarding the appropriate radio equipment for the planned route is missing in the flight plan, a warning will be added to the flight plan Message distributed by the IFPS. This warning indicates that the aircraft is not 8.33 equipped, and that special care must be taken.

It is essential, however, that the information that an aircraft is not 8.33 equipped (whether or not this information is distributed by IFPS, or via other means of FPL distribution for VFR operated flights), is displayed to the air traffic services personnel in charge of handling the aircraft, within the area of responsibility. This means that, as a minimum, Item 10 of the flight plan must be processed (either automatically by the ATS system or manually by the flight data personnel). If possible, the RMK field in Item 18 of the flight plan 18 should also be processed for the eventual indication of the status of the aircraft (e.g. State aircraft equipped with UHF need to be identifiable)

In case of system support for the flight plan processing and coordination of flights, with respect to the 8.33kHz radio capability, the following operational requirements must be taken into account:

- ATS systems should indicate the relevant 8.33 kHz equipage status of an aircraft

(it is preferable that in an area in which 8.33khz radio equipage is required, the exempted status is provided to the ATS personnel).

Note that this can be achieved through the flight progress strip or through the radar track/label. There is no requirement to indicate it on both.

- For non-8.33 kHz equipped State aircraft, ATS systems should indicate whether or not the aircraft is UHF equipped.
- The possibility to change the 8.33 kHz equipage status should be provided to controllers.(This capability covers the eventual flight plan errors).
- System notification and co-ordination data should include the current 8.33 kHz equipage status of an aircraft, and, for not equipped State Aircraft, indicate whether or not the aircraft is UHF equipped

The Eurocontrol On-line Data Interchange (OLDI) Specifications (as means of compliance to the Coordination and Transfer (COTR) Implementing Regulation) include requirements for indication of 8.33kHz and UHF equipment (as specified in item 10 of the flight plan) as well as the current capability and status of the equipment (equipped and available/ not equipped or not available/ unknown).

The capability and status field may be updated by ATS personnel if the information in the flight plan is found to be incorrect, and the ATS personnel is required to inform the adjacent Air Traffic Service Unit.

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6. FREQUENCY MANAGEMENT

6.1 General

The frequency band 117.975 - 137 MHz is allocated solely for aeronautical radio communication. ICAO EUR Doc 011, sets out planning rules that are designed to ensure that each system element is adequately protected from interference from other compliant aeronautical radio services. These rules are based on the assumption that all systems and equipment are compliant with current standards.

The ICAO Frequency Management Group (FMG) of the EANPG maintains the European planning rules contained in ICAO Doc 011. Eurocontrol, under the Radio Frequency Function (RFF) of the Network Manager, coordinates activities to ensure that those planning rules are efficiently applied and provides automated systems to improve the overall effectiveness of the process.

The Radio Frequency Function (RFF) of the Network Manager was created following the adoption of the European Commission Regulation (EU) 677/2011 laying down detailed rules for the implementation of ATM network functions. This function, conducted together with ICAO and the States, has as main objective of addressing the network impact of aviation frequencies shortage. One of the first priorities is to address the VHF congestion and maximise the benefit of the 8.33 kHz expansion

For the VHF communications band 117.975 - 137 MHz special procedures are applied due to the congestion problems in this band. Block Planning Exercises are organised, as required, based on the mutual arrangements agreed between the States involved. These exercises are organized for those requirements for which an available channel can only be identified through shifting of one or more existing assignments to some other channel. The normal ad-hoc procedure can be used if no shifts are involved. Co-ordination must be made with all States that in some way may be affected by the proposed assignment. This should take into account the possibilities that an assignment already exists in another State which is not shown in the available aeronautical frequency assignment tables. Additionally some States may have an interest in being informed about changes, although not directly affecting them, in order to update national databases or for other purposes.

The RFF provides frequency management support to States in the following areas:

- managing the block planning process to find effective frequency shifts to satisfy frequency requirements;
- assisting States in finding appropriate frequencies and maximising the use of the available spectrum;
- assisting States in finding suitable frequencies in cases of urgency (e.g. interferences);
- providing training and support for the frequency management software systems.

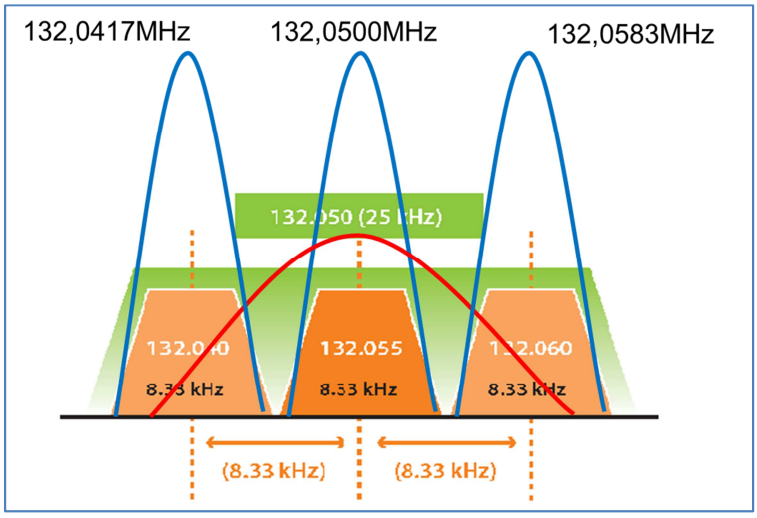
European States have nominated a National Frequency Manager, in accordance with the requirements set by the IR 677/2011. The NFMs are expected to apply the best practices set up within the RFF Best Practices document in order to ensure that the appropriate authorities (civil or military):

- Conduct an assessment for all new frequency requests to ensure they are warranted and feasible;
- Conduct assessments of existing frequency assignments to ensure they are being correctly and efficiently used;
- Properly define and promulgate the conditions of use (including the DOC and any other applicable constraint) associated with the frequency assignments.

For further details regarding the coordination and assignment of specific air traffic services frequency assignments please consult the Radio Frequency Function Group (RAFT) Manual

6.2 Frequency Conversions

The introduction of 8.33 kHz channel spacing involves the conversion of existing 25 kHz channels to 8.33 kHz channels. An 8.33 kHz channel has a reduced bandwidth compared to its 25 kHz counterpart. This allows for the creation of two adjacent 8.33 kHz channels on the so-called “shoulder” frequencies



It is recommended that individual 25 to 8.33 kHz conversions are initially operated for a trial period of a suitable duration (dependent on the operational use of the assignment). This will allow any potential problems, such as interference on non-8.33 kHz equipped aircraft, to be identified. When applying this recommendations States have to be aware of the deadline for converting all remaining 25kHz assignments into 8.33kHz channels which is (as set up by the VCS Regulation) 31.12.2018

Coordination of the conversions can then be started in the SAFIRE System (i.e. the electronic ICAO COM-2 table) before the start of the trial period as an assignment modification .This coordination can be concluded at the end of the trial period as it is only at this stage that new 8.33 kHz channels can be co-ordinated on the freed shoulder frequencies. (i.e. the status of the assignment becomes operational/assigned).

6.3 Network Impact assessment

One of the main tasks of the RFF, related to 8.33VCS implementation is to evaluate the potential network impact assessment of future requirements for frequency assignments. In order for this task to be performed, in the context of the 8.33kHz channel spacing deployment a forecast of future demands for frequency assignments is needed. The forecast data is based on the following information:

- Analysis of past frequency demand evolution, based on the “Frequency Requirement Forecast” documentation (2008)
- Known planned developments of the ATM infrastructure (new ATC sectors, ATC services, airports, etc.), based on the Network Operations Plan document (2015)
- Validation and extrapolation of demand trends based on the current situation

Note: the data forecast proposed below takes into account the availability of the information at the level of the Network Manager. Ideally the States 8.33National Coordinators in coordination with the air traffic service providers should made available, information regarding plans of development which would imply a demand for additional frequency assignments.

The forecast data is provided in reference to the states in Area I (Austria, France, Germany, Luxembourg, Netherlands, United Kingdom, Belgium, MUAC, Switzerland) and Area II (Hungary, Ireland, Italy, Croatia, Czech Republic, Denmark, Greece, Poland , Portugal, Slovakia, Slovenia, Spain, Sweden, Norway, Albania, Bosnia and Herzegovina, Serbia, Macedonia) of the EUR region

The network impact assessment performed in the context of 8.33kHz deployment will assess the available number of frequency assignments in the future and the potential issues related to exemptions from frequency conversions.

6.3.1 ACC Frequency assignments forecast

The VHF frequency assignments classified as ACCs are for most of them used in Area Control Centre to cover en-route ATC sectors. However some of these assignments are used also for:

- Backup frequencies
- Military frequencies
- Approaches (APP) and Flight Information Services (FIS)

Past studies provided the conclusion that if a comparison is made for the demand covered between 2008 and 2012 a linear model can be considered as the best assumption for ACC frequency requirements.

An analysis of the past data based on the Network Strategic tool (NEST) Historical data regarding the number of elementary sectors and maximum number of operational sectors in a possible configuration, between 2012 and 2015 (2 AIRAC cycles/year) has been performed.

For the frequency demand forecast consolidation, between 2015 and 2019, information regarding the maximum number of sectors in a configuration was derived from the Network Operations Plan (NOP) Service Provider's reported information.

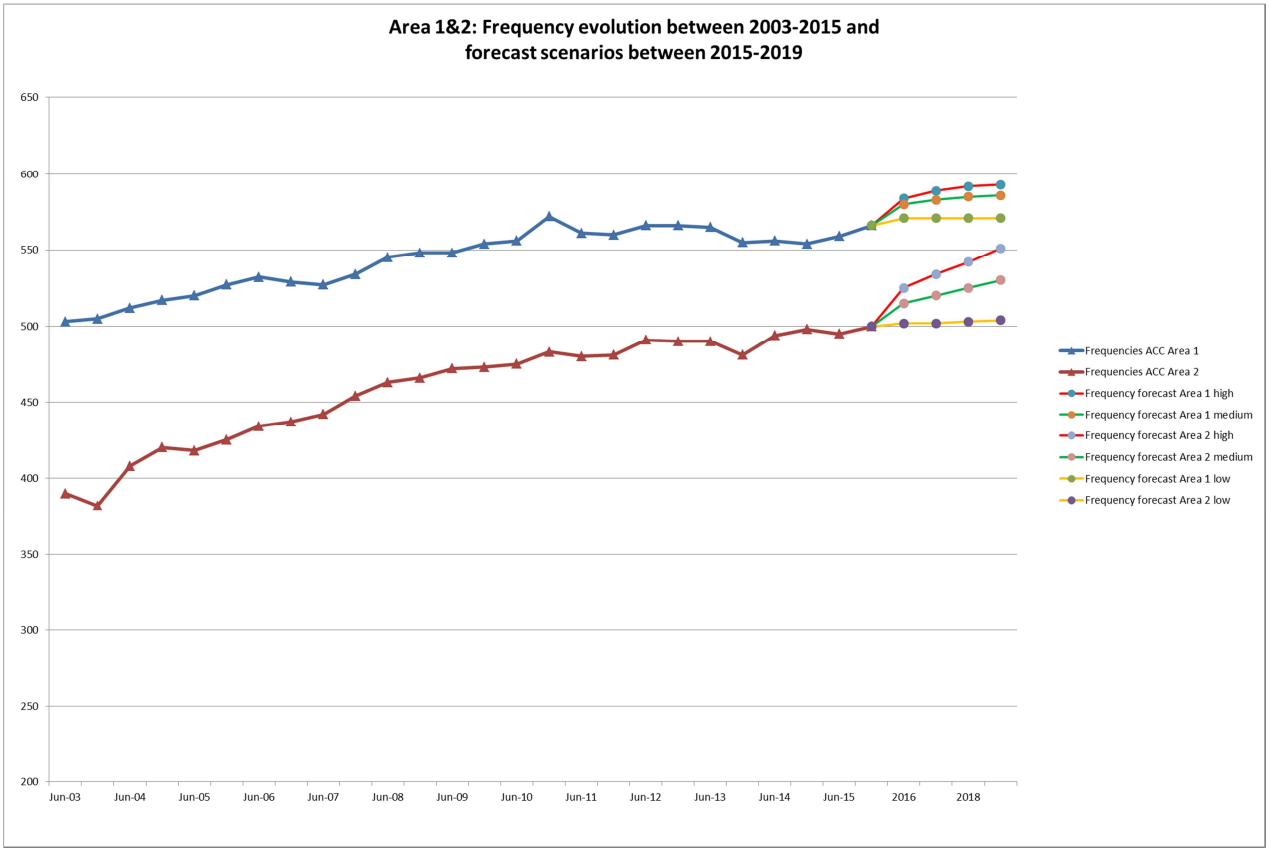
Three scenarios were developed (high, medium and low) depending on different strategies for allocating assignments to the new planned sectors. Based on expert judgement, the resulting scenarios were adjusted by applying a de-multiplication factor (High – 67% Medium – 75% Low – 50%) taking into account the possibility of frequency allocation already in place or re-use of current assignation.

The following values were derived:

Additional Frequency demand trend - baseline 2015	2016	2017	2018	2019
Area 1 high	18	23	26	27
Area 1 medium	14	17	19	20
Area 2 high	25	34	42	51
Area 2 medium	15	20	25	30

Note: the values above are cumulative. E.g. in Area1 in the high scenario in 2016 a number of 18 additional frequencies are required compared with 2015, in 2017 23

additional frequencies are required compared with 2015, in 2018 26 additional frequencies are required compared with 2015, etc.



The following conclusions can be drawn:

- The growth of the number of frequencies and the number of sectors can be considered linear for more than a decade.
- Based on the NOP forecast the demand may be bigger in 2016 compared with the following years,
- The analysis shows that, the linear growth of ACC frequencies and ACC sectors have almost the same slope in each analysis area.
- the linear growth of ACC frequency assignments cannot continue forever (due to the limited operational dimensions of an ACC sector);
- In average, the forecast demand will consider, as the most realistic scenario, that 5 new ACC frequencies are required every year in Area 1 and 10 new frequencies are required per year in Area 2

6.3.2 Airport/Aerodromes Services (Tower/ AFIS and approaches)

Tower, AFIS and APP frequency requirements depend on airports and aerodromes development. The data analysed in 2008 provided the following results when estimating the growth of frequency demand in for these services:

Area	TWR	AFIS	APP
	Average additional assignments/year	Average additional assignments/year	Average additional assignments/year

Area I	1.6	2.5	0
Area 2	5	2.8	4.5

In 2013 an analysis of the existing assignments at that date was undertaken. The result of this activity was an optimization of the frequency usage and a reduction of the number of assignments for several services.

The TWR assignments evolution is as follows, taking into account the

Area	TWR assignments in 2008	TWR assignment reduction in 2013	TWR new assignments estimated for 2016 based on the average growth	TWR assignments in 2016
Area 1	480	-6	13	493
Area 2	485	-22	40	464

Comparing the values above, assuming a linear growth of the demand, it can be concluded that for the TWR forecast assignments the following adjusted figures can be considered:

- 2 assignments/year in average for Area 1
- 0 assignments/year (flat evolution) for Area 2

The AFIS assignments evolution is as follows

Area	AFIS assignments in 2008	AFIS assignment reduction in 2013	AFIS new assignments estimated for 2016 based on the average growth	AFIS assignments in 2016 (excluding duplications)
Area 1	460	0	20	488
Area 2	115	0	22	138

Comparing the values above, assuming a linear growth of the demand, it can be concluded that for the AFIS forecast assignments the initial estimated figures can be maintained:

- 2.5 assignments/year in average for Area 1
- 2.8 assignments/year in average for Area 2

The APP assignments evolution is as follows

Area	APP assignments in 2008	APP assignments	APP new assignments	APP assignments in 2016

		reduction in 2013	estimated for 2016 based on the average growth	
Area 1	470	0	0	481
Area 2	530	-22	36	541

It has to be noted that some of the APP assignments may be "marked" as ACC in the SAFIRE database.

Comparing the values above, assuming a linear growth of the demand, it can be concluded that for the APP forecast assignments the figures can be estimated:

- 1.4 assignments/year in average for Area 1 (adjusted figure)
- 4.5 assignments/year in average for Area 2 (initial estimated value)

6.3.3 Automatic Terminal Information Services (ATIS)

These assignments are used to permanently broadcast information relative to an airport and therefore most of them are centred on airports. Since ground transmissions only are generated by broadcast services, they have specific frequency reuse criteria.

The data analysed in 2008 provided the following results when estimating the growth of frequency demand in for these services:

Area	ATIS
	Average additional assignments/year
Area I	5.1
Area 2	6

The ATIS assignments evolution is as follows

Area	ATIS assignments in 2008	ATIS new assignments estimated for 2016 based on the average growth	ATIS assignments in 2016
Area 1	180	40	202
Area 2	125	48	149

Comparing the values above, assuming a linear growth of the demand, it can be concluded that for the ATIS assignments the following adjusted figures can be considered:

- 2.75 assignments/year in average for Area 1
- 3 assignments/year in average for Area 2

6.3.4 Vol Meteorologique (VOLMET)

These assignments are dedicated to constantly provide in broadcast mode meteorological information to aircraft in flight. Its particularity is to use ground transmitters only.

The data analysed in 2008 provided the following results when estimating the growth of frequency demand in for these services:

Area	VOLMET
	Average additional assignments/year
Area I	0
Area 2	0

The VOLMET assignments evolution is as follows

Area	VOLMET assignments in 2008	VOLMET new assignments estimated for 2016 based on the average growth	VOLMET assignments in 2016
Area 1	21	0	22
Area 2	31	0	30

Comparing the values above it can be concluded that for the VOLMET estimated forecast assignments, for both Area 1 and 2 the flat (0) growth is confirmed.

6.3.5 Air Ground (A/G)

Air ground services (AG) is a generic service allocation name covering several assignments across COM2 for different types of services. They could cover military frequencies, helicopters, gliders, Flight Tests, ballooning, etc.

The data analysed in 2008 provided the following results when estimating the growth of frequency demand in for these services:

Area	A/G
	Average additional assignments/year
Area I	1.3
Area 2	3.5

In 2013 an analysis of the existing assignments at that date was undertaken. The result

of this activity was an optimization of the frequency usage and a reduction of the number of assignments for several services. The A/G assignments evolution is as follows

Area	A/G assignments in 2008	A/G assignments reduction in 2103	A/G new assignments estimated for 2016 based on the average growth	A/G assignments in 2016 (excluding duplications)
Area 1	650	-52	10	484
Area 2	610	0	28	807

Comparing the values above, assuming a linear growth of the demand, it can be concluded that for the A/G assignments the following adjusted figures can be considered:

- 0 assignments/year (flat evolution) for Area 1
- 24 assignments/year in average for Area 2

6.3.6 Other services

Other services such as assignments for OPC, National Aerodromes, etc. were not considered in this study due to either specific band allocation (e.g. OPC) or due to the fact that the estimated growth was negligible (based on the past historical data trend).

7. EQUIPEMENT REQUIREMENTS

Note: the following applicable requirements and standards are to be completed and validated

- The aircraft voice communication system that needs to be retrofitted/upgraded shall conform to the performance requirements as set out in the Commission Implementing Regulation (EU) No. 1079/2012 (VCS Regulation).

ETSO-2C37e (Receiver) and ETSO 2-C38e (Transmitter) are the related EUROPEAN standards which are comparable with FAA TSO-2C37e and TSO-2C38e. Such general regulations describe the applicable MOPS (Minimum Operational Performance Specification) documents for transceivers (this includes also EUROCAE standards ED 14G and ED 12C)

Airborne equipment for VHF 8.33 kHz communications must be compliant with EUROCAE Minimum Operational Performance Specification for Airborne VHF Receiver-Transmitter operating in the frequency range 117,975-137 MHz document ED 23B, (a sufficient means of compliance) or EUROCAE ED 23C (a preferred option whenever possible).

A process has been put in place by EASA and FAA for TSO/ETSO reciprocal acceptance. This is the process by which the importing authority will accept the exporting authority's approval of a TSO article without the importing authority issuing an approval: i.e. the FAA will accept an EASA ETSO for an article from the European Union (EU) and the FAA will no longer issue a Letter of TSO Design Approval, likewise, EASA will accept the FAA's TSO for an article from the United States without issuing an ETSO. Additional details on the TSO/ETSO acceptance process are available in the "Technical Implementation Procedures for airworthiness and environmental certification between FAA and EASA" document (revision 5, September 2015)

7.1 Applicable standards

The European Telecommunications Standards Institute (ETSI) has published standards to enable manufacturers of aeronautical radio equipment to self-declare compliance with the RED Directive.

- ETSI EN 300 676-1 V1.5.2 (2011-03) - Ground-based VHF hand-held, mobile and fixed radio transmitters, receivers and transceivers for the VHF aeronautical mobile service using amplitude modulation; Part 1: Technical characteristics and methods of measurement
- ETSI EN 300 676-2 V2.1.1 (On Approval) - Ground-based VHF hand-held, mobile and fixed radio transmitters, receivers and transceivers for the VHF aeronautical mobile service using amplitude modulation; Part 2: Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU
- ETSI EN 301 489-22 V1.3.1 (2003-11) - Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 22: Specific conditions for ground based VHF aeronautical mobile and fixed radio equipment
- EN 301 489-01 V1.4.1 Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements
- ETSI EN 301 688 V1.2.1 (2015-04) (On Approval) - Electromagnetic compatibility and Radio spectrum Matters (ERM); Technical characteristics and methods of measurement for fixed and portable VHF equipment operating on 121,5 MHz and

123,1 MHz

- ETSI ETS 300 676 ed.1 (1997-03) - Radio Equipment and Systems (RES); Radio transmitters and receivers at aeronautical stations of the aeronautical mobile service operating in the VHF band (118 MHz -137 MHz) using amplitude modulation and 8,33 kHz channel spacing; Technical characteristics and methods of measurement

A new Radio Equipment Directive (RED), Directive 2014/53/EU, is applicable from 13 June 2016. Member States are required to take appropriate measures to ensure that radio equipment is made available on the market only if it complies with the Directive.

Note: The EC provides guidance on the application of the RED directive as covered by the "Application of Directives 2014/53/EU, 2014/35/EU and 2014/30/EU" letter rom from 18.06.2015.

The RED repeals the radio equipment and telecommunications terminal equipment (R&TTE) Directive, 1999/5/EC. It should be noted that a key change in the new regulation is the inclusion of receiving equipment.

The RED can be viewed at http://ec.europa.eu/enterprise/sectors/rtte/radio-equipment-directive/index_en.htm

8. SAFETY CONSIDERATIONS

The objective of the related safety risk management activities is to ensure that the 8.33 kHz channel spaced communication deployment is implemented at an acceptable level of safety. For the implementation to be considered safe, the resulting operations' level of safety shall not decrease due to the 8.33kHz deployment in comparison with the current existing situation. In order to demonstrate this, a safety case must be developed by each State. The safety case shall be supported by a safety assessment executed in compliance with Regulation (EU) No 1035/2011 of 17 October 2011 laying down common requirements for the provision of air navigation services.

Guidance for the development of a safety case is provided by the EUROCONTROL Safety Case Development Manual.

8.1 Typical Scenarios

A list of typical hazardous scenarios that could occur following the introduction of 8.33kHz channel spacing communications in the lower airspace is provided here as a guidance, in support of the development of local safety cases.

- Unintentional controlled airspace infringement by a non-equipped aircraft operating from an uncontrolled airspace.
- Intentional/forced deviation of a non-equipped aircraft, due to technical or weather reasons, into an airspace requiring 8.33kHz radio carriage
- Unintentional planning of a flight by non-equipped aircraft into an area in which 8.33kHz radio carriage is mandated
- Incorrect frequency change due to misunderstanding of the ATS clearance/information
- Missed clearances and instructions in controlled airspace due to transmission/reception, radio interference etc.
- Communication equipment problems make it impossible for communications to be maintained.

Note that the last two scenarios, while not necessary identified with 8.33VCS equipment deployment, are mentioned here due to the increased probability of occurrence due to the new equipment and communication procedures

It is recommended, however, that the scenarios to be used in the functional hazard assessment (FHA) are developed taking into account the specific environmental conditions and traffic characteristics in the area concerned by the change.

8.2 Associated Hazards

Safety related hazardous situations in the context of the deployment of 8.33kHz channel spaced communications are mainly related to: lack/loss of communications, impossibility to contact air traffic services when required or needed or to receive essential information regarding the flight conditions, traffic, weather; increased controller workload due to accommodation of non-equipped aircraft, etc.

Basically such incidents usually occur in one of the following cases:

- Radio Interference
- Mismanagement of communications equipment or wrong application of prescribed procedures and requirements or
- Malfunction of communications equipment

A non-exhaustive list of hazards associated with or impacted by the introduction of 8.33kHz channel spaced based communications is provided below as an illustration and

support to local safety assessments. Depending on the local environment factors (e.g. traffic characteristics, airspace definition, procedures etc.) some of these hazards may not be applicable (or could have a low probability of occurrence) while other new hazards may be identified.

- non-8.33kHz equipped flight entering an area where 8.33 kHz communications are provided.
  Depending on the traffic density and airspace characteristics, such an event may create severe problems and disruptions in a controlled airspace environment. Note that this hazard may occur as well for non-equipped flights trying to land on controlled aerodrome in which communications are handled in 8.33kHz channel spacing. The inability to tune to a 6-digit 8.33 kHz channel means that ultimately the pilot may not be able to communicate or receive instructions or information from an air traffic service. Moreover, if the pilot attempts to communicate on a 25 kHz channel, then there is a risk of interference on the adjacent 8.33 kHz channels
- Selection of wrong frequency by a pilot.
  Mistuning can be considered also a hazard for 25kHz spaced communications in today's environment. However the addition of an extra digit and sometimes uncertainty about phraseology, may increase the probability of occurrence of this hazard which could lead to communication problems, including additional pilot and controller workload
- Unplanned flight diversion due to equipage requirements.
  This hazard occurs when a 8.33kHz unequipped aircraft is erroneously flight planned through an area in which 8.33kHz equipage is required. Note that this is applicable as well for flights planned to land to controlled aerodromes where communications is exclusively performed in 8.33kHz channel spacing; in such cases the flight may be required to divert to an alternate aerodrome compatible with the equipage on board. This hazard may result in additional controller workload, and the diversion itself may present a risk to the affected flight and other aircraft
- Excessive number of non-8.33 kHz equipped State aircraft in an area with limited UHF capability.
  Procedures are put in place to handle non-8.33 kHz equipped State aircraft in the airspace of mandatory carriage, within the limits of the ATC capacity system. In practice, depending on the local environment and traffic density and characteristics, the handling of non-8.33 kHz equipped State aircraft can lead to increases in air traffic controller workload, and this needs to be taken into account in order to maintain safety levels.
- Incorrectly fitted radios.
  Problems may occur when airborne radios or ground equipment are not performing according to specification, such as interferences, loss of contact, etc. The effects are concerning not only the aircraft in question but also communications on adjacent channels.

8.3 Potential Safety Effects

Depending on the environment and traffic density and characteristics, as well as the type of services affected by the 8.33kHz induced communication hazards the following effects may be produced:

- Inability to receive (and therefore to follow) an ATC clearance, leading to loss of separation and possibly an AIRPROX;
- Inability to receive essential information regarding the flight (e.g. traffic information, weather, etc.) which may lead to loss of safe separation between

aircraft or between aircraft and hazardous weather phenomenon, late diversion, unsafe flying conditions for the type of aircraft and the flight rules
- Impossibility for a pilot to pass essential information to the air traffic services, with effect on the safe ATC provision
- Misuse of the emergency dedicated frequency for routine communications
- Air traffic services excessive workload
- Diversion and evasive actions required from other flights in order to avoid the flight which is not in contact with ATC
- Etc.

8.4 Risk Mitigation

The list of required risk mitigation measures (also referred to as safety requirements in safety assessments) shall be derived from the analysis of the identified hazards (e.g. by Preliminary System Safety Assessment - PSSA process). The concrete and complete list of safety requirements shall be established at the local level by taking into account the local environment of operations (e.g. traffic characteristics, airspace definition, procedures etc.) as well as the probability and severity of the hazard effects in that particular environment.

A non-exhaustive list of generic risk mitigation measures (also referred to as safety requirements in safety assessments) is provided for illustration below.

- Training and or briefings related to the 8.33 kHz requirements for flight plan handling shall be provided to all concerned ATS personnel
- Flight Crews and pilots shall be provided with training/briefings on the 8.33 kHz requirements related to flight planning. (especially for GA pilots operating under VFR)
- Flight Crews and pilots shall be trained in relationship with the implementation of 8.33kHz channel spacing communications, regarding especially RMZ carriage requirements, contingency procedures, phraseology, etc.
- States implementing 8.33kHz channel spaced communications in their airspace shall enforce mandatory carriage of appropriate equipage and publish the required information in the information publications (e.g. AIC, AIP, AIP SUP, NOTAM)
- States shall verify that national regulations enforce mandatory carriage and enable sanctions to be applied against aircraft operators that intentionally operate non-8.33 kHz compliant aircraft in 8.33 kHz airspace.
- ANSPs shall ensure that the 8.33 kHz equipage status of aircraft, including State aircraft, is available to ATS personnel (e.g. via flight progress strips and/or radar track labels).
- LoAs between neighbouring ATS units shall contained contingency procedures developed for handling non-8.33 kHz compliant aircraft, taking into account coordination procedures, airspace structures and airspace classes.
- Consistent use of the correct phraseology shall be enforced (especially related to requesting 8.33 kHz and UHF capability and transfer of communications).
- dedicated training / briefings shall be provided to ATS personnel regarding 8.33kHz carriage requirements related to the area of responsibility
- the HMI for the display of VHF channels for transfer of communications, shall be consistent with R/T procedures (i.e. in accordance with amendment 80 to ICAO Annex 10, Volume II – 6 & 4 digits).
- Aircraft operators shall ensure that briefing/training is provided to the flight crews and clear instructions are available in the cockpit regarding the use the 8.33kHz radio equipment
- States shall review the need for enhanced UHF coverage as a means of handling non-8.33 kHz equipped State aircraft.

- An assessment shall be performed regarding the impact of handling non-8.33 kHz equipped State aircraft in an area in which 8.33kHz radio equipment carriage is required, taking into account factors such as sector capacity, safety levels and technical constraints with the goal of determining whether modifications to sector capacity or airspace design/structures are applicable
- States shall ensure that 8.33kHz operations are tested for a trial period, during which time safe operation can be verified, prior to effectively converting the assignment in the COM2 table (i.e. the assignment becoming operational)

A few recommendations for actions mitigating against VHF communication problems are provided below as good practice guidelines

- Good radio discipline is a key defence against communication problems (for a extended description of radio discipline practices please consult http://www.skybrary.aero/index.php/Radio_Discipline)
- Flight Crew or pilots should not alter the previous frequency on the pre-select position on a COM radio used for primary ATC communications until two way communications have been established on the new frequency/channel.
- Flight crew awareness of the likely frequency sequence can be helpful. In the event that a loss communication or impossibility to receive information on a specific frequency is discovered, reference to radio navigation charts, and procedures can provide contingency or back-up solutions

The information regarding 8.33 kHz related hazards covered in this document should be reviewed and adapted, as appropriate, for use in local safety cases taking into account local operational environment and specifics.

A dedicated 8.33 VCS Safety Considerations Workshop has been organised in October 2016 with the aim to provide guidance on the identification of the safety hazards associated to the implementation of 8.33 kHz VCS below FL195 at local level and development of the associated Local Safety Case argument. A summary of the workshop results are included in the Annex F of this document; for more details regarding the, methodology, participants and the results please consult the workshop report at:

https://ost.eurocontrol.int/sites/833ISG/SitePages/Home.aspx

PART II: GUIDELINES FOR IMPLEMENTATION

9. GROUND IMPLEMENTATION

9.1 Air Traffic Control Services

According to the SERA provisions Air traffic control service shall be provided to:

- all IFR flights in airspace Classes A, B, C, D and E;
- all VFR flights in airspace Classes B, C and D;
- all special VFR flights;
- all aerodrome traffic at controlled aerodromes

According to the SERA provisions Flight Information Service shall be provided by the appropriate air traffic services units to all aircraft which are likely to be affected by the information and which are:

- provided with air traffic control service; or
- otherwise known to the relevant air traffic services units.

It has to be noted that in places where air traffic service units provide both flight information service and air traffic control service, the provision of air traffic control service shall have precedence over the provision of flight information service whenever the provision of air traffic control service so requires.

Within this context communications are essential to be provided to flights subject to air traffic control service, explicitly: an aircraft operated as a controlled flight shall maintain continuous air-ground voice communication watch on the appropriate communication channel of, and establish two-way communication as necessary with, the appropriate air traffic control unit

On the operational level, before implementing 8.33kHz channel spacing communications, it is required (VCS Regulation Art 10) that the State (or ANSP(s) depending on the case) has evidence that:

- a local safety case has been performed identifying all potential hazards and associated mitigation means and safety requirements in order to ensure that the change will not affect the existing level of safety
- all flights subject to an air traffic service are properly equipped, or exemption procedures are in place
- Contingency and fall back procedures are put into place for establishing communications in case of interferences,

On the technical level, the ANSPs will have to ensure, before converting the assigned 25kHz frequency to an 8.33kHz channel that:

- the radio equipment on the ground designated to be used for 8.33kHz channel spacing communications is properly installed and certified
- the coverage is ensured in such a way that all traffic subject to the air traffic service provided are able to maintain communications in the concerned area of responsibility
- testing is performed to ensure that there are no technical issues (e.g. interferences, etc.)

9.2 Emergency Services

According to the SERA provisions Alerting service shall be provided by the air traffic services units:

- for all aircraft provided with air traffic control service;
- in so far as practicable, to all other aircraft having filed a flight plan or otherwise

known to the air traffic services; and
- to any aircraft known or believed to be the subject of unlawful interference

Since the alerting service will continue to make use of the 121.5MHz dedicated (protected) frequency no additional provisions are made for the State or ANSPs for implementation of 8.33kHz channel spacing communications. However, at the operational level, caution must be exercised due to a potential increase of the use of this frequency by non-equipped flights entering controlled airspace in which communications are provided on 8.33kHz channels. It is recommended, following the results of a safety assessment that, if needed, specific 25kHz spacing frequency assignments are maintained for contingency cases, ensuring appropriate coverage and non-interference with adjacent channels.

9.3 Aerodrome/airfield Control

For a controlled aerodrome, the control towers issue information and clearances to aircraft under their control to achieve a safe, orderly and expeditious flow of air traffic on and in the vicinity of an aerodrome with the object of preventing collision(s) between:

- aircraft flying within the designated area of responsibility of the control tower, including the aerodrome traffic circuits;
- aircraft operating on the manoeuvring area;
- aircraft landing and taking off;
- aircraft and vehicles operating on the manoeuvring area;
- aircraft on the manoeuvring area and obstructions on that area

Normally, for the provision of information and clearances two way communications must be established and maintained between flights and the air traffic services personnel. Moreover all vehicles employed on the manoeuvring area shall be capable of maintaining two-way radio communication with the aerodrome control tower and the concerned aircraft, except when the vehicle is only occasionally used on the manoeuvring area and is either accompanied by a vehicle with the required communications capability; or employed in accordance with a pre-arranged plan established with the aerodrome control tower.

On the operational level, before implementing 8.33kHz channel spacing communications, it is required (VCS Regulation Art 10.) that the State (or ANSP(s) or airport operating agency, depending on the case) has evidence that:

- a local safety case has been performed identifying all potential hazards and associated mitigation means and safety requirements in order to ensure that the change will not affect the existing level of safety
- all flights operating on the aerodrome surface or in the vicinity are properly equipped, or exemption procedures are in place
- all vehicles operating on the aerodrome surface (if required to be equipped with radio communication means by the local procedures in place) are properly equipped
- Contingency and fall back procedures (including visual signals) are put into place for establishing communications in case of interferences,
- Coordination procedures are put in place with the air traffic services handling traffic in the upper airspace, especially for cases of non-equipped traffic handling

On the technical level, the ANSPs and/or the aerodrome operating agency will have to ensure, before converting the assigned frequency to an 8.33kHz channel that:

- the radio equipment on the ground designated to be used for 8.33kHz channel spacing communications is properly installed and certified
- the radio equipment installed on board of vehicles operating on the aerodrome surface are properly installed and certified
- the coverage is ensured in such a way that all traffic subject to the air traffic

service provided are able to maintain communications in the concerned area of responsibility
- testing is performed for all equipment involved (including vehicles) to ensure that there are no technical issues (e.g. interferences, etc.)

A special case is considered for the operations of flights into non-towered aerodromes. Normally this is an aerodrome (e.g. airport during non-operating hours, airstrip, etc.) with no operating tower, or air traffic control unit.

At non-towered aerodromes, pilots follow recommended procedures locally defined and available through AIPs. It is usually the case that these procedures include also radio calls over a common frequency, in order to allow pilots to broadcast their intentions (e.g. “on final”, “vacating runway” etc.). If the decision is made to convert these frequencies to an 8.33kHz channel spacing assignment, particular care must be exercised depending on the traffic normally operating to/from the considered airfield and its potential equipage.

9.4 Special Events

(To be developed)

10. AIRCRAFT IMPLEMENTATION

10.1 Aircraft radio requirements

From 01/01/2018 all aircraft operating within the ICAO EUR airspace where EU member states are providing air traffic services are required to have 8.33kHz channel spacing capable radio equipment on board (VCS Regulation Art 5(4)).

It is recommended that all aircraft currently equipped with communication radio equipment in the VHF band are fitted with 8.33kHz capable radio equipment.(including also the aircraft equipped with radio and operating in airspace in which radio equipment carriage is not required) Even if, part of the State 8.33kHz implementation strategy these aircraft may be exempted from carriage of radio equipage or are not required to have 8.33kHz capable radio equipment on board, these exemptions are mostly limited in duration and given the future requirements for ATM development within the EU Region it is highly expected that appropriate equipage will be required at a later time

10.2 Aircraft forward fit / retrofit

The 8.33 kHz related equipment depends on the aircraft class, the type of the VHF radio equipment currently installed (if a radio is installed on board), and on the general avionics concept (mainly analogue vs. digital and non-integrated/integrated avionics) of the particular aircraft. Therefore one of the following situations may be applicable

- Install a new VHF radio
- Upgrade / configure the radio software;
- Replace the radio control panel only
- Upgrade the complete VHF radio
- Replace the complete VHF radio

According to the VCS regulation, from November 2013 all radios placed on the EU market shall have the 8.33kHz channel spacing capability

10.3 Certification

As for any other avionic retrofit, the installation of new radio components or the upgrade of existing radio components shall receive an Airworthiness Approval.

11. STATE ACTIONS GUIDELINES

Depending on the complexity estimated for the deployment of 8.33kHz spacing communications, within the State an organization may be designated to handle all the coordination and implementation processes. It is recommendable, however, that a programme is defined, targeting structured tasks and actions with clear dead-lines for achievement. The following identified packages are provided as a guideline for the definition of the local processes and supporting actions for the deployment of 8.33kHz communications in line with the requirements of the VCS regulation.

11.1 Evaluation of the local environment (current and planned evolution)

Within this package a comprehensive description of the existing ATM environment is performed. The following elements will need to be available

- Airspace organization: the definition of the different classes of airspace, types of services provided, and the associated requirements in terms of communications within the concerned areas
- Ground facilities organization: aerodromes/airports, controlled and non-controlled aviation fields, types of services provided, and the associated requirements in terms of communications within the concerned areas
- Airspace users: information regarding the current operating fleet (commercial and non-commercial, IFR and VFR operating traffic, state aircraft, types of aircraft registered and operating within the considered airspace, GA aircraft population not registered within the state but operating mainly within the concerned airspace, etc.), traffic patterns, density and complexity of traffic within the concerned area, radio carriage requirements (dependent on the type of aircraft and operations)
- ATM service providers: identification of all agencies responsible for provision of air traffic services within the State area, associated requirements regarding communications, etc.
- Other related services to airspace users: identification of other services provided to airspace users in terms of information, control, etc., handling agencies, operational control, and the associated requirements regarding communications

Normally all this information is required for both the assessment of the current situation within the State, but also as an input into the required local safety case supporting the implementation of 8.33kHz channel spacing communications. In addition to this information, it is recommended that planned evolution (long term) of the ATM system is included in the evaluation, especially elements related to:

- Airspace changes and re-organisation
- Development of ground facilities for aviation
- Traffic patterns changes
- Etc.

The planned information will provide an enhanced analysis of the future needs in terms of communication requirements.

11.2 Radio equipment inventory

Within this package a comprehensive inventory of the existing VHF/UHF radio communication equipment environment is performed. The following elements will need to be available

- Ground radio equipment: information regarding the number, types and installations of the current existing radio equipment for VHF and UHF communications used for air traffic services, ground services at aerodromes, operational control etc. Information regarding these stations 8.33kHz channels spacing capability (for VHF communications) is required.
- Ground radio users: information regarding the users and owners of these radio stations, responsibilities for upgrades, replacements, licensing, certification and installation
- Airborne radio equipment: information regarding the number, types and installations of the current existing radio equipment available on board the aircraft, UHF radio equipment available on board state aircraft, the capability of these radios for 8.33kHz channel spacing communications

It is also important to determine, if possible, the number and status of the radio stations equipping aircraft operating predominantly in the concerned airspace, but not registered within the state.

Part of the radio equipment inventory it is important to determine as well for each of the concerned installations the following elements:

- Future usage (service, 25Khz exclusive use, etc.)
- Upgrade suitable
- Replacement requirements

11.3 Institutional arrangements

This package addresses a thorough understanding of the institutional arrangements within the state with respect to the deployment of 8.33kHz channel spaced communications especially related to the responsibility for

- Certification
- Installation
- Licensing
- Airworthiness requirements:

Also it is necessary to identify means of providing the required information to those agencies responsible, for the airworthiness and certification for the aircraft not registered within the state but operating almost exclusively within the concerned airspace.

11.4 Deployment strategy

Taking into account the requirements derived from the VCS regulation, and with the knowledge of the local situation within the state, a strategy for deployment can be developed. This would normally address the following steps, in coordination with the stakeholders concerned (e.g. ANSPs, airspace users, handling agencies, aircraft operators, etc.):

- Environment assessment
    - Identification of users affected by the change depending on services and airspace/aerodrome
    - identification of potential impact on the users
- Definition of a local safety case for deployment

  - Hazards identification (determination of hazards associated with the deployment of 8.33kHz channel spaced communications within the concerned airspace)
  - Identification of the potential effects at the ATM level with impact on the safety level of the operations
  - Identification of mitigation means and safety requirements
- Development of a conversion plan
  - Airspace/sectors conversion (e.g. lower/mid sectors, airspace of a certain class, etc.)
  - Specific services (e.g. ATIS, OPC, handling etc.)
- Establishment of conversion dates (while adhering to the IR milestones)
  - Adapted to the environment and services
- Development of exemption procedures and handling
  - Flexible depending on airspace/service and user

In the process of developing the strategy, conversion planning and the associated equipment requirements, the local safety case is determinant in defining the eventual required exemptions and derogation from the VCS regulation requirements. It is recommended that several iterations are performed in establishing the most feasible solution for the deployment.

It is essential that the deployment strategy is defined and agreed together with all the air navigation service providers, airspace users and in coordination with military and aircraft operators as well as with the regulatory bodies within the state. It has to be noted that in case of specific exemptions from the VCS Regulation requirements a formal approval is required. Depending on the type of exemptions, as identified by the VCS Regulation provisions, supporting documentation may need to be developed (e.g. a safety case identifying the potential hazards and the requirement for exempting a specific frequency assignment in a 25kHz spacing, network impact assessment proving the limited impact of the derogation, etc.)

The requirements derived from the VCS Regulation Art. 4(5) are addressing the State responsibility regarding radio capabilities. According to this article, States will have to ensure that all radios have 8.33kHz capability by the end of 2017 (31/12/17) (this includes radio on board aircraft as well as radio that are on the ground) with the exception of those ground stations operated by ANSPs.

The exception mentioned above is meant to be only temporary because ANSPs have until 31 December 2018 to ensure that all conversions to 8.33kHzVCS are performed. However, in the process of implementation, ANSPs will need to take into account the possible exemptions, and de facto exceptions (out of scope, e.g. radio that are used exclusively for communications in 25kHz) to recognise that some ground radios will remain 25 kHz

According to the Regulation 549/2004 by “Air Navigation Service Providers” is understood any public or private entity providing air navigation services for general air traffic; with the understanding that the “Air Navigation Services” consist of air traffic services; communication, navigation and surveillance services; meteorological services for air navigation; and aeronautical information services. “Aeronautical Information Service” is a service established within the defined area of coverage responsible for the provision of aeronautical information and data necessary for the safety, regularity, and efficiency of air navigation

Considering these definitions, it implies that even a ground radio located at an aerodrome, if it is used to provide information to aircraft (i.e. as defined in aeronautical information service) should be allocated to the air navigation service category and therefore is falling under the exception mentioned in the article.

11.5 Deployment strategy coordination

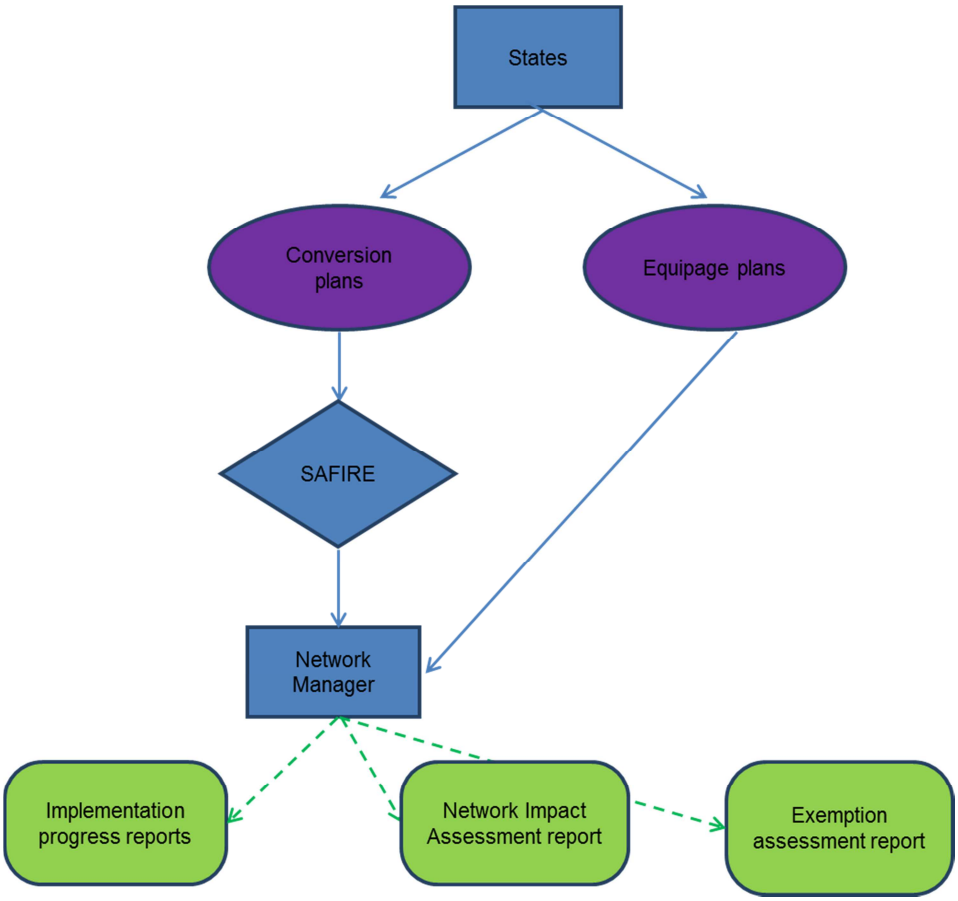
Since the deployment of 8.33kHz channel spaced communications is potentially affecting airspace users as well as service provision between the EU Member states it is required that the strategies and planning for deployment and exemptions are coordinated at European level between the states, Network Manager and the European Commission. In order to support this activity several coordination and reporting processes are put in place. The recommended processes and the content of the reporting are provided in the following sections.

11.5.1 Implementation plans

In order to provide a clear picture of the implementation progress as well as to facilitate the assessment of the network impact, the States implementation plans are required to be collected and consolidated in a centralized data repository.

The assessment of the information will provide:

- A complete picture of the planning requirements of the states involved in the deployment of 8.33 below FL195
- Means of assessment of the network impact of eventual exemptions or deviations from the planning
- Identify risks and mitigations at the level of the network (e.g. delays in the implementation, uncoordinated plans with effect on frequency allocation and availability, potential problems with the availability of radio equipment, etc)
- Means to coordinate a consistent approach at the network level for implementation
- Provide a basis for the planning of new frequency assignments
- Provide a basis for the assessment of the exemption impact on the network.
- Provide a means to measure and monitor the implementation progress



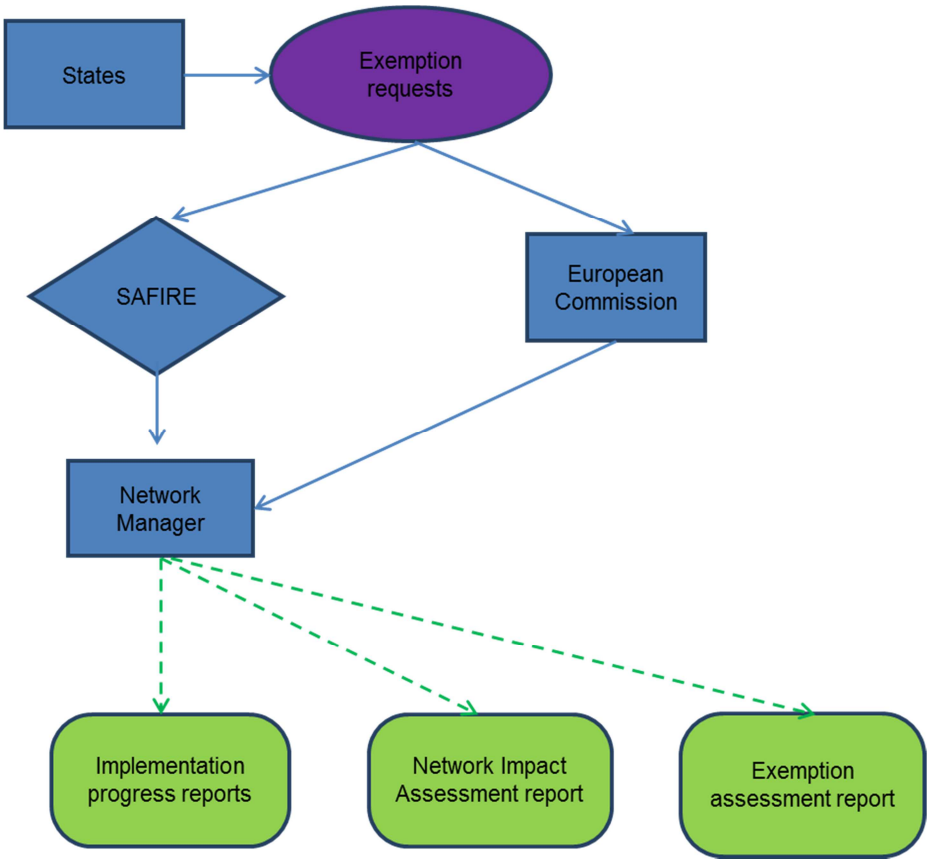
The plans submitted by the states will have to contain a high level of confidence regarding the information provided in order to ensure the accuracy of the assessments
There are two categories of planning information that are required to be reported:

- Frequency conversion planning
- Equipage planning for both ground stations and airborne equipment

11.5.2 Exemption/derogation planning

Due to several local factors (traffic characteristics, aircraft equipage, etc.) states may decide to address the possibility of granting exemptions. According to the IR1079/2012 States may issue temporary derogations from the 8.33 equipment requirements (Art 14.). As well the states may take local measures granting exemptions from the requirements laid down by the regulation. These exemption measures must be communicated to the EC with associated justification. The network impact of the exemption is part of the EC review process
The Network manager uses the data provided by states in the exemption report to assess the impact on the network. The data will provide means:

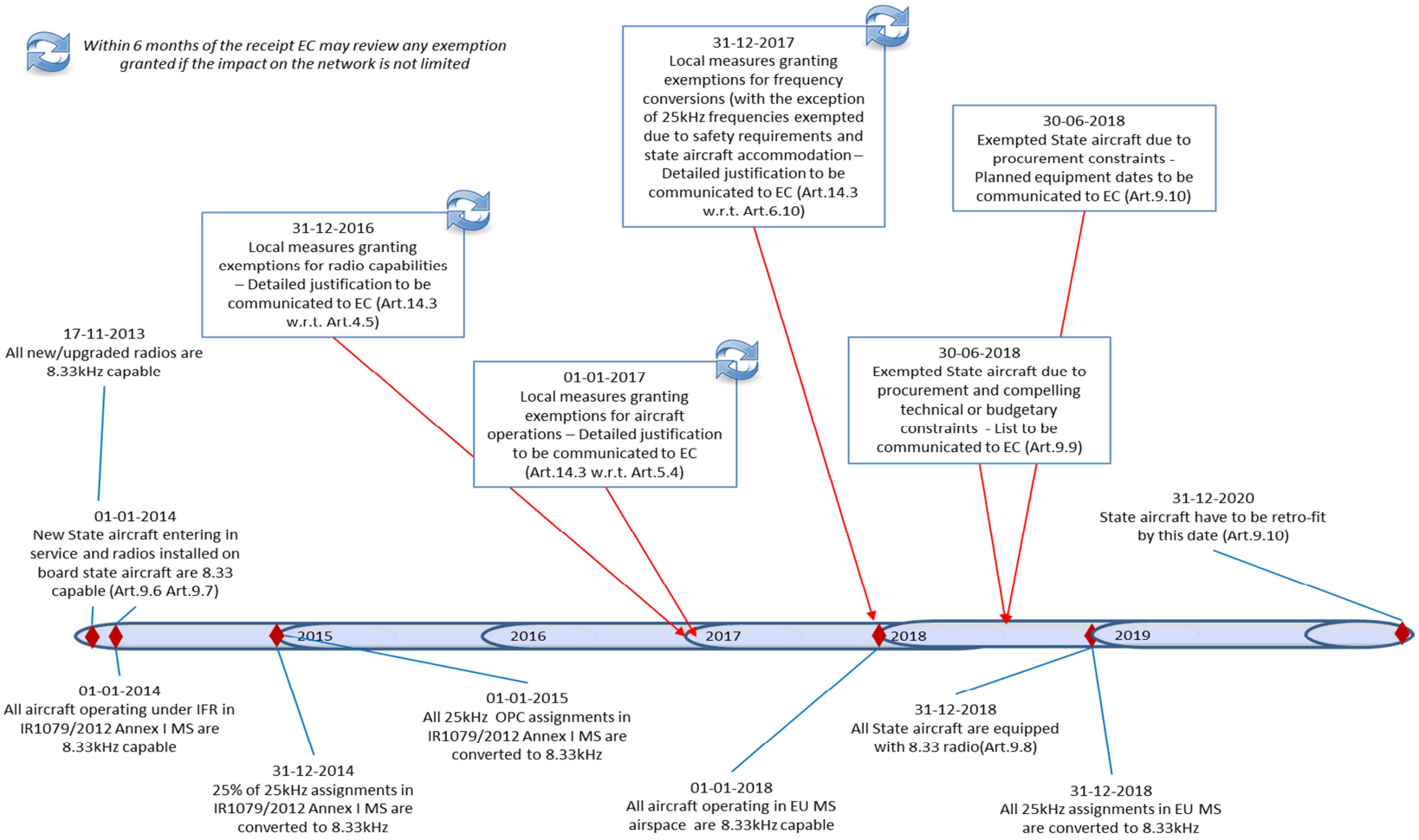
- for the assessment of the network impact
- to identify risks and mitigations at the level of the network
- to coordinate a consistent approach at the network level for implementation
- assess the impact on the network capacity



The exemption request forwarded by the States to the EC shall contain as a minimum:

- The justification of the request
- The airspace/frequency assignments affected by the exemptions
- The aircraft categories affected by the derogation
- the estimated dates for the exemption
- associated safety case

The IR1079/2012 requires any exemption request to be submitted at least 1 year before the planned derogation is expected to be applicable (Art.14(3)). It is recommended that, given the importance of the exemptions and derogations in the assessment of the network impact, these reports are made available as soon as possible.



Note: The graphical depiction above, providing the main milestones of the VCS Regulation is not exhaustive. Moreover this does not constitute a legal interpretation of the Regulation and only the Commission Implementing Regulation (EU) No 1079/2012 (VCS Regulation) provides the legally, binding requirements for a coordinated introduction of air-ground voice communications based on 8.33kHz channel spacing.

11.6 Action plan development

Once the deployment strategy has been agreed, an action plan, with detailed tasks and responsibilities of all stakeholders concerned can be developed. The following actions are recommended to be included in the process:

- Publication of the required implementation and conversion dates. The following milestones will have to be accounted for
    - Radio equipage implementation dates (installation and certification)
    - Radio equipment test planning (operational and technical testing dates and duration)
    - Intermediate phase and milestones if applicable (e.g. specific services conversion ahead of the VCS Regulation dates)
    - Conversion dates (the date by which the service will start to be provided in 8.33kHz channel spacing)
    - Exemptions (if granted) dates and eventual durations
- Procedures and action list for infrastructure availability
        - Budget sources and availability (e.g. local budget for ANSPs, aerodrome handling agencies, etc.)
        - Planning for GA airspace users (e.g. funding/incentives initiatives, equipment availability, etc.)Airspace user
    - Procedures for installation and certification of the new/retro-fit equipment (both for aircraft and ground station installations)
- Awareness campaign. Ensure that all information related to the 8.33kHz deployment is available and easy accessible by all the stakeholders concerned
    - Aeronautical Information Publications (e.g. AIP/AIC/NOTAM)
    - Advertising in local specialised magazines
    - workshops organization targeting specific categories of implementers or procedures
- Air navigation service provider's procedure updates. Ensure that appropriate procedures are put in place, published and the operational personnel is trained in their application (the airport personnel is included here as well). Mainly the following have to be taken into account in the update process
    - Letters of agreement between units, sectors, etc.
    - Communication procedures including phraseology
    - Handling of non-equipped exempted aircraft
    - Coordination and transfer procedures
    - Contingency procedures (e.g. handling of unexpected non-equipped aircraft)
    - FPL processing
- Airspace user procedure update. Several procedures and the operation in the new environment will have to be updated and trained to the airspace users (mainly GA)
    - Communication procedures including phraseology
    - Non-equipped aircraft handling in specific situations
    - Contingency procedures
    - Flight planning requirements

12. AIRCRAFT OPERATOR ACTIONS GUIDELINES

For a consistent approach in implementing the VCS Regulation requirements, aircraft operators (including airlines, general aviation, aircraft owners, etc.) should include in their normal information process the following items:

- Be aware of the VCS Regulation requirements and dead-lines for implementation affecting it's operations in the European airspace
- Keep track of all available information, published via the means of aeronautical publications (AIP/AIC/NOTAM) regarding the requirements for 8.33kHz capable radio equipment and eventual exemptions and derogation from the carriage
- Maintain contact through representatives (e.g. aero clubs, associations, airline representatives, etc.) with the authorities within the state responsible for the deployment of 8.33kHz channel spacing communications within the concerned airspace
    - Deployment strategy and deadlines (especially since conversions may take place early in some areas)
    - Exemption and derogation planning
- Keep an updated picture of the new procedures in place, including phraseology (either personally as a pilot or provide training and documentation to flight crews if an airline) relevant to the use of 8.33kHz capable radio equipment

Depending on the operating areas, type of aircraft and current available equipage on board the aircraft, there may be a need to upgrade or install an 8.33kHz channel spacing capable radio. The following steps are recommended to be followed by an aircraft operator (or owner):

- Assess the status of the current equipment available on board the aircraft and the requirements for operation in the concerned airspace
- Investigate if available feasible solutions exist for upgrading the current equipment through:
    - Replacement
    - Upgrade (e.g. software upgrade)
    - Installation of an additional compatible appropriate radio (e.g. in case of budgetary concerns for replacing the current existing unit)
- Provide installation and certification (if applicable) of the new/upgraded equipment in accordance with the regulation

13. NETWORK MANAGER

13.1 8.33 VCS Implementation support project

In order to reduce the risk of significant delays in the implementation of the requirements derived from the IR1079/2012 which would jeopardise the success of the Radio Frequency Function, the EC designated NM to take an active and central role in the coordination of the implementation of 8.33 kHz voice channel spacing capability below FL195.

In response to this role, the objective of the 8.33VCS support to implementation project is, through assessments, analyses and delivery of supporting guideline documentation, to coordinate the deployment of 8.33 kHz VCS below FL195 by Member States in the ICAO EUR Region by 2018, avoiding major impact on the Network performance and maximizing the spectrum usage.

The main activities within the project are related to the coordination of the 8.33VCS capability implementation below FL195 in the European airspace by:

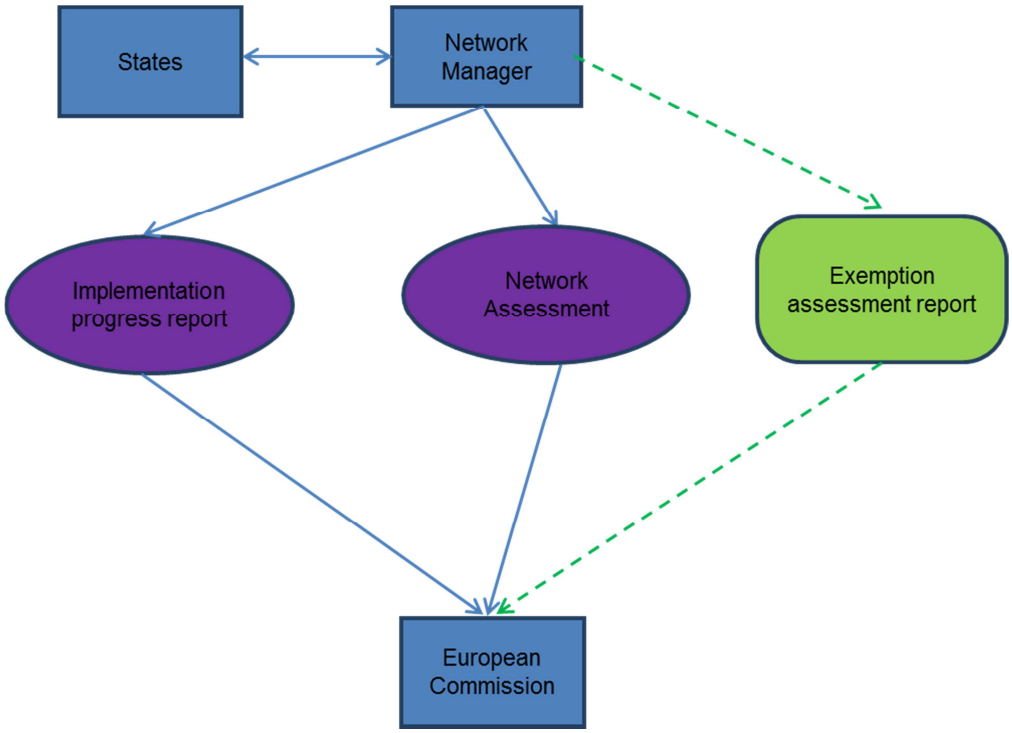
- monitoring and steering the implementation of 8.33 kHz VCS on both ground and air;
- providing a central coordination and information function on the granted exemptions and derogations under the specific provisions of the Regulation;
- building and providing awareness raising and implementation support capabilities, notably as regards the VCS IR implementation status;

In order to provide a clear picture of the implementation progress as well as of the impact the implementation process including exemptions have on the network performance, a set of reports have to be compiled and presented to the EC. These reports allow the EC in its oversight capacity (VCS Regulation Art 14) over the implementation of the IR1079/2012 to escalate potential identified risks to the states for mitigation measures. The set of information required by the EC is contained in two reports:

- Implementation progress report
- Network assessment report

The input for these reports consists of the information contained in the states implementation plans, exemptions, regular progress reports, technical reports, safety and performance assessments, etc. The data is compiled within NM and, in cooperation with the stakeholders is compiled in the reports to be provided to the EC.

On demand by the EC, in specific cases, the NM may provide special exemption assessments reports.



The implementation progress report will contain as a minimum the following information:

- Statistics of the number of frequencies converted in comparison with the plan
- Statistics of the number of 25kHz frequencies and 8.33kHz channels in the states covered by the implementation
- Statistics regarding the number of airframe equipage with 8.33 capable radios in comparison with the plan
- Statistics regarding the number of implemented ground stations, required to be capable of 8.33VCS, in comparison with the plan

The Network assessment report will contain as a minimum the following information:

- Assessment of the frequency assignment success indicators based on the demand forecast and the implementation plans provided by the states
- Assessment of the identified risks at the network level related to the deployment of 8.33 and associated mitigation means

When required by the EC, the Network manager provides assessments of the exemption requests submitted by the states. As a minimum the exemption assessment report will contain the following information:

- Assessment of the risks and associated mitigations for the submitted exemption/derogation consolidated with other eventual exemptions requests
- Forecast of the network impact resulting by the adoption of the exemption

13.2 Radio Frequency Function

The role of the Radio Frequency Function within the Network Manager, is defined in accordance with the IR 677/2011 (Annex II). Its activities are defined within a cooperative decision making process together with the concerned stakeholders.

For a better coordination of the 8.33kHz deployment plans and the eventual exemptions and exceptions from the VCS Regulation requirements it is recommended that the

collection of such information is performed in a structured way, making use of the available facilities within the RFF.
The following codes have been agreed to be used in the SAFIRE v5 Remarks Field to record the planned date for conversion or the reason for exemption:

Code	Description
$es	Assignment exempted because of a safety requirement
$ec	Assignment exempted because of the use of offset-carrier.
$em	Assignment exempted because of its use for the accommodation of non-equipped military flights
$dDDMMYY	Assignment planned conversion date
$e<REF>	Assignment exempted because of local measures. <REF> is an ASCII code associated to the description of the State's local measures and their justification.

Annex A Aeronautical Information

The text below provides proposed AIP, AIC and AIP SUP content following the implementation of the IR 1079/2012 EU regulation requirements in the concerned environment. The text is intended to provide extensive information to the concerned airspace users, ANSPs, aircraft operators, etc. Depending on local specificities additional text may need to be added

Within the proposed text, the following notation has been used:

- *Text within {…} is considered to be optional or the proposed text is provided with several options*
- *Text within […] is to be filled in by the AIP publishing authority (e.g. CAA)*
- *Explanatory text is provided in italics and is not to be considered part of the proposed text for inclusion in the AIP*

A.1 AERONAUTICAL INFORMATION PUBLICATION (AIP)

Implementation of the 8.33 kHz voice channel spacing for VHF voice communication below Flight Level (FL) 195

AIP proposed content

Note: the "Exemptions" provided in ENR 1.8 chapter are examples of possible text to be included. Local authorities will have to decide if they allow exemptions from the equipment requirements within the corresponding FIR. If needed, one or several paragraphs can be used within the AIP, to convey correctly and in an unambiguous manner the conditions of exemption from the 8.33VCS equipage requirements.

Within the text the main parts of the AIP have been indicated, as well as specific paragraphs or chapters where the proposed text is suggested to be inserted. In order to maintain a harmonized approach to the 8.33VCS requirements, it is proposed that these placeholders are used consistently by the AIP publishing authority.

Note: Some current AIPs contain specific requirements for certain categories of aircraft to be equipped with 25kHz capable radio when entering a certain airspace. The AIP publisher should check for consistency all these requirements and replace/remove/amend them (if required)

PART 1 – GEN

GEN 1.5 Aircraft Instruments, Equipment and Flight Documents

Radio Equipment

Add the following paragraphs as appropriate:

1. IFR flights

The carriage and operation of VHF 8.33 kHz channel spacing aircraft radio equipment suitable to maintain continuous two-way radiotelephony communication with the appropriate ATC units is mandatory for **IFR flights** within the [**XXXX**] FIR in airspace class [**airspace classes**]

VHF aircraft radio equipment suitable to maintain continuous two-way radiotelephony communication with the appropriate ATC units is mandatory for **IFR flights** operating above FL [**XXX**]/[**altitude**] feet in airspace class [**airspace classes**].

Exemptions from mandatory carriage of VHF 8.33/25 kHz aircraft radio equipment are described in **ENR 1.8**.

2. VFR flights

The carriage and operation of VHF 8.33 kHz channel spacing aircraft radio equipment suitable to maintain continuous two-way radiotelephony communication with the appropriate ATC units is mandatory for **VFR flights** within the [**XXXX**] FIR in airspace class [**airspace classes**]

VHF aircraft radio equipment suitable to maintain continuous two-way radiotelephony communication with the appropriate ATC units is mandatory for **VFR flights** operating above FL [**XXX**]/[**altitude**] feet in airspace class [**airspace classes**].

Exemptions from mandatory carriage of VHF 8.33/25 kHz aircraft radio equipment are described in **ENR 1.8**.

VHF aircraft radio equipment suitable to maintain continuous two-way radiotelephony communication with the appropriate ATC units is recommended for **VFR flights** operating in airspace class [**airspace classes**]

{**GEN 1.6 Summary of national Regulations and International Agreements/Conventions**

If Commission Implementing Regulation IR 1079/2012 has been integrated in a national regulation, the references towards such text may be reproduced in this section}

GEN 3.4 Communication Services

If frequencies, used normally for operational air to air or air to ground communications (e.g. gliders, ballooning, ultra-light etc.) are included in this chapter, include also a note as appropriate:

Note: the use of this frequency {these frequencies} requires 8.33 kHz channel spacing capable radio equipage on board the aircraft.

PART 2 – ENR

ENR 1.2 Visual Flight Rules

Add the following paragraph/chapter:

Communication requirements

Requirements for VFR flights related to VHF 8.33 kHz channel spacing radio equipage are stated in **GEN 1.5**

ENR 1.3 Instrument Flight Rules

Add the following paragraph/chapter:

Communication requirements

Requirements for IFR flights related to VHF 8.33 kHz channel spacing radio equipage are stated in GEN 1.5

ENR 1.4 ATS Airspace classification and description

If possible for each class of airspace described, if radio communication capability is required, add as a note or a specific paragraph:

"8.33 kHz channel spacing capability radio equipment is required"

or, depending on the case, if applicable:

"8.33 kHz channel spacing capability radio equipment is required in parts of this airspace"

The note should refer to both IFR and VFR categories of flights, and to both requirements for communication capability and continuous two-way air-ground voice communication, if applicable.

Depending on local characteristics, if needed, the note could be attached to the list of sectors/airspaces described in each class of airspace

ENR 1.8 Regional Supplementary Procedures

(ICAO DOC 7030-EUR:

3.2 MANDATORY CARRIAGE O F 8.33 KHZ CHANNEL S PACING CAPABLE RADIO EQUIPMENT

(A10, Vol. V–Chapter 4)

3.2.1 All aircraft operating above FL 195 in the European Region shall be equipped with 8.33 kHz channel spacing capable radio equipment.

3.2.2 Exemptions may be granted by States concerned for certain types of aircraft operation and for certain areas of operation.

Note.— All exemptions granted by States, including the extent to which aircraft from other States can be exempted, should be specified in States' AIPs.

3.2.3 When ultra-high frequency (UHF) ground infrastructure permits a close operational link to a State's airspace management procedure, UHF equipped State aircraft not equipped with an 8.33 kHz channel spacing capable radio will be allowed to operate in the airspace designated for 8.33 kHz channel spacing operations.

Note. — Details of UHF coverage meeting the above infrastructure requirements should be specified in States' AIPs)

The text above is the current content of DOC 7030 EU/4 regarding 8.33 VCS equipage requirements. Add any of the following, proposed text according to the local specificities of the requirements and eventual exemptions (different versions possible):

Aircraft operating in airspace class [**airspace class**] within [**XXXX**] FIR are required to be equipped with 8.33 kHz channel spacing capable radios

Note: the requirement above shall be in line with the requirements stated in GEN 1.5

Exemption from the 8.33 kHz channel spacing capable radio equipage requirement is granted for State aircraft operating in airspaces class [**airspace classes**] within [**XXXX**] FIR above FL [**XXX**] on condition that these flights are equipped with radio operating in the UHF band and are able to establish and maintain two way radio communications with the appropriate ATC unit prior to entering the airspace.

Exemption from the 8.33 kHz channel spacing capable radio equipage requirement is granted for those flights operating for [**mission name**] missions. These flights are required to include the following remark(s) in the filed 18 of the FPL:

- STS/SAR
- STS/HOSP
- …

Note: mission name in this context may be search and rescue, hospital, firefighting, etc.

The following categories of aircraft are exempted from the 8.33 kHz channel spacing capable radio equipage requirements:

- [**aircraft category**]
- [**aircraft category**] with a take-off mass less than [**xxx**] kg,

if the aircraft are operated within [**XXXX**] FIR in airspace class [**airspace class**] at maximum altitude of [**altitude**] feet MSL

Temporary exemption from the 8.33 kHz channel spacing capable radio equipage requirement is granted for [**aircraft category**] aircraft on condition that such flights establish and maintain two way radio communication contact with the appropriate ATS Unit on one of the following UHF frequency

- [**xxx,xxx**] MHz
- [**xxx,xxx**] Mhz
- …. ,

as instructed by ATC.

ENR 1.10 Flight Planning

Acceptance of flight plans filed via an electronic system

If considered useful add the following paragraph for Operational Reply Messages expected to be received upon filling a flight plan via an electronic system:

With respect to the 8.33 kHz channel spacing capable radio equipage requirements for IFR flights, the IFPS (see IFPS Manual 19.0.03, chapter 47. 8.33 channel spacing) may send one of the following comments:

a. REJ message with the following comment: <<This flight does not comply with 8.33 radio equipment>>

b. ACK message with the following comment: <<Flight plan is not compliant with 8.33kHz radio equipment; expect significant operational penalty>>, if the flight is indicated as STS/SAR or STS/HOSP
c. ACK message with the following comment: <<This flight may require special handling by ATC due to 8.33 kHz carriage requirements>>, if the flight has UHF radio communication capability and plans to operate in an area where communication is provided on UHF
d. ACK message with the following comment: <<Flight plan may be rejected after [**date**] due to 8.33 kHz equipage requirements in [**XXXX**] FIR / DEST [**ZZZZ**]. Please consult AIP>>, if the flight plans to operate in an area that will require 8.33 kHz equipage in the near future

For a detailed description of FPL processing related to the 8.33 kHz channel spacing capable radio equipage requirements please consult the IFPS Manual ed. [**XXXX**]:

https://www.public.nm.eurocontrol.int/PUBPORTAL/gateway/spec/index.html

Note: the ACK message followed by the 8.33VCS warning comment at bullet d. is pending approval and implementation by IFPS

Note: the messages provided in the list above are in line with the current version of the IFPS Manual (i.e. 19.0.1/11.03.2015). The list may need to be updated with the version valid at the time of the publication.

And if applicable to local ARO offices:

With respect to the 8.33 kHz channel spacing capable radio equipage requirements for VFR flights, the [**XXXX**] ARO sends:

- REJ message with the following comment: <<Flight plan rejected due to 8.33 kHz equipage requirements in [**XXXX**] FIR>>
- ACK message
- ACK message with the following message content: <<Flight plan may be rejected after [**date**] due to 8.33 kHz equipage requirements in [**XXXX**] FIR / DEST [**ZZZZ**]. Please consult AIP/AIP SUP [**XXXX**]>>

If abbreviated flight plans are used (e.g. for specific situation, etc.) a requirement to fill in the radio equipage available on board may be included:

The abbreviated flight plan shall, depending on the situation, contain the necessary details to obtain the service required. Mandatory information to be submitted are:

- aircraft call sign,
- aircraft type,
- flight rules (IFR/VFR),
- cruising speed,
- requested level,
- route,
- ETA
- persons on board, and
- **radio communication equipage**

ENR 2.0 Air Traffic Services/Airspace

Include the notification of either airspace as being "8.33VCS airspace" or mention specifically which of the frequencies in use for a particular airspace/service are 8.33VCS. Eventually both notifications could be included. The table below is provided as an example:

Name Lateral limits Vertical limits Class of airspace	Unit providing service	Call sign Languages Area and conditions of use Hours of service	Frequency/ purpose	Remarks
[**XXXX**] upper control area Lateral limits: as [**XXXX**] FIR. <u>FL 660</u> FL 195 Class of airspace: C <u>FL 490 - FRA</u> FL 245 <u>FL 410 - RVSM</u> FL290 <u>FL 660 – **8.33VCS**</u> FL 195	[**XXXX**] UAC	[**XXXX**] radar H24	[**XXX.XXX**] [**XXX.XXX**]	Above FL245
	[**XXXX**} ACC	[**XXXX**] radar H24	[**XXX.XXX**] {**8.33VCS**}	Below FL245
[**XXXX**] control area [**coordinates**]	[**XXXX**] ACC	[**XXXX**] radar H24	[**XXX.XXX**]	{**8.33 VCS**}, IFR & VFR

Name Lateral limits Vertical limits Class of airspace	Unit providing service	Call sign Languages Area and conditions of use Hours of service	Frequency/ purpose	Remarks
FL 195 – **8.33VCS** FL 095 Class of airspace: D				
[**XXXX**] control zone 4500ft AMSL GND Class of airspace: E	[**XXXX**] TWR	[**XXXX**]TWR 06.00-19.00	[**XXX.XXX**] {**8.33VCS**} 121.500 EMG	{**8.33 VCS**}, IFR & VFR

ENR 5.5 Aerial Sporting and Recreational Activities

If appropriate, add a paragraph regarding the permission required for flights to operate (or cross) within a controlled area:

The permission to operate within or cross a controlled area (airspace class [**airspace class**]) may require specific conditions and/or restrictions with respect to:

- Flight altitude;
- Establishment of two-way radio communication (i.e. Contact with the relevant air traffic service before entering the concerned airspace)
- **Suitable radio equipment on board (e.g. 8.33VCS capable radio)**
- SSR transponder equipage
- Etc.

ENR 6 En-Route Charts

For the relevant charts add the following note:

1. 8.33 kHz Voice Channel Spacing is used for allocating the channels for the communication with the following services:
   - [**XXXX**] Information
   - [**XXXX**] TWR
   - [**XXXX**] APP
2. If no reply call **XXX.XXX / XXX.XXX** [**XXXX**] Information.
3. 121.500 / 243.000 Emergency.
4. {121.500 / 243.000 to be used to provide communication when airborne equipment failure prevents the use of the regular channels}, or
5. {[**XXX.XXX**] contingency frequency to be used to provide communication when airborne equipment failure prevents the use of the regular channels (see corresponding AD chapter)}

PART 3 AD

[XXXX] AD 2.18 ATS Communication Facilities

Include a notification of "8.33kHz channel" in the remarks field for each of the frequencies/channels allocated to the corresponding services. If the case applies, a "contingency" frequency could be indicated as well in the remark field. The table below is provided as an example:

Service designation	Call sign	Channel/ Frequency	Hours of operation	Remarks
ACC: Arrivals via [**XXX**]	[**XXXX**] radar	[**XXX.XXX**]	H24	8.33 channel
APP	[**XXXX**] Approach	[**XXX.XXX**]	H24	Arrivals 8.33channel
		[**XXX.XXX**]	H24	Departures 8.33 channel
TWR	[**XXXX**] Tower	[**XXX.XXX**]	HO	8.33 channel/{ use [**XXX.XXX**] as contingency if not 8.33 equipped}
ATIS	[**XXXX**]ATIS	[**XXX.XXX**]	H24	

Note that, for consistency and to ensure an increase of the operator's awareness, the same remarks should be included as part of the aerodrome charts

VFR Flight Procedures at [XXXX] airport/aerodrome

If applicable consider adding the following paragraph for VFR flights (note that the IFR flights not equipped are subject to flight plan rejection by the IFPS, hence the probability of a non-equipped IFR flight to operate in the area is very remote):

[**XXXX**] CTR has been designated as controlled airspace (airspace class [**airspace class**]). Voice communications with ATC within this airspace are performed in a 8.33kHz channel. Airspace users planning to enter or operate within this airspace shall ensure that proper radio communications equipage is available on board their aircraft.

Operators equipped only with 25kHz channel spacing radios capability are encouraged not to {*shall not*} use these radios in trying to communicate on a 8.33kHz spaced channel due to potential interferences. 25kHz voice channel spaced frequencies published as "contingency" shall only be used in these remote situations (e.g. airspace infringement by flights not planned to operate within the [**XXXX**] CTR) and only when directed by ATC.

Non-adherence to the procedures related to communication requirements mentioned above lead to an unacceptable load for ATC and may result in the flight being refused to enter the CTR or being instructed to leave the CTR. {In this last case the pilot shall normally inform ATC about its plans for diversion, new destination aerodrome, etc.}

A.2 AERONAUTICAL INFORMATION CIRCULAR (AIC)

Implementation of the 8.33 kHz voice channel spacing for VHF voice communication below Flight Level (FL) 195

AIC proposed content

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Note: the "Exemptions" chapter is provided just as an example. Local authorities will have to decide if they allow exemptions from the equipment requirements within the corresponding FIR and if these provisions will be included in the AIC in clear or just a link towards the specific section in the AIP is provided.

Normally 2 types of AICs are used:

- *AIC-A contain aeronautical information, mainly of an administrative nature, which does not qualify for insertion in the AIP or NOTAM, such as:*
  - *long-term forecast of any major change in legislation, regulations, procedures or facilities;*
  - *information of a purely explanatory or advisory nature liable to affect flight safety.*
- *AIC-B contain information or notification of an explanatory or advisory nature concerning technical, legislative or purely administrative matters*

While the decision of which type of AIC should be published is local, in the scope of ensuring a broad awareness of the requirements derived from the implementation of the EU IR 1079/2012 it is suggested that the same basic information is contained in either of the AICs.

Note: Depending on the local/national decision, the dates for implementation, and hence the operators requirements for equipage may be different than the milestones mentioned in the VCS Regulation. In this case the dates provided below shall reflect these plans rather than the IR1079/2012 dates for implementation (e.g. paragraph 7 below should be amended accordingly or removed from the list)

AIC No. [no.] [DATE]

Implementation of the 8.33 kHz voice channel spacing for VHF voice communication below Flight Level (FL) 195 in [XXXX] FIR following the Commission Implementing Regulation IR 1079/2012

This AIC contains initial guidance information for the awareness of aircraft operators, airspace users and air navigation service providers regarding the 8.33 kHz channel spacing capable on-board radio carriage requirements.

For complete information and specific requirements in terms of aircraft equipage, airspace characteristics and associated exemptions please consult the [XXXX] Aeronautical Information Publication (AIP) sections: [AAA], [BBB], ….

{Introduction

1. This circular provides advanced notification to airspace users in respect of the implementation of 8.33 kHz channel spacing in the ICAO EUR region.
2. The demand for VHF assignments in the aeronautical mobile radio communication service band 118 to 137 MHz continues to grow due to:
    a. The creation and modification of ATC sectors;
    b. The creation and modification of air traffic services such as approach, Tower and ATIS;
    c. The provision of backup services and avoiding interference;
    d. The provision of aeronautical operational control (AOC) services;
    e. Accommodating VHF Digital Link services in the band 136.600 to 137 MHz
3. In response to the increasing VHF frequency congestion, the Commission Implementing Regulation (EU) No 1079/2012 lays down requirements for voice channel spacing for the Single European Sky in the EUR region }

Operators

4. An operator shall not operate an aircraft **above FL 195** unless the aircraft radio equipment has the 8.33 kHz channel spacing capability.
5. From [**DATE**] an operator shall not operate an aircraft flying under instrument flight rules (IFR) in airspace class [Airspace Class] in the [**XXXX**] FIR unless the aircraft radio equipment has the 8.33 kHz channel spacing capability,
6. From [**DATE**] an operator shall not operate an aircraft flying under visual flight rules (VFR) in areas in which communications are performed in the 8.33 kHz voice channel spacing, unless the aircraft radio equipment has the 8.33 kHz channel spacing capability.
7. From 1 January 2018 an operator shall not operate an aircraft in airspace where carriage of radio is required unless the aircraft radio equipment has the 8.33 kHz channel spacing capability.

Air Navigation Service Providers

8. Air navigation service providers shall ensure that their 8.33 kHz channel spacing voice communication systems allow an operationally acceptable voice communication between controllers and pilots within the designated operational coverage.
9. Air navigation service providers shall implement the notification and initial coordination processes in their flight data processing systems in accordance with Commission Regulation (EC) No 1032/2006 (1) as follows:
    a. the information about the 8,33 kHz channel spacing capability of a flight shall be transmitted between ATC units;
    b. the information about the 8,33 kHz channel spacing capability of a flight shall be made available at the appropriate working position;
    c. the controller shall have the means to modify the information about the 8,33 kHz channel spacing capability of a flight.

Equipment requirements

10. Air navigation service providers, operators and other users or owners of radios shall ensure that all radio equipment put into service from 17 November 2013 includes the 8.33 kHz channel spacing capability.
11. Member States shall ensure that aircraft for which the individual certificates of airworthiness or individual flight permits are first issued in the Union from 17 November 2013 and have a radio equipage requirement, are fitted with radios having the 8.33 kHz channel spacing capability.
12. Air navigation service providers, operators and other users or owners of radios shall ensure that from 17 November 2013 their radios include the 8.33 kHz channel spacing capability whenever they are subject to radio upgrades.
13. Users or owners of ground radios having the 8.33 kHz channel spacing capability shall ensure that the performance of these radios and the transmitter/receiver ground constituent complies with the ICAO standards specified in point 1 of Annex II to EC 1079/2012.
14. Users or owners of aircraft radio equipment having the 8.33 kHz channel spacing capability shall ensure that the performance of these radios comply with the ICAO standards specified in point 2 of Annex II to EC 1079/2012.

Integrated Initial Flight Plan Processing System (IFPS)

15. From [**DATE**] IFPS extends existing verification of the flight plans for 8.33 kHz capable equipment carriage for all IFR/GAT flights operating within [**XXXX**] FIR below FL195.
16. From [DATE], for a flight planning to operate in [**XXXX**] FIR in the airspace for which 8.33 channel spacing capability is required, the following apply:
    a. Letter 'Y' shall be inserted in field 10 of the flight plan, for aircraft equipped with 8.33 kHz capable radio equipment; or
    b. (For state aircraft not equipped with 8.33 kHz capable radio equipment but equipped with UHF radio, letters 'U' and 'Z' shall be inserted in item 10a of the flight plan together with 'COM/EXM833' remark in field 18)
17. Special purpose flights (e.g. medical flights, aircraft engaged in search and rescue missions, etc.) to specific provisions published in the AIP [section]. Flight plans

containing STS/HOSP or STS/SAR in the remark field, not equipped with 8.33 channel spacing capabilities will not be rejected by the IFPS.

{Exemptions

18. Exemptions from the requirement to be equipped with 8.33 kHz channel spacing radio communications equipment for operation within [**XXXX**] FIR can be found in [**XXXX**] AIP [**section**]
19. A state aircraft, which is fitted with UHF radio communications equipment, is hereby exempted from the requirement to be equipped with 8.33 kHz channel spacing radio communications equipment for operation within [**XXXX**] FIR airspaces classes [**airspace classes**] but shall, as a minimum, be equipped with 25 kHz channel spacing radio equipment.
20. VFR flights operating within [**XXXX**] FIR in classes of airspace for which communication equipment is not required, or in class G airspace below [**altitude**] feet are exempted from the requirement to be equipped with 8.33 channel spacing radio.}

Additional information

21. The complete content of the Commission Implementing Regulation (EU) No 1079/2012, laying down requirements for voice channel spacing for the Single European Sky can be consulted at:

http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1429091660424&uri=CELEX:32012R1079

22. Additional information regarding the 8.33 kHz channel spacing for VHF voice communication below FL 195 in English language are available via the EUROCONTROL website:

http://www.eurocontrol.int/services/vhf-833-khz

23. For more details regarding the flight planning requirements see the IFPS User's manual [version], section [number] referring to 8.33 kHz CHANNEL SPACING.

http://www.eurocontrol.int/sites/default/files/content/documents/nm/network-operations/HANDBOOK/ifps-users-manual-current.pdf

Any queries and further guidance required as a result of this AIC should be addressed to:

[**STATE**] CAA/NSA

[**contact details**]

A.3 AERONAUTICAL INFORMATION PUBLICATION SUPLEMENT (AIP SUP)

Implementation of the 8.33 kHz voice channel spacing for VHF voice communication below Flight Level (FL) 195

AIP SUP proposed content

AIP Supplement (SUP) is normally defined as a temporary amendment containing changes of long duration (three months and longer) or information which consists of extensive text and/or graphics, supplementing the permanent information contained in the AIP. Operationally significant temporary changes to the AIP are published in accordance with the AIRAC system and its established effective dates and are identified by the acronym AIRAC (AIRAC AIP SUP). AIP Supplements are published on yellow paper to be conspicuous

Note: The 2 annexes included at the end of the SUP proposed content are intended to provide the user with the amended information in a direct and unambiguously way. Both the summary tables as well as the charts should be consistent with the information provided in the AIP.

Note: If considered useful, additional text regarding the eventual exemptions could be added to the SUP. However, it was noted that inclusion of such provisions is not in line with the main focus of the SUP, moreover such text has the potential for confusion. As an example text has been included in the proposal below to indicate the source for more information related to exemptions.

AIP SUP No. [no.] [DATE]

Implementation of the 8.33 kHz voice channel spacing for VHF voice communication below Flight Level (FL) 195 in [XXXX] FIR

This AIP SUP contains information for the awareness of aircraft operators and airspace users regarding the 8.33 kHz channel spacing capable radio carriage requirements.

For complete information and specific requirements in terms of aircraft equipage, airspace characteristics and associated exemptions please consult the [**XXXX**] Aeronautical Information Publication (AIP) sections:

- GEN 1.5 Aircraft Instruments, Equipment and Flight Documents
- {GEN 1.6 Summary of national Regulations and International Agreements/Conventions}
- GEN 3.4 Communication Services
- ENR 1.2 Visual Flight Rules
- ENR 1.3 Instrument Flight Rules
- ENR 1.4 ATS Airspace classification and description
- ENR 1.8 Regional Supplementary Procedures
- ENR 1.10 Flight Planning
- ENR 2.0 Air Traffic Services/Airspace
- ENR 5.5 Aerial Sporting and Recreational Activities
- ENR 6 En-Route Charts
- [XXXX] AD 2.18 ATS Communication Facilities

Introduction

1. From [**DATE**] the frequencies in which the communication between controllers and pilots is performed for air traffic control (ATC) services, in the ATC sectors within airspace class [**Airspace Class**] in the [**XXXX**] FIR above [**FLXXX/XXXX feet**], will be converted to 8.33 kHz voice channel spacing.
2. From [**DATE**] the communication frequencies in which flight Information services (FIS) are provided in the airspace class [**Airspace Class**] in the [**XXXX**] FIR above/below [**FLXXX/XXXX feet**] will be converted to 8.33 kHz voice channel spacing.

The frequencies allocated for alerting services remain the same.

Overview

3. ATC sectors above/below [**FLXXX/XXXX feet**] within airspace class [**airspace class**] are designated as controlled airspace. Voice communications with ATC within this airspace are performed in a 8.33kHz channel. Airspace users planning to enter or operate within

this airspace shall ensure that proper radio communications equipage is available on board their aircraft.

4. From [**DATE**] an operator shall not operate an aircraft flying under instrument flight rules (IFR) in the ATC sectors within airspace class [**Airspace Class**] in the [**XXXX**] FIR above [**FLXXX/XXXX feet**], unless the aircraft radio equipment has the 8.33 kHz channel spacing capability,
5. If operating under visual flight rules (VFR), from [**DATE**] an operator shall not operate an aircraft in areas in which communications are performed in the 8.33 kHz voice channel spacing, unless the aircraft radio equipment has the 8.33 kHz channel spacing capability.
6. Aircraft operated only in airspace class [**airspace class**] {or in uncontrolled airspace}, below [**XXXX feet**] do not require 8.33 kHz channel spacing capability radio equipment.
7. Operators equipped only with 25kHz channel spacing radios capability are encouraged not to {*shall not*} use these radios in trying to communicate on a 8.33kHz spaced channel due to potential interferences.
8. Non-adherence to the procedures related to communication requirements mentioned above lead to an unacceptable load for ATC and may result in the flight being refused to enter the control area or being instructed to leave it.
9. {Depending on the type of aircraft operating within the concerned airspace, under special conditions, some flights may be exempted from the 8.33 kHz channel spacing capability equipage requirement. For details regarding such situations please consult [**XXXX**] AIP ENR 1.8 Regional Supplementary Procedures}
10. The table in Annex 1 summarises the control areas concerned by this AIP SUP, the services provided and the new communication channel allocation.
11. Annex 2 of this AIP SUP provides the associated charts containing the associated communication channels.

A.4 NOTICE TO AIRMEN (NOTAM)

Though the following NOTAM Specimen relate to 8.33 kHz channel spacing, and a NOTAM code exists for 'air/ground facility', it is proposed to use the code related to 'Aircraft entry requirement', as the common subject to all these Specimen is the introduction of the mandatory carriage of 8.33 kHz capable equipment which can potentially affect the entry of a non equipped aircraft within the airspace of a State.

It is important that the dates indicated for the publication of the NOTAM and the items B) and C) are followed.

Note: The underlined space ( ) is expected to be filled in by the State concerned as required.

TRIGGER NOTAM SPECIMEN:

(A____/07 NOTAMN

Q) __XX/QOETT/I/BO/E/050/999/ *(appropriate co-ordinates, radius for whole State)*

A) *(location indicators of all FIR/UIR of the State)*

B) 1801010000

C) *(XXXXXXXXXX)*

E) TRIGGER NOTAM–PERM AIRAC AIP AMDT *(insert AIP reference)*. 8.33 KHZ OPERATIONAL REQUIREMENTS ARE APPLICABLE..FPL, RPL OF NON 8.33 EQUIPPED AIRCRAFT WILL BE REJECTED.IF FLIGHT IS SUBJECT TO EXEMPTION INCLUDE INDICATOR 'STS/EXM833' IN RPL AND FPL..

Alternatively, as appropriate, the following NOTAM PERM specimen is attached:

NOTAM SPECIMEN:

(A____/07 NOTAMN

Q) __XX/QOEXX/I/NBO/E/050/999/ *(appropriate co-ordinates, radius for whole State)*

A) *(location indicators of all FIR/UIR of the State)*

B) 1801010000

C) PERM

E) 8.33 KHZ OPERATIONAL REQUIREMENTS ARE APPLICABLE, REF AIC *(insert AIC reference)* AND AIRAC AIP AMDT *(insert AIP reference)*.

FPL, RPL OF NON 8.33 EQUIPPED AIRCRAFT WILL BE REJECTED.

IF FLIGHT IS SUBJECT TO EXEMPTION INCLUDE INDICATOR 'STS/EXM833' IN RPL

AND FPL.

Annex B Classes of airspace

Member States shall, as appropriate to their needs, designate airspace in accordance with the following airspace classification and in accordance with Appendix 4 of the Standard European Rules of the Air (SERA) (EU) 923/2012

(a) **Class A**. IFR flights only are permitted. All flights are provided with air traffic control service and are separated from each other. Continuous air-ground voice communications are required for all flights. All flights shall be subject to ATC clearance.
(b) **Class B**. IFR and VFR flights are permitted. All flights are provided with air traffic control service and are separated from each other. Continuous air-ground voice communications are required for all flights. All flights shall be subject to ATC clearance.
(c) **Class C**. IFR and VFR flights are permitted. All flights are provided with air traffic control service and IFR flights are separated from other IFR flights and from VFR flights. VFR flights are separated from IFR flights and receive traffic information in respect of other VFR flights and traffic avoidance advice on request. Continuous air-ground voice communications are required for all flights. For VFR flights a speed limitation of 250 kts indicated airspeed (IAS) applies below 3 050 m (10 000 ft) AMSL, except where approved by the competent authority for aircraft types, which for technical or safety reasons, cannot maintain this speed. All flights shall be subject to ATC clearance.
(d) **Class D**. IFR and VFR flights are permitted and all flights are provided with air traffic control service. IFR flights are separated from other IFR flights, receive traffic information in respect of VFR flights and traffic avoidance advice on request. VFR flights receive traffic information in respect of all other flights and traffic avoidance advice on request. Continuous air-ground voice communications are required for all flights and a speed limitation of 250 kts IAS applies to all flights below 3 050 m (10 000 ft) AMSL, except where approved by the competent authority for aircraft types, which for technical or safety reasons, cannot maintain this speed. All flights shall be subject to ATC clearance.
(e) **Class E**. IFR and VFR flights are permitted. IFR flights are provided with air traffic control service and are separated from other IFR flights. All flights receive traffic information, as far as is practical. Continuous air-ground voice communications are required for IFR flights. A speed limitation of 250 kts IAS applies to all flights below 3 050 m (10 000 ft) AMSL, except where approved by the competent authority for aircraft types, which for technical or safety reasons, cannot maintain this speed. All IFR flights shall be subject to ATC clearance. Class E shall not be used for control zones.
(f) **Class F**. IFR and VFR flights are permitted. All participating IFR flights receive an air traffic advisory service and all flights receive flight information service if requested. Continuous air-ground voice communications are required for IFR flights participating in the advisory service and all IFR flights shall be capable of establishing air-ground voice communications. A speed limitation of 250 kts IAS applies to all flights below 3 050 m (10 000 ft) AMSL, except where approved by the competent authority for aircraft types, which for technical or safety reasons, cannot maintain this speed. ATC clearance is not required.
(g) **Class G**. IFR and VFR flights are permitted and receive flight information service if requested. All IFR flights shall be capable of establishing air-ground voice communications. A speed limitation of 250 kts IAS applies to all flights below 3 050

m (10 000 ft) AMSL, except where approved by the competent authority for aircraft types, which for technical or safety reasons, cannot maintain this speed. ATC clearance is not required.

(h) Implementation of Class F shall be considered as a temporary measure until such time as it can be replaced by alternative classification.

Annex C Frequency tables

At present, in 25 kHz channel spacing VHF COM, the frequency in use is identified by the numbers which correspond to the centre of frequency used for transmission (e.g. “Contact Brussels Approach 120.1” → 120.100MHz). In 8.33 kHz channel spacing VHF operations, the selectable frequencies are associated with the channel identifications which do not correspond exactly with frequency used (e.g. “Contact Amsterdam Approach 118.080” → 118.0750MHz). The table below provides a sample of mapping between the selected channel and its corresponding frequency

Old 25kHz radio	New 8.33kHz radio				
	Dial selection			Real TX/RX frequency	
Frequency	Dial	25kHz Frequency	8.33kHz Channel	Frequency (Mhz)	Spacing (kHz)
118.000	118.000	118.000		118.0000	25
	118.005		118.005	118.0000	8.33
	118.010		118.010	118.0083	8.33
	118.015		118.015	118.0167	8.33
118.025	118.025	118.025		118.0250	25
	118.030		118.030	118.0250	8.33
	118.035		118.035	118.0333	8.33
	118.040		118.040	118.0417	8.33
118.050	118.050	118.050		118.0500	25
	118.055		118.055	118.0500	8.33
	118.060		118.060	118.0583	8.33
	118.065		118.065	118.0667	8.33
118.075	118.075	118.075		118.0750	25
	118.080		118.080	118.0750	8.33
	118.085		118.085	118.0833	8.33
	118.090		118.090	118.0917	8.33
118.100	118.100	118.100		118.1000	25
….					

Old 25kHz radio	New 8.33kHz radio				
	Dial selection			Real TX/RX frequency	
132.000	132.000	132.000		132.0000	25
	132.005		132.005	132.0000	8.33
	132.010		132.010	132.0083	8.33
	132.015		132.015	132.0167	8.33
132.025	132.025	132.025		132.0250	25
	132.030		132.030	132.0250	8.33
	132.035		132.035	132.0333	8.33
	132.040		132.040	132.0417	8.33
132.050	132.050	132.050		132.0500	25
	132.055		132.055	132.0500	8.33
	132.060		132.060	132.0583	8.33
Etc.					

Annex D Frequently Asked Questions

Since the publication of the IR 1079/2012 regulation several States through their 8.33ISG representatives raised a number of questions and requested clarification on a number of provisions. Requests for clarifications on the VCS Regulation were also introduced by email either to EUROCONTROL or to the European Commission.

The purpose of this Annex is to provide clarifications to the requested clarifications on Regulation (EC) No 1079/2012.to general questions and on specific provisions which were and still are frequently asked by Airspace Users, Air Navigation Service Providers, States, Airports and others. The proposed clarifications have been prepared in coordination between the European Commission and EUROCONTROL.

Disclaimer: the clarification of the Union legislation provided in present document does not bind the Commission and is without prejudice to the interpretation to be provided eventually by the European Court of Justice

Note: Some of the answers to clarification requests address particular Articles of the VCS Regulation which are in reference to actions required to be implemented before 2014. These sections, while maintained here for the consistency of the annex will be considered for removal in the forthcoming editions of the Handbook document. ,

Question 1 (General):

Do 8.33 kHz channel spacing capable radios need to comply with the R&TTE Directive (2014/53/EU)?

Answer:

As described in Annex I of the R&TTE Directive, only airborne radios that fall within the scope of Article 3 of Regulation (EC) No 216/2008 are exempted. All other radios will need to comply with R&TTE directive. Radio manufactures can apply ETSI EN 300 676 to demonstrate their compliance with article 3.2 of the R&TTE directive.

Question 2 (General):

Who is responsible in a State to decide who will be responsible for reporting to the EC on the implementation of the regulation, exemptions and other aspects?

Answer:

It is not up to the European Commission (neither EUROCONTROL) to decide who represents the State. A National Representative to the Single Sky Committee might be identified as a point of contact.

Question 3 (General)

Is EASA aware and/or maintaining the status of 8.33 kHz equipage for third country operators (TCO's), and notably from the Middle East.

Answer:

EASA confirmed that in their database, they can monitor whether an aircraft of a TCO has communication equipment supporting 8.33 kHz channel spacing. An operator applying for an EASA TCO Authorisation is required to declare that information and has the obligation to keep this declaration up to date.

Question 4 (Whereas):

It seems that there are different understandings of item (15) of the EU Regulation 1079/2012.

Does it mean that according to Regulation item, frequency 122.100 MHz should be installed at all airports which provide TWR service for State a/c not equipped with 8.33 radios? It will mean that we should add this frequency to all VCCS, and necessary radio sites at all airports for handling of State a/c, to accommodate State a/c on the same frequency in all NATO States. What is the real purpose of this frequency?

Answer:

The Regulation recitals (i.e. whereas statements) are not regulatory requirements.

The use of 122.100 MHz is defined in the NATO Guide to Spectrum Management (ACP 190) in Military Operations plus the applicable national civil-military agreements.

Question 5 (Article 1):

Is it correct, that Regulation No 1079/2012 does not apply to air-air voice communications since Article 1 states that this Regulation lays down requirements for the coordinated introduction of air-ground voice communications based on 8.33 kHz channel spacing?

Answer:

If air-to-air communications are performed on VHF band (Article 2.1), then the radios used should have the 8.33 capability.

Question 6 (Article 2):

Can you please confirm if it's correct that the VCS 2 regulation is applicable to all frequencies within the VHF band, i.e. including the frequencies within that band used for approach control, aerodrome control and other aerodrome services?

Answer:

Yes, as stated in Articles 2.1, 2.2 and 2.3.

Question 7 (Article 2):

Radios not migrating to 8.33 kHz is generally understood as: CLIMAX, Military, SAR, Data-link, but the rule is not specifying this, could it be interpreted that it also applies to Broadcast and all other only-ground (no Aircraft involved) transmissions?

Answer:

Article 2.4 is specifying frequency assignments to which conversion requirements shall not apply and that will remain in 25 kHz channel spacing, namely that will remain in 25 kHz channel spacing on the following frequencies:

- the emergency frequency (121,5 MHz);
- the auxiliary frequency for search and rescue operations (123,1 MHz);
- the VHF digital link (VDL) frequencies (136,725 MHz, 136,775 MHz, 136,825 MHz, 136,875 MHz, 136,925 MHz and 136,975 MHz);
- the aircraft communications addressing and reporting system (ACARS) frequencies (131,525 MHz, 131,725 MHz and 131,825 MHz);
- where offset carrier operation (CLIMAX) within a 25 kHz channel spacing is utilised.

Broadcast and all other only-ground transmissions shall operate in the 8.33 kHz channel spacing capability as well, as they are not specified in the regulation as exempted.

Question 8 (Article 2):

Please provide clarification of the Article 2 Provision 5 “Radios intended to operate exclusively in one or more frequency assignments that will remain in 25 kHz channel spacing shall not be required to have the 8.33 kHz channel spacing capability.”

Answer:

This requirement exempts Emergency Location Transmitters (ELT), Data Link Radios, and other radios in special cases when it can be proven that they will never be used in 8.33 kHz frequency assignment airspace, from 8.33 kHz channel spacing capability.

Question 9 (Article 2):

Article 2.5 describes exactly how most ground use radios are licensed in Europe. Does this mean that operators with a ground use license for a single 25 kHz channel are still permitted and that we may continue to supply radios for them?

Answer:

Licenses to operate/use a radio/radio frequency are normally granted for a fixed limited time period. In 2018 all licenses will be changed to 8.33 kHz, except those of exempted channels.

You can supply radios without the 8.33 kHz capability exclusively to repair operational equipment operating in 25 kHz spacing environment only. All radio upgrades should have the 8.33 kHz capability.

Question 10 (Article 4):

Could you define what "radio equipage requirement means”?

Answer:

This means an obligation at local, national or EU level to equip the aircraft with a VHF radio.

Question 11 (Article 4):

Is a distinction made between commercial and non-commercial IFR-flights concerning the number of VHF radios?

Answer:

There is no difference between commercial and non-commercial IFR flights in Regulation No1079/2012.

Question 12 (Article 4):

Article 4.3 says: "and have a radio equipage requirement, are fitted with radios having the 8.33 kHz channel spacing capability." In aviation rules radio is required for commercial aviation and IFR/night flying.

For VFR flying (and especially in uncontrolled airspace (G) in daytime) there is no requirement for any kind of radio. This paragraph looks like that if new VFR/non-commercial aircraft is registered and taken into use after 17 November 2013, and it is operated outside areas requiring 8.33 radio, it can have older radio installed (made and sold before 17 November 2013).

Answer:

The obligation put forward by Regulation Article 4 paragraph 3 is indeed only applicable

if there is a radio equipage requirement for the aircraft in question. Actually this means that if the aircraft will always fly in airspace where there is no radio equipage requirement (e.g. imposed locally, nationally, or at EU level) (i.e. for VFR flying in uncontrolled airspace as you mention it), then there is no need to equip, and if there is already a 25 kHz radio equipment aboard, it does not have to be upgraded.

Question 13 (Article 4):

Does Article 4 Provision 6 mean that all radios placed on the market as of 2013 require 8.33 kHz channel spacing capability so that all radios will have the capability by 31/12/2017?

Answer:

Yes, it means that all radios which are placed on the European market as of 2013 have to be 8.33 kHz channel spacing capable as well as 25 kHz.

Question 14 (Article 4):

As manufacturers, can we supply 25 kHz only radios to the European market after 17 November 2013 through our authorized representatives?

Answer:

No new radios can be placed on the market after 17 November 2013 without the 8.33 kHz capability; however, radios already on the market can still be supplied for repairs of existing installations (e.g. for radios that are used exclusively for frequency assignments that will remain in 25 kHz channel spacing such as SAR, CLIMAX, etc.), but not for new installations and upgrades requiring 8.33 kHz capable radios.

Question 15 (Article 4):

An airport group uses 20+ handheld radios. If one of them is broken will it be possible to replace it in the future?

Answer:

Yes. It can be replaced by exactly the same model until the frequencies it is intended to operate are converted to 8.33 kHz. If it is a different model, the new model should have the 8.33 capability (Article 4.4).

Question 16 (Article 4):

Member States shall ensure that by 31 December 2017 at the latest all radios have the 8.33 kHz channel spacing capability with the exception of ground radios operated by air navigation service providers. Can you please provide some clarification on this article (Article 4.5)?

Answer:

The justification for this exception is that the main requirement for ANSPs is the conversion of channels to 8.33 kHz, not the radio capabilities. In order to make the conversions by end of 2018, ANSPs radios will require the 8.33 kHz capability, but this is not required for the 31 December 2017.

There are two different types of requirements in the rule: requirements on conversions of assignments to 8.33 kHz and requirements on radio capability.

The most important are the ones on conversions and they are applicable to ANSPs, they have to do all the conversions by end 2018.

So everybody else will have to have the radios capable by 31.12.2017, allowing the

ANSP to start testing after that date, make the conversions and the States to publish then in the COM 2 Table by 31 December 2018.

Question 17 (Article 5):

How many 8.33 capable radios are required on-board of an airplane?

Answer:

In Regulation 1079/2012 there is no reference to the amount of radios needed.

The Regulation requires in its Article 5, that the aircraft radio equipment must have 8.33 kHz channel capability.

Regulation 923/2012 which concerns the Standardised European Rules of Air (SERA) considers equipage requirements to be airspace-rule based.

Regulation 965/2012 concerning Commercial Air Transport (CAT) determines the equipage requirements when engaged in CAT IFR operations in CAT.IDE.A.345, subparagraph (b). For non-CAT operations such as most General Aviation flights, the non-commercial operations rules found in Regulation 800/2013 are more appropriate (EASA, Certification Specifications and Acceptable Means of Compliance for Airborne Communications, Navigation and Surveillance CS-ACNS, 17 December 2013)

Furthermore it is important to note that as explained above, it is still in a transitional period. The SERA rule must only be applied as of 4 December 2014 and for the non-commercial Air-Ops requirements in Regulation 800/2013, the Member States may delay application until August 2016. Until that date various national rules may cover their scope.

Question 18 (Article 5):

Sample situation: A glider flown in class G airspace and from uncontrolled airfields. There is no requirement for radio in airworthiness requirements. There is no requirement for radio in operational requirements. Also article 5 looks that airspace without radio requirement, radios with other spacing than 8.33 can be used. Can a 25 kHz radio (made and sold to end user before 17 Nov 2013) be installed?

Answer:

No. If a new radio is to be installed it should have the 8.33 kHz capability.

Question 19 (Article 5):

Please provide clarification of Article 5 Provision 4 “Without prejudice to Article 2(5), from 1 January 2018 an operator shall not operate an aircraft in airspace where carriage of radio is required unless the aircraft radio equipment has the 8.33 kHz channel spacing capability.”

Answer:

It means that from 1 January 2018 all flights operating as GAT, within the airspace of the ICAO EUR region where Member States are responsible for the provision of ATS in accordance with the Regulation 1079/2012 shall carry 8.33 kHz capable radios on board.

Question 20 (Article 14):

What means having limited impact on the network and how to apply to the derogations in the Article 14.2?

Answer:

The limited impact is not only referring to the Radio Frequency Function, it is also

including other NM services, also the capacity, safety and economic impact aspects of the impact on the network

This is the reason why Article 14.4 mentions that the Commission may review an exemption granted by a MS, "after consultation with the Network Manager".

When it comes to the requirements of the regulation expressed in articles 4(5) 5(4) and 6(10), article 14 had foreseen exemption conditions to be applied by the Member States themselves. However, in doing so, the Member States have to send to the Commission detailed justification material demonstrating that there is no impact on the network. Then the Commission has 6 months to analyse after a potential consultation with the NM and take a position.

Question 21 (Article 14):

Article 14 allowing States to grant some derogation, if this has no impact on the network. But it does not protect from the provision of Article 5.2 that, from January 1st, 2014, an aircraft under IFR may not enter an airspace class A, B or C if not equipped with a 8.33 radio, even if the ground radio remains 25 kHz.

Would it be allowed if an AIC will provide derogation that equipment of IFR aircraft in class C remaining 25 kHz can be used by aircraft in 25 kHz airspace?

Answer:

Article 14 on exemptions cannot be invoked with respect to the provisions of Article 5.2. Considering the timeline and equipage obligations of the Regulation, it is correct to say that the Regulation originally envisaged and actually mandated that aircraft would have to be equipped with 8.33 kHz (as of 1 January 2014) before all the communication channels would have been converted. The Regulation does legally not provide for such derogation for equipment of IFR aircraft in class C airspace remaining in 25 kHz channel assignment at least until the moment that the conversions to 8.33 kHz in the class C are applied. Considering that in the scope of the SES reporting obligations for Member States specific questions will be asked on the implementation and measures taken by the Member States regarding their various obligations from the Interoperability Regulations (including this one), it is advisable for the concerned Member States to document and justify any decision or deviation from the obligations of the Regulation they would like to apply.

Question 22 (Article 14):

The operator(s) are going to ferry/fly aircraft though European airspace. Can you please provide information on exemptions/ or to grand an exemption on the specific FL.

Answer:

As per Article 6 of the Regulation, all airspace above FL195 in Europe must have been converted to the 8.33 kHz radio spacing, with the exception the frequency assignments that stay in 25 kHz as a result of a safety requirement and of 25 kHz frequency assignments used to accommodate State aircraft as foreseen in Article 6 (10).. More over according to Article 5.1 of the Regulation No 1079/2012 "an operator shall not operate an aircraft above FL 195 unless the aircraft radio equipment has the 8.33 kHz channel spacing capability."

Therefore, considering the possible exemptions provided by some States in accordance with Article 14, it is recommended, for operators planning to fly through the airspace of those States, to contact the responsible authorities (CAAs) of those States and to check the relevant published AICs of those states.

Question 23 (Article 14):

Some helicopters are not at the moment equipped with 8.33 kHz spacing VHF transceivers. Can we ask the national authorities for an exemption?

Answer:

Regulation 1079/2012 allows for exemptions in a few special cases. Your national authorities can decide to propose those exemptions when there is a limited impact on the network.

Question 24 (Article 14)

What is the nature and duration of derogations and exemptions? Are those to be considered temporary only or permanent?

Answer:

The text of the regulation is different for Art 14.1, which speaks specifically about temporary derogations, and for Art 14.2 with speaks about exemptions for cases having limited impact on the network. Because of the evolution expected in the network, a case-by-case analysis should be made to the possible derogation or exemption requests.

Question 25 (Article 14)

The Regulation does not specifically include a deadline for requesting exemptions.

Answer:

According to the Art 14.3 process, Member States have to provide the Commission with the need justification at least one year before the relevant application dates (i.e. 1 December 2016 for Art 4.5, 1 January 2017 for Art 5.4 and 31 December 2017 for Art 6.10)

Question 26 (Annex 3):

Is Annex III Provisions 9b, 9c on the local assessment a purely local issue, or if it should involve EASA, EC or Network Manager?

Answer:

Yes, it is a local issue. The Regulation is referring to the local safety assessment which shall be done by each Member State implementation 8.33 kHz. For more information please see Justification Material for the Draft Implementing Rule on the 2nd Phase of the Air-Ground Voice Channel Spacing 6.3 Safety Impact Assessment.

Question 27 (Regulation No 657/2013):

How to calculate 25% of ACC frequencies according to Regulation No 657/2013? Shall CLIMAX, Military, SAR, Data-link be included in the total number of ACC frequencies for calculation of 25%?

Answer:

It shall be calculated as 25% from the total number of ACC frequencies assigned to the State in COM2 Table, excluding CLIMAX, Military, SAR, Data-link and other exempted frequencies which shall not be included into 100%. 100% contains only ACC frequencies which can be potentially converted from 25 kHz into 8.33 kHz. Only frequencies assigned as ACC in COM2 are included into calculation, frequencies stated as VOLMET and other shall not be included to the calculation of 25% target.

The number of conversions= 25% *(COM2 ACC 25kHz freq. assignments – CLIMAX – Exempted due to safety reasons – Accommodate State Aircraft).

For example, if a State owns 22 ACC frequencies having a 25kHz channel spacing and 2

of them are CLIMAX, the State should convert 5 frequencies. The 25% conversion target would be applicable to the amount of 25 kHz assignments, not only to ACC assignments.

25% * (22-2-0-0) = 5

The 25% conversion target can be fulfilled by any type of non-OPC assignment (not only ACCs) in the 117,975-137 MHz band.

For example,

- 1st frequency assignment 118.000 (APP) convert to 118.005
- 2nd 135.550 (VOLMET) convert to 134.880
- 3rd 126.750 (ACC) convert to 126.755
- 4th 119.150 (TWR) convert to 118.005
- 5th 130.050 (ATIS) convert to 130.055

The conversions shall be performed in the COM2 table by the end of 2014. Frequency 8.33 kHz conversion means that the channel assigned on 8.33 kHz only (i.e. the former 25 kHz assignation disappeared from SAFIRE) according to the Regulation 1079/2012 Article 3.5.

Annex E Radio equipment carriage requirements (IR OPS)

The EASA Regulatory System of Implementing Regulations (IRs) under Part-OPS has been developed and was adopted as Regulation (EC) 965/2012 of the European Commission in October 2012 (IR-OPS)[3]. The IR-OPS covers the air operation of all aircraft except tilt-rotor, airships and UAVs.

This annex reproduces the provisions derived from the IR-OPS regarding the radio equipment requirements. Please refer to the Regulation to see the full regulatory legal text (http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2012:296:0001:0148:En:PDF)

The IR-OPS does not apply to:

- Aeroplanes used by customs or police services
- Parachute dropping and fire-fighting flights and associated positioning
- Flights before, during and immediately after an aerial work activity provided that the flights before and after the aerial work are connected with that activity

The regulation applies to all type of aircraft operating within the airspace of the EU Member States. This includes commercial and non-commercial type operations executed with complex or non-complex aircraft types as per the descriptions below

The term ‘complex motor-powered aircraft’ refers to:

- an aeroplane:
  - with a maximum certificated take-off mass exceeding 5,700 kg; or
  - certificated for a maximum passenger seating configuration of more than nineteen; or
  - certificated for operation with a minimum crew of at least two pilots; or
  - equipped with (a) turbojet engine(s) or more than one turboprop engine; or
- a helicopter certificated:
  - for a maximum take-off mass exceeding 3,175 kg; or
  - for a maximum passenger seating configuration of more than nine; or
  - for operation with a minimum crew of at least two pilots; or
  - a tilt rotor aircraft.

An aircraft not meeting the above criteria is an ‘other-than-complex motor-powered aircraft’.

Commercial operations

The term ‘commercial’ refers to aircraft operations involving the transport of passengers, cargo or mail for remuneration or hire. Operations involving the transport of passengers, cargo or mail not for remuneration or hire are ‘non-commercial’.

(CAT.IDE.A.330) Aeroplane radio communication equipment

(a) Aeroplanes shall be equipped with the radio communication equipment required by the applicable airspace requirements.

[3] Regulation (EC) 965/2012 of the European Commission lays down detailed rules for commercial air transport operations with aeroplanes and helicopters, including ramp inspections of aircraft of operators under the safety oversight of another State when landed at aerodromes located in the territory subject to the provisions of the Treaty. This regulation, which is generally known as IR-OPS (Implementing Rules – Operations), replaces EU-OPS (Regulation (EC) 859/2008).

(b) The radio communication equipment shall provide for communication on the aeronautical emergency frequency 121,5 MHz.

(CAT.IDE.A.340) Aeroplane radio equipment for operations under VFR over routes navigated by reference to visual landmarks

Aeroplanes operated under VFR over routes navigated by reference to visual landmarks shall be equipped with radio communication equipment necessary under normal radio propagation conditions to fulfil the following:

(a) communicate with appropriate ground stations;

(b) communicate with appropriate ATC stations from any point in controlled airspace within which flights are intended; and

(c) receive meteorological information.

(CAT.IDE.A.345) Aeroplane communication and navigation equipment for operations under IFR or under VFR over routes not navigated by reference to visual landmarks

(a) Aeroplanes operated under IFR or under VFR over routes that cannot be navigated by reference to visual landmarks shall be equipped with radio communication and navigation equipment in accordance with the applicable airspace requirements.

(b) Radio communication equipment shall include at least two independent radio communication systems necessary under normal operating conditions to communicate with an appropriate ground station from any point on the route, including diversions

(CAT.IDE.H.330) Helicopter radio communication equipment

(a) Helicopters shall be equipped with the radio communication equipment required by the applicable airspace requirements.

(b) The radio communication equipment shall provide for communication on the aeronautical emergency frequency 121,5 MHz

(CAT.IDE.H.340) Helicopter radio equipment for operations under VFR over routes navigated by reference to visual landmarks

Helicopters operated under VFR over routes that can be navigated by reference to visual landmarks shall be equipped with radio communication equipment necessary under normal radio propagation conditions to fulfil the following:

(a) communicate with appropriate ground stations;

(b) communicate with appropriate ATC stations from any point in controlled airspace within which flights are intended; and

(c) receive meteorological information.

(CAT.IDE.H.345) Helicopter communication and navigation equipment for operations under IFR or under VFR over routes not navigated by reference to visual landmarks

(a) Helicopters operated under IFR or under VFR over routes that cannot be navigated by reference to visual landmarks shall be equipped with radio communication and navigation equipment in accordance with the applicable airspace requirements.

(b) Radio communication equipment shall include at least two independent radio communication systems necessary under normal operating conditions to communicate with an appropriate ground station from any point on the route, including diversions

Non-commercial operations - with complex motor-powered aircraft

(NCC.IDE.A.245) Aeroplane radio communication equipment

(a) Aeroplanes operated under IFR or at night, or when required by the applicable airspace requirements, shall be equipped with radio communication equipment that, under normal radio propagating conditions, shall be capable of:

(1) conducting two-way communication for aerodrome control purposes;

(2) receiving meteorological information at any time during flight;

(3) conducting two-way communication at any time during flight with those aeronautical stations and on those frequencies prescribed by the appropriate authority; and

(4) providing for communication on the aeronautical emergency frequency 121,5 MHz.

(b) When more than one communication equipment unit is required, each shall be independent of the other or others to the extent that a failure in any one will not result in failure of any other

(NCC.IDE.H.245) Helicopter radio communication equipment

(a) Helicopters operated under IFR or at night, or when required by the applicable airspace requirements, shall be equipped with radio communication equipment that, under normal radio propagating conditions, shall be capable of:

(1) conducting two-way communication for aerodrome control purposes;

(2) receiving meteorological information;

(3) conducting two-way communication at any time during flight with those aeronautical stations and on those frequencies prescribed by the appropriate authority; and

(4) providing for communication on the aeronautical emergency frequency 121,5 MHz.

(b) When more than one communications equipment unit is required, each shall be independent of the other or others to the extent that a failure in any one will not result in failure of any other.

(c) When a radio communication system is required, and in addition to the flight crew interphone system required in NCC.IDE.H.155, helicopters shall be equipped with a transmit button on the flight controls for each required pilot and crew member at his/her assigned station.

Non-commercial - air operations with other-than-complex motor-powered aircraft

(NCO.IDE.A.190) Aeroplane radio communication equipment

(a) Where required by the airspace being flown aeroplanes shall be equipped with radio communication equipment capable of conducting two-way communication with those aeronautical stations and on those frequencies to meet airspace requirements.

(b) Radio communication equipment, if required by (a), shall provide for communication on the aeronautical emergency frequency 121,5 MHz.

(c) When more than one communication equipment unit is required, each shall be independent of the other or others to the extent that a failure in any one will not result in

failure of any other

(NCO.IDE.H.190) Helicopter radio communication equipment

(a) Where required by the airspace being flown helicopters shall be equipped with radio communication equipment capable of conducting two-way communication with those aeronautical stations and on those frequencies to meet airspace requirements.

(b) Radio communication equipment, if required by (a), shall provide for communication on the aeronautical emergency frequency 121,5 MHz.

(c) When more than one communications equipment unit is required, each shall be independent of the other or others to the extent that a failure in any one will not result in failure of any other.

(d) When a radio communication system is required, and in addition to the flight crew interphone system required in NCO.IDE.H.135, helicopters shall be equipped with a transmit button on the flight controls for each required pilot and/or crew member at his/her working station

(NCO.IDE.S.145) Sailplane radio communication equipment

(a) Where required by the airspace being flown sailplanes shall be equipped with radio communication equipment capable of conducting two-way communication with those aeronautical stations or those frequencies to meet airspace requirements.

(b) Radio communication equipment, if required by (a), shall provide for communication on the aeronautical emergency frequency 121,5 MHz

(NCO.IDE.B.145) Balloon radio communication equipment

(a) Where required by the airspace being flown, balloons shall be equipped with radio communication equipment capable of conducting two-way communication with those aeronautical stations or those frequencies to meet airspace requirements.

(b) Radio communication equipment, if required by (a), shall provide for communication on the aeronautical emergency frequency 121,5 MHz.

For further information please consult:

http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2012:296:0001:0148:En:PDF

Annex F 8.33 VCS Safety Considerations

The Network Manager, through the 8.33 Implementation Support Project, was asked by a number of stakeholders to support them in the development of the local safety assurance documentation (safety case).

In response to this request a safety workshop was organized on 20 and 21 October 2016 at EUROCONTROL premises in Brussels with the aim to provide information required for the development of safety guidance material in support of 8.33 kHz VCS implementation by the concerned States and service providers. For this purpose the workshop agenda included safety considerations as well as generic hazard assessment sessions.

The workshop was attended by representatives of National authorities, pilots, safety experts and ANSPs from a number of European countries.

This Annex provides a summary of the result of the 8.33 VCS Safety Considerations Workshop held in October 2016 and provides guidance on the identification of the safety hazards associated to the implementation of 8.33 kHz VCS below FL195 at local level and development of the associated Local Safety Case argument

For more details regarding the Safety Consideration workshop, methodology, participants and the results please consult the workshop report at:

https://ost.eurocontrol.int/sites/833ISG/SitePages/Home.aspx

Annex F 1. Hazard Assessment Scope

The safety considerations and hazard assessment process included the following steps:

Step 1: Safety considerations sessions to identify the scope of the change (8.33 kHz VCS implementation below FL195) and understand its impact on the ATM systems (people, procedures and equipment) elements of, both ground and airborne based, and on the operational environment. The output of these sessions is detailed in Appendix 2 of this report.

Step 2: Review of the hazards identified by the safety assessment of 8.33 kHz VCS implementation above FL195 in order to validate their applicability also in the airspace below FL195. The process included also the validation of the applicability of the identified hazard effects and their associated severities.

Step 3: Review of the additional scenarios identified by the safety assessment of 8.33 kHz VCS above FL195 and assessment of their relevance and potential safety impact in the airspace below FL195.

Step 4: Review of the hazard mitigation means identified by the safety assessment of 8.33 kHz VCS implementation above FL195 and assessment of their relevance to and effectiveness in the operational environment below FL195.

Step 5: Identification of any ‘new’ hazards associated to the implementation of 8.33 kHz VCS below FL195 and assessment of their effects on safety of aircraft operations. The output of Step 1 provided the baseline for the conduct of this step.

Annex F 2. 8.33 kHz VCS below FL195 Hazards

The workshop identified six (6) hazards as being applicable to the implementation of 8.33 kHz VCS below FL195. Each of these hazards is described below with reference to:

- the potential hazard causal factors;
- the probability of hazard occurrence compared to 8.33 kHz environment above FL195;
- the effects on ATS provision and aircraft operation;
- the severity of worst credible effect[4];
- the potential risk mitigation means.

The information provided with respect to the identified and analysed hazards should be used as guidance only. This information is not exhaustive and may vary depending on the particularities of the local ATM system and local operational environment. It is recommended that the local safety case development process includes review of these hazards in the perspective of the local operational environment within a full Functional Hazard Assessment exercise.

The severity classification scheme provided in Annex II of Regulation EC No 1035/2011 has been used in the assessment of hazards' effects.

a. Hzd-1: Aircraft unable to communicate on 8.33 kHz sector frequency

Description: It is not possible to establish air-ground voice communication between the pilot and the ATC on an 8.33 kHz sector frequency.

Causes:

- aircraft not equipped with 8.33 kHz capable radio (exempted or non-compliant)
- incorrectly fitted radio
- pilot not trained in using the radio equipment on board the aircraft

Probability of hazard occurrence: Frequency of occurrence may increase due to the mix of operations and mix of aircraft below FL195 (e.g. various types of GA operations, recreational flying by balloons, gliders, powered aircraft, fixed wing, rotary aircraft, etc.)

Effects:

- interference on adjacent communication channels due to frequent pilot attempts to communicate on a frequency believed to be the 8.33 channel leading to workload and difficulties of communication in other ATC sectors.
- increased pilot workload due to the action taken to verify the correct sector frequency and additional attempts to establish radio contact with ATC;
- in most cases increased controller workload caused by the attempts to establish contact with the non-communicating aircraft, by applying the RCF procedures and by implementing the required actions to ensure safety of other traffic that could be affected by the non-communicating aircraft;
- in the worst case scenario a separation infringement may occur due to: (1) presence of one or more other aircraft on conflicting trajectory with the non-communicating (8.33 kHz incapable) aircraft and (2) insufficient time for the

[4] Most probable effect in the worst case scenario

implementation of conflict prevention actions, i.e. provision of separation instructions by the controller to the other conflict participant(s) and their implementation by the pilot(s);
- in some specific cases (e.g. State border crossing by the non-communicating aircraft) interception might be undertaken in accordance with applicable local rules and procedures, which might be considered as a threat to the subject aircraft and its occupants;

Severity of worst credible effect: major incident (severity 3)

Mitigation means:

- awareness campaign for all concerned operators - pilots, controllers, A/FIS officers, vehicle drivers on aerodromes/airfields, etc. regarding the requirements for 8.33 kHz VCS communications in the area of operation;
- dedicated awareness campaign for GA pilots for better pre-flight preparation: e.g. consultation of AIP, NOTAM and other information regarding the applicable requirements in area in which they intend to operate;
- within the 8.33 kHz conversion process ensure a period of time in which the 25 kHz frequency is converted to the central 8.33 channel; plan for a transition period in which reverting to the initial 25 kHz frequency is technically possible (in case of significant problems with non-equipped aircraft entering the airspace concerned);
- test, parameters verification and fine tuning of new/upgraded radios (both ground and airborne);
- upon receiving a frequency change instruction to select a 8.33 kHz channel the pilot informs the controller he is not able to tune to it; this should normally lead to an agreed solution depending the case;
- when not able to establish communications with ATC upon transfer the pilot reverts to the previous sector frequency to ask confirmation of the next sector frequency; this should normally lead to an identification of the problem and an agreed solution depending the case;
- pilot verifies the ATC sector frequency/channel by using the available on board navigation charts/maps (electronic and/or printed) and takes appropriate action;
- use of UHF for air-ground voice communication, if equipment is available and UHF communications are applicable in the area concerned;
- use of dedicated 25 kHz frequency for exempted/non-equipped aircraft;
- correct application of the communication failure (RCF) procedures by the pilot and/or controller;
- use of the emergency communication frequency – 121.5 kHz;
- the controller resolves conflicts with other aircraft in the sector's airspace by issuing instructions to the other aircraft;

b. Hzd-2: Interference on 8.33 kHz sector frequency

Description: Presence of noise, message garbling or communication exchange not relevant to the affected ATS sector, which may prevent the pilots or controller(s) tuned to that sector frequency to receive and/or understand correctly the transmitted voice messages (instructions, clearances, read-backs, etc.).

***Note**:* This hazards exists also in the current operational environments where 25 kHz and 8.33 kHz VCS are used.

Causes:

- non-equipped aircraft communicating on 25 kHz frequency (either in air to air communications in all classes of airspace or trying to communicate on a 25 kHz tuned frequency in an airspace in which 8.33 kHz VCS communications are performed);
- incorrect radio (Rx/Tx) installation/parameter settings;
- radio (Tx) performance characteristics out of required range;
- increased number of frequencies/channels for communication used in a geographical area[5];
- unauthorized air-to-air use of 25 kHz frequency, including in class E/G airspace;

Probability of hazard occurrence: Until the conversion to 8.33 kHz below FL195 is completed frequency of occurrence may increase due to the mixed use of 8.33 and 25 kHz VCS in adjacent airspaces and the partial aircraft equipage rate.

Effects:

- simultaneous (overlapping) transmissions on a ATS frequency/channel;
- unreadable communication messages;
- in the extreme case the frequency in use for communication or information broadcast may become unusable (blocked);
- distortions may contribute to call-sign confusion, information, instructions and clearances misunderstandings;
- workload increase for the affected parties to ensure proper communication, i.e. messages delivered and correctly understood by the intended recipients)

Notes:

- Interference may occur in the area of responsibility (AoR) of the ATS unit or in the AoR of an adjacent ATS unit.
- Tests are planned in 2017 (by at least one State) to verify the actual level (severity) of interference a transmission on 25 kHz frequency may create on adjacent 8.33 kHz channels.

Severity of worst credible effect: significant incident (severity 4)

Mitigation means:

- awareness campaign for all concerned operators - pilots, controllers, A/FIS officers, vehicle drivers on aerodromes/airfields, etc. regarding the requirements for 8.33 kHz VCS communications in the area of operation;
- adherence to procedures for frequency management;
- within the 8.33 kHz conversion process ensure a period of time in which the 25 kHz frequency is converted to the central 8.33 channel; plan for a transition period in which reverting to the initial 25 kHz frequency is technically possible (in

[5] The more frequencies with reduced channel spacing are used, the higher is the probability of unexpected Rx/Tx deviations from the standard parameters, anomalous radio wave dissemination and interference.

case of significant problems with non-equipped aircraft entering the airspace concerned);
- test, parameters verification and fine tuning of new/upgraded radios (ground, airborne and handheld);
- request the other party to repeat the message;
- use of back-up frequency;
- use of emergency communication frequency – 121.5 kHz;
- use of (existing, or updated as necessary) procedures for cases of frequency interference;

c. Hzd-3: Aircraft does not establish or establishes late communication on sector frequency

Description: The pilot of an 8.33 kHz capable aircraft does not establish radio communication with the ATC on the relevant sector frequency or establishes the communication late (e.g. several minutes after entry in the sector's airspace).

***Note**:* This hazards exists also in the current operational environments where 25 kHz and 8.33 kHz VCS are used.

Causes:

- incorrectly fitted radio
- selection of incorrect channel/frequency;
- misunderstanding of the communication channel received on transfer;
- delayed frequency selection;
- mode change from frequency to channel selection not done (applicable to some radios);

Probability of hazard occurrence: Frequency of occurrence may increase initially after implementation of 8.33 kHz VCS below FL195 due to lack of awareness and knowledge of 8.33 kHz channel selection (differences to frequency selection) by pilots who do not have previous experience with 8.33 kHz operations, in particular pilots involved in recreational flying.

Effects:

- increased pilot workload due to the action taken to verify and select the correct 8.33 kHz channel;
- in most cases increased controller workload caused by the attempts to establish contact with the non-communicating aircraft by applying the RCF procedures and the actions taken to ensure safety of other traffic that might be affected by the non-communicating aircraft;
- in the worst case scenario a separation infringement may occur due to presence of one or more aircraft on conflicting trajectory with the non-communicating one and insufficient time for the controller to prevent the separation infringement by issuing spacing instructions to the other conflict participant(s) (e.g. conflict close to the sector boundary);
- in some specific cases (e.g. State border crossing by the non-communicating aircraft) interception might be undertaken in accordance with applicable local

rules and procedures, which might be considered as a threat to the subject aircraft and its occupants;

Severity of worst credible effect: major incident (severity 3)

Mitigation means:

- test, parameters verification and fine tuning of new/upgraded radios (ground and airborne);
- dedicated awareness campaign for GA pilots for better pre-flight preparation: e.g. consultation of AIP, NOTAM and other information regarding the applicable requirements in area in which they intend to operate;
- implementation of communication best practices: e.g. pilot notes the lack of air-ground communication exchange, verifies the frequency/channel selection on the radio panel and corrects it;
- pilot contacts the previous ATC sector/unit, obtains confirmation of the sector frequency/channel and correctly selects it;
- pilot verifies the ATC sector frequency/channel by using the available on board navigation charts/maps (electronic and/or printed) and correctly selects the appropriate 8.33 kHz channel;
- correct application of the RCF procedures by the pilot and/or controller;
- use of emergency communication frequency – 121.5 kHz (this mitigation means may not applicable if only one radio is available on board of aircraft);
- controller resolves conflicts with other aircraft in the sector's airspace by issuing instructions to the other aircraft;
- awareness campaigns for airspace users reducing the risk of confusion between 25 kHz frequencies and 8.33 kHz channels

d. Hzd-4: Unplanned aircraft diversion around 8.33 kHz airspace

Description: Due to the need to avoid an 8.33 kHz airspace (i.e. an airspace in which 8.33 kHz capable radio equipment is required on board the aircraft) an 8.33 kHz non-equipped aircraft is required to deviate from its planned or intended route (without pilot's prior knowledge of the need to do so). The unexpected diversion is considered a threat to the safety of aircraft.

Causes:

- FPL route incorrectly filed via 8.33 kHz airspace;
- Lack of or inappropriate pre-flight preparation;

Probability of hazard occurrence: Until the conversion to 8.33 kHz below FL195 is completed, and 8.33 kHz equipage of all aircraft within the area concerned is achieved frequency of occurrence may increase due to the mixed use of 8.33 and 25 kHz VCS in adjacent airspaces and the partial aircraft equipage rate.

Effects:

- Increased density of flights in uncontrolled airspace (or in airspace in which 8.33 kHz VCS is not required)

- Increased controller workload to coordinate of changed route with adjacent sectors/ATS units and update the system flight plan (when applicable);
- Increased pilot workload to identify and follow the new route or revert back to the departure airfield;

Severity of worst credible effect: significant incident (severity 4)

Mitigation means:

- dedicated awareness campaign for GA pilots, and in particular for pilots involved in recreational flying, for better pre-flight preparation: e.g. consultation of AIP, NOTAM and other information regarding the applicable communication requirements and airspace constraints in area in which they intend to operate;
- Pilot requests and controller grants permission of the non-equipped aircraft to cross 8.33 kHz airspace in case destination cannot be reached (due to significant mileage increase and threat of fuel starvation)
- Avoid diversion by using 25 kHz frequency for exempted/non-equipped aircraft (e.g. FIS frequency (if available);
- promulgation and use of procedures for 8.33 kHz non-equipped aircraft;
- Use of existing procedures for unusual and emergency situations, as applicable;
-

e. Hzd-5: Too many 8.33 kHz exempted aircraft in an ATC sector

Description: The number of 8.33 kHz exempted aircraft in an ATC sector is such that controller's ability to provide safe ATS may be compromised.

***Note**:* This hazards exists also in the current operational environment above FL 195 where 8.33 kHz VCS is used.

Causes:

- national authority grants too many exemptions
- incorrect assumptions regarding capability of the service provider to handle exempted flights

Probability of hazard occurrence: Frequency of occurrence is not expected to increase due to the implementation of 8.33 kHz VCS below FL195 per se, but will depend on the number of exemptions granted by the national authorities.

Effects:

- increased controller workload to handle many exempted flights on a different frequency (e.g. UHF);
- increased pilot workload to maintain full situation awareness (partial loss of 'party line');

Severity of worst credible effect: significant incident (severity 4)

Mitigation means:

- use of UHF for handling of exempted aircraft (flights);
- availability of sufficient number of assigned UHF frequencies for accommodation of the exempted flights (i.e. the number of UHF frequencies is aligned with the predicted density of the exempted flights);

- coupling of (or parallel transmission on) VHF and UHF;
- reduction of ATC sector capacity to ensure safe ATS;

***Note*:** Effectiveness and applicability of the above mitigation means, or in other words the safety risk associated with the use of one (or few) UHF only for handling of exempted flights in the entire AoR of the ATS unit and/or coupling of that UHF with all VHFs used, need to be assessed at local level. Such assessment shall take into account the estimated demand to be created by the envisaged exemptions to be granted by the State, the usual GAT demand and the number of UHF frequencies available.

- use of the central 8.33 kHz frequency/channel;

Note: Using the central frequency/channel is possible only temporary and may not be possible to be applied to all conversions. Also, from a technical point of view this solution may not be mitigation against exempted aircraft since the use of a 25vkHz radio may create more communication issues on the 8.33 kHz frequency even if it is the central one. For example, non- reception of the transmission, interferences on other adjacent channels, etc.

- use of 25 kHz VCS (if available/preserved);
- promulgation and use of procedures for handling of exempted/non-equipped flights;
- training of controllers to handle exempted/non-equipped flights;
- limit the number of exempted aircraft to be handled by ATC in a volume of airspace (e.g. sector) simultaneously and/or per unit of time (e.g. per hour);
- apply ATFCM procedures (flow measures);
- apply tactical traffic restrictions (normally OPS SUP responsibility);

f. Hzd-6: Too many non-communicating aircraft in the vicinity of an aerodrome/airfield or in FIS airspace

Description: The number of 8.33 kHz non-equipped aircraft in a particular airspace volume where two-way radio communication is not mandatory is such that pilot ability to maintain separation from other traffic and/or FIC officer/controller's ability to provide safe flight information service may be compromised.

Context example: The use of a small airfield (with or without AFIS) by high number of non-equipped aircraft could lead to reduced situation awareness of the pilots intending to land at or depart from that airfield.

Causes:

- increased use of class E and/or class G airspace to avoid airspace where use of 8.33 kHz VCS is mandatory;

Probability of hazard occurrence: Frequency of occurrence is expected to increase due to the assumed increased number of non-communicating aircraft in a particular airspace.

Effects:

- increased pilot workload (i.e. more effort required) to ensure self-separation from other traffic in the vicinity;
- unexpected traffic on the runway/landing strip or on final/departure path;
- safety of aircraft may be compromised;

Severity of worst credible effect: major incident (severity 3)

Mitigation means:

- awareness campaign for airspace users, in particular pilots involved in recreational flying;
- use of 'see and avoid';
- provision of information about 'unknown traffic' by FIC officer/controller, if surveillance data are available;
- implementation of mandatory radio communication if risk is assessed to be intolerable;
- provision of common GA frequencies in 25 kHz, if available.

g. Other potential safety related issues

A couple of additional potential safety issues were identified in the process. Due to time constraints and their particular dependency on the local environment these issues were not further developed during the workshop safety considerations sessions. However, it is recommended that they are addressed within the scope of the local safety case development process:

- Increased air to air communications in class G airspace on unapproved channels due to necessity to maintain traffic situational awareness;
- Increased density of aircraft in uncontrolled airspace due to 8.33 kHz VCS airspace avoidance. (The reduction of uncontrolled airspace in some states following the 8.33 kHz VCS deployment was noted also as a potential contributory factor to this issue.)

Annex F 3. Conclusions

The safety workshop enabled the identification and description of six (6) generic operational hazards that are relevant to the implementation of 8.33 kHz voice channel spacing. Most of them are not 'new', i.e. they exist in the current operational environment where 25 kHz and/or 8.33 kHz VCS is used.

The severities of hazards' worst credible effects are not expected to increase in comparison with the severities defined for the 8.33 kHz VCS deployment above FL195. However, if appropriate mitigation means are not implemented, the frequency of hazard occurrence might increase, at least during the transition period until the total aircraft equipage is achieved.

During the workshop discussions a couple of other potential safety related issues were identified, however they were not further analysed due to the strong dependency on the local operational environment. It is recommended that these issues are addressed within the scope of the local safety assessment and safety case development activities.

In order to maintain the safety risk to aircraft operations at the current (acceptable) level, a number of potential risk mitigation measures for each of the 6 hazards have been identified.

It is important to note that the severity of hazard effects and the probability of their occurrence, as well as the applicability and effectiveness of the risk mitigation means, may differ between States, service providers and ATS units due to the difference in the operational environments and ATM systems deployed (e.g. traffic demand, traffic mix,

number of exempted aircraft, airspace classification, technical system support, use of UHF, procedures, etc.). **Therefore the information about 8.33 kHz related hazards provided in this report should be reviewed and adapted, as appropriate, for use in local safety cases taking into account local operational environment and specifics.**

The safety considerations output is provided in the full version of this report and identifies the generic components of the ATM system (people, procedures and equipment) and operational environment impacted by the implementation of 8.33 kHz VCS below FL195. It offers also some additional information related to the anticipated impact. The inventory of impacted components provides guidance to the concerned stakeholders at local level (e.g. NSA, service providers, airport operators, airspace users, etc.) regarding the scope of the planned change and respectively, regarding the safety argument they need to build at local level.

As notified above, **the safety considerations output needs to be reviewed and adapted at local level, as some components identified as impacted may not be or may not exist in the local operational environment.**

The following generic risk mitigation measures, associated to the changes to the ATM system components required for the implementation of 8.33 kHz VCS below FL195 have been identified:

- Ensure that scope of local safety assessments by the aviation service providers include the changes to the functional system (e.g. radios' replacement) needed for the implementation of 8.33 kHz VCS below FL195.
- Ensure that all concerned staff is familiar with the changes to the ATM functional system (e.g. CWP HMI, voice communication system HMI, etc.).
- Dedicated awareness campaigns shall ensure that all 8.33 kHz stakeholders understand their potential contribution to the safety risk and their role in preventing or mitigating it. The awareness campaigns shall include a wide variety of means (e.g. specialised magazines, websites, events, briefings, letters, leaflets, visits, etc.) in order to reach as many as possible organisations and individuals.
- Monitoring of operations following 8.33 kHz implementation below FL195, risk analysis and identification of corrective actions, if needed (e.g. to respond to shift in traffic, new hotspots, etc.)
- Synchronised and timely publication of updated aeronautical information (e.g. AICs, AIP amendments) including arrangements for the transition period (between the publication and the implementation) to ensure timely update of aeronautical databases of service providers (such as Jeppessen, LIDO, etc.).
- Increased awareness of GA community (in particular recreational aviation) about the use of all approved information means for pre-flight preparation. The use of AIP, AIC, NOTAM in the pre-flight briefing should be encouraged and recommended.

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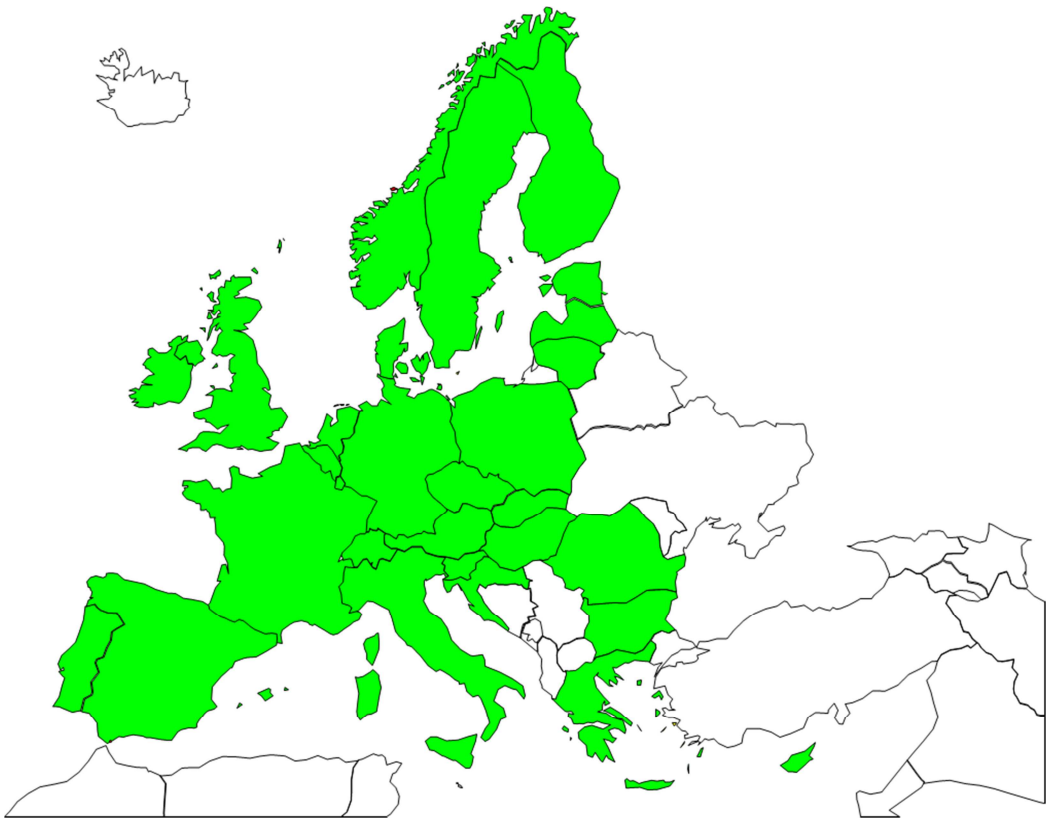
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Annex H 8.33 States



The following European States are implementing 8.33kHz channel spacing communications in the VHF aeronautical band:

Belgium (EB)

Germany (ED)

Estonia (EE)

Finland (EF)

UK (EG)

The Netherlands

Ireland (EI)

Denmark (EK)

Luxembourg (EL)

Norway (EN)

Poland (EP)

Sweden (ES)

Latvia (EV)

Lithuania (EY)

Bulgaria (LB)

Cyprus (LC)

Croatia (LD)
Spain (LE)
France (LF)
Greece (LG)
Hungary (LH)
Italy (LI)
Slovenia (LJ)
Czech Republic (LK)
Malta (LM)
Austria (LO)
Portugal (LP)
Romania (LR)
Switzerland (LS)
Slovakia (LZ)