

Concept paper

Proposal for a pan-Scandinavian exemption from the requirement to carry and use radio equipment with 8,33 kHz channel spacing from January 1st 2018 for aircraft flown at lower altitudes, typically engaged in general aviation and air sports

1. Proposal

The Scandinavian air sports organisations¹ hereby propose the following exemption to article 5 (4) of regulation (EU) 1079/2012, according to article 14 (2) of the same regulation:

Aircraft operators may operate in Danish, Norwegian and Swedish airspace where carriage of radio is required, even though the aircraft radio equipment does not have the 8,33 kHz channel spacing capability, provided that the aircraft does not operate above a pre-assigned maximum altitude and that the radio transmitting power is 10 Watts or less.

The pre-assigned maximum altitude is initially set at flight level 95, but may be reduced by the competent authorities in certain areas, whenever strictly required for frequency co-ordination purposes. A minimum of one month's notice shall be provided, whenever a competent authority chooses to utilise this provision.

This exemption shall expire on January 1st 2028. The exemption may be withdrawn by the competent authorities in certain areas prior to this date, whenever strictly required for frequency co-ordination purposes. A minimum of three months' notice shall be provided, whenever a competent authority chooses to utilise this provision.

Air operators wishing to utilise this exemption is required to perform a frequency analysis of their radio equipment during each annual inspection of the aircraft to ensure that any excessive drift is detected and rectified.

This exemption is compatible with a pan-Scandinavian conversion to air communication frequencies with 8,33 kHz assignments, provided that frequency assignments in Denmark, Norway and Sweden are exclusively transferred to 8,33 kHz frequencies, which also match the 25 kHz grid.

The Eurocontrol Network Manager may give due priority to Denmark, Norway and Sweden as regards 8,33 kHz assignments matching the 25 kHz grid for frequency management purposes.

¹ Kongelig Dansk Aeroklub (KDA), Norges Luftsportforbund (NLF), Kungliga Svenska Aeroklubben (KSAK), AOPA (Sweden), EAA Chapter 573 (Norway), EAA (Sweden), Segelflyget (Sweden) and FFK(Sweden)

The proposal's assumption of potential priority to Denmark, Norway and Sweden for the purposes of frequency management is considered to be in line with the principles of subsidiarity and proportionality in the Treaty of the European Union, taking into account that these territories are not parts of the core area for European radio frequency congestion.

The proposal is considered to have "limited impact on the network", in line with the legal requirements for such exemptions.

2. Background

General Aviation and air sports represent the largest fleet of aircraft in Scandinavia with a substantial margin. Approximately 3.900 aircraft within these segments are registered and operated in Denmark, Norway and Sweden.

The requirement to convert all aircraft radios to 8,33 kHz channel spacing by January 1st 2018 represents significant challenges:

a) Cost

The cost of purchasing and replacing each single aircraft radio set is significant, and it varies between EUR 2.000 (simple sailplane installations accounting for approximately 900 aircraft in Scandinavia) and EUR 13.500 (motor-powered aircraft, where the communications and navigations radio oftentimes are packaged as a single unit).

Assuming that 60 per cent of the fleet is yet to be converted, the total cost of replacing radios within this segment adds up to:

Sailplanes	EUR 1.080.000
Motor-powered aircraft	EUR 14.400.000
Total estimate	EUR 15.480.000

The estimate is conservative and does not take into account the cost of ferry flights, unexpected extras, etc. Aircraft down time – a significant cost factor in air operations – is also not considered above.

An important aspect is that general aviation and air sports have no customer to forward the cost to. In other words, the private individuals will have to pay the cost entirely out of their own pockets. In turn, this will lead to less activity within the segment, exactly the opposite of the objectives of the European Union's "An agenda for sustainable future in general and business aviation" (2010/C 67 E/02).

Less activity will inevitably have a negative economic impact, and it may lead to lower standards of safety (see below).

The cost of a radio conversion may in some cases be higher than the value of the entire aircraft. Those aircraft may never be upgraded but phased out instead, leading to further negative economic impact.

b) Logistics

While the 8,33 kHz conversion requirement has been known for quite some time, the majority of general aviation aircraft in Europe is not yet converted. Within a very short time frame of less than two years, a large amount of radio sets will be required, while the manufacturing base is unlikely to be able to meet the demand.

Also, the required resources with regard to certified avionic engineers are limited. The mere manpower required for the conversion effort is simply not present. Taking into account that aviation technology is a niche market, with a high level of regulation, it is not realistic to increase the available manpower for such a short-lasting campaign.

The result will be that large parts of the general aviation fleet will be grounded from January 1st 2018 or forced to fly without using their radios (limited to uncontrolled airspace).

Any exemption to the regulation, which lowers the demand for manpower and parts/radios in Europe, should therefore be welcome. By allowing a ten years transition period for Scandinavia, the conversion can be performed in a more controlled fashion – lowering costs for all – while at the same time having limited impact on the network.

c) Air safety

General Aviation and air sports already have the highest accident rate within European aviation. One of the core challenges is to ensure that pilots fly sufficiently regularly.

By imposing a fleet cost north of EUR 15 millions, the number of hours flown per pilot will drop substantially. Provided that the average hour in the air costs EUR 135, an estimated 115.000 less hours will be flown during the transition period in Scandinavia. Many pilots may fly 50 per cent less per year, with a significant risk of reduced pilot skills as an inevitable consequence.

Another safety challenge inherent in the regulation is that aircraft operators may choose to avoid the conversion by operating the aircraft only in areas where the use of radio is not legally required. Today, excellent situational awareness in uncontrolled airspace is achieved through very frequent use of radio telephony. The radio use is voluntary, and while the air sports organisations in Scandinavia will continue to encourage pilots to use radios, they can legally fly without. Pilots without the financial means to upgrade, may opt to use this provision, greatly reducing situational awareness not only for themselves, but also for other operators. The negative safety impact may be substantial.

The proposed exemption addresses these concerns, as the radios will be replaced over a longer period of time, and as repairs and replacements may be required during a ten years phase anyway.

3. Legal aspects

The requirement to convert air operators' radio equipment to 8,33 kHz channel spacing can be found in article 5 (4) of regulation (EU) 1079/2012

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.

Exemptions are possible by means of article 14 (2) of regulation (EU) 1079/2012:

2. Member States may take local measures granting exemptions from the compliance with Articles 4(5), 5(4) and 6(10) for cases having limited impact on the network.

In order to utilise this provision, the member states....

.... shall provide the Commission with detailed information justifying the need for exemptions at the latest: one year before the dates identified in Articles 4(5), 5(4) and 6(10).

In most European countries, exemptions – if at all possible – will be limited to a handful of radio frequencies, which will not be converted to the 8,33 kHz assignments at all. This approach is required in most cases, since it is the only way to ensure a “limited impact on the network” in areas of Europe with severe frequency congestion.

In the outskirts of Europe (for instance in Scandinavia, but also in Finland and Iceland), there are other technical solutions to ensure the required “limited impact on the network”, as this proposal demonstrates. This is due to radio frequencies being generally abundant in these parts of Europe, even though the 25 kHz channel spacing is being kept. (Please see Chapter 4 for further technical details.)

This proposal assumes a full conversion to 8,33 kHz spacing in Scandinavia. By providing Scandinavia with a certain level of priority with regard to assigning frequencies that are also compatible with the 25 kHz grid, the exemption can be put in place through frequency management, which generally won't reduce the number of available frequencies in the congested parts of Europe. Due to the above, the impact on the network ought to be considered as limited.

Allowing this exemption is also in the financial interest of the other European countries, since it reduces the demand for radio sets and replacement services in the market within the short time frame before the 2018 deadline.

4. Technical aspects

The concept of 8,33 kHz channel separation is described in various papers, including the Eurocontrol JUSTIFICATION MATERIAL SES/IOP/VCS/JMA/1.0.

What is not often discussed, however, is the fact that 8,33 kHz assignments that match the 25 kHz grid, are actually identical to the previous 25 kHz assignment with regard to centre frequency, even though the label is different.

For instance, the centre frequency of 132.000 MHz (25 kHz spacing) is from the standpoint of a frequency analysis the same as 132.005 MHz (8,33 kHz spacing).

(Another aspect is that the bandwidth is in fact the same – despite the spacing indicating otherwise – unless the audio is over-modulated. This provides for a further technical barrier against problems, but this has not been taken into account here, as over-modulation may in some rare instances occur.)

Since 132.000 MHz and 132.005 MHz only apply to the label, a radio limited to 25 kHz spacing will communicate without any problems on all 8,33 kHz spaced frequencies matching the 25 kHz grid.

This compatibility between 8,33 kHz and 25 kHz radios have been demonstrated over the years, as aircraft flying above FL 195 have been required to use 8,33 kHz spacing for quite some time.

An aircraft operating at low altitude with low transmission power will have a very limited impact radius, compared to the radius of high-power transmitters in aircraft operating up to FL 440 or even between FL 95 and 195. In other words, by restricting the transmission power and the allowed operating altitude for aircraft equipped with radios with 25 kHz spacing, the impact radius can be minimised to local needs. Indeed, while this proposal assumes FL 95 as the maximum altitude, this could be lowered in areas where impact would otherwise be present.

The drawback with this proposal is that Scandinavian assignments – though converted entirely to 8,33 kHz spacing – will be limited to 8,33 kHz frequencies also found on the 25 kHz grid. Hence, Scandinavia won't experience the same degree of more available frequencies. With a couple of exceptions (notably for ground stations at Oslo Airport Gardermoen), this ought to be a minor issue today, and possible to tackle until 2028.

The proposal will, however, put some restraints on the European frequency co-ordination. However, since no aircraft with 25 kHz spacing will fly above the assigned maximum altitude, the impact ought to be very limited.

The only technical problem, which we can foresee, is linked to drifting radio sets:

If a radio with 25 kHz spacing is experiencing frequency drift, an 8,33 kHz station may not receive the signal. In practice, the problem will be limited, because:

- a) The ground station may not need to be converted to 25 kHz spacing in most cases, due to limited disturbance radius from the ground.
- b) Even though a) may not apply, this proposal includes a compensating measure: Yearly check of radio sets during the annual aircraft inspection, aimed at detecting and rectifying any drift problems.
- c) If the problem is encountered despite the above, the aircraft operator won't receive any clearance either – hence no impact on other aircraft in controlled airspace. Not least: Compared to implementing the regulation without exemptions, this approach leads to a much higher probability of flight information service available.

5. Alternative solutions

The other proposals offered can be found attached:

- Proposal from Naviair/DK (via KDA)
- Proposal from Avinor/Norway
- Initial proposal from Arbetsgrupp 8.33/Sweden

The Avinor proposal for Norway has been extended with a “wish list” from the Norwegian Air Sports Federation with regard to further frequencies kept at 25 kHz, among 9 so-called “NAK frequencies” historically assigned to air sports/General Aviation.

The main challenges with all these alternative proposals can be summarised as:

- They generally bar General Aviation and air sports from en-route flight information services (with the exception of the Danish proposal, for aircraft outside the Copenhagen Area and below 3000 ft at night). This is problematic because:
 - It may reduce flight safety, as the pilot's situational awareness is reduced. The applicable pilots will no longer have access to traffic, weather, information about active danger/restricted areas, etc.
 - It may reduce flight safety for other aircraft, since operations without radio may be more common in uncontrolled airspace.
 - It may reduce flight safety, since unconverted aircraft cannot be contacted in cases of airspace infringement
- Since frequencies dedicated to air sports and general aviation in Scandinavia has so far not been co-ordinated with 8,33 kHz conflicts in mind, the more frequencies are kept at 25 kHz, the more challenging the frequency co-ordination will be. The reason is that without the proposed exemption, a number of 8,33 kHz frequencies outside the 25 kHz grid may be applied in Scandinavia. In turn, this may effectively render some of the required 25 kHz frequencies incompatible.

- The problem described in the above bullet point will increase over time, as more and more 8,33 kHz frequencies outside the 25 kHz grid are being applied.

Our proposal is consequently more robust, it has smaller impact in the network, and it increases safety.