



# Technical information for Ground Stations

## Conversion from 25 kHz to 8.33 kHz channel spacing

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### Introduction

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There have been two EU Commission Implementing Regulations dealing with the transition to 8.33 kHz channel spacing for VHF aeronautical communications in the EU. In 2007 (EC) No 1265/2007 required the move to 8.33 kHz VHF channels for air traffic operations above FL 195 in the ICAO EUR region. In 2012 (IR) (EU) No 1079/2012 requires the move to 8.33 kHz VHF channels below FL 195 and encompasses all uses of VHF aeronautical frequencies below FL 195.

Some specific uses of the aeronautical VHF band are out of scope of the IR and will remain on 25kHz channels. This includes allocations for use in an emergency such as 121.5 and 123.1 MHz, allocations associated with data link services and allocations that operate on an offset carrier basis.

Some limited exemptions for ground and aircraft equipment will also apply. These exemptions are not significant and will be for a limited duration only. Any exemptions that are granted will not delay the change in UK legislation. Further details of any exemptions granted by the European Commission will be published on the CAA website. In line with existing advice, ground station and aircraft owners are encouraged to upgrade early.

### Aircraft Radios

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Aircraft operating in airspace where carriage of a radio is mandatory are expected to have 8.33 kHz 'capable' radios by 31 December 2017. 'Capable' means that the aircraft radios will be able to tune to both 8.33 and 25 kHz channels with the related channel selection, transmitter modulation and receiver IF capabilities.

In some cases the aircraft radio(s) will be manually switchable between 25 kHz and 8.33 kHz modes while some radios will automatically switch between modes depending on channel selection.

Additional guidance for aircraft owners is available on the CAA's website:

<https://www.caa.co.uk/General-aviation/Aircraft-ownership-and-maintenance/8-33-kHz-radios/>

## Ground Radios

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All types of ground radio (fixed, mobile and handheld) at most Aeronautical Radio Stations including ATS, AGCS, OPC, (Offshore or Recreational Users) will need to be ready to operate on 8.33 kHz channels in 2018.

For ATC and FISO airfields operated by Air Navigation Service Providers, safety assurance and interoperability compliance will need to be in place prior to the upgrade, and all ground station operators will be expected to demonstrate that relevant safety considerations have been made before conversion. Ground stations are encouraged to discuss the matter with their airfield inspector if they have any concerns.

It is important that provisions to change over to 8.33 are considered now and not deferred until the Implementing Rule deadlines, when it may be too late and jeopardise the continued provision of your service. Appendix A sets out the key milestones of the implementing rule.

## Channel Number

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One aspect of 8.33 kHz operation that could cause confusion is that the radio or voice switch display for the operator (aircraft, ATC, FIS or AGCS) shows the channel not the frequency, although it is presented in a frequency like manner.

For example 131.425 MHz will be displayed as 131.430 as an 8.33 kHz channel on a radio front panel or voice switch display. Similarly 131.450 MHz will be displayed as 131.455 as an 8.33 kHz channel. The 8.33 kHz channel is what will be spoken by the ground radio user and the pilot, and in some cases more numbers will need to be spoken as, for example, 131.4 MHz becomes 131.405, although the actual frequency of transmission remains the same but with a smaller frequency stability and bandwidth.

Any service provider procedures will need to be modified accordingly. The simple message is for the pilot and the ground radio user to just use the numbers presented and not be concerned about the frequency.

The changeover to 8.33 kHz channels in most cases will use the existing licensed (25 kHz) centre frequency, although this will now be displayed and spoken as an 8.33 kHz channel, as explained above, as a slightly modified number. Licence holders should be aware of the changes needed to their documentation, approvals and certificates and ensure that these changes are in-hand.

The licensing fee charged by Ofcom for an 8.33 kHz radio licence will be significantly less than the 25 kHz licence fee, due to the reduced bandwidth occupied.

A 100 kHz range example of 8.33 kHz frequencies and related channel displays is shown in table 1.

**Table 1 - 8.33 kHz Frequency and Channel Display Table**

Operating Frequency (MHz)	Channel Spacing	Displayed and Transmitted
118.0000	8.33	118.005
118.0083	8.33	118.010
118.0167	8.33	118.015
118.0250	8.33	118.030
118.0333	8.33	118.035
118.0417	8.33	118.040
118.0500	8.33	118.055

Operating Frequency (MHz)	Channel Spacing	Displayed and Transmitted
118.0583	8.33	118.060
118.0667	8.33	118.065
118.0750	8.33	118.080
118.0833	8.33	118.085
118.0917	8.33	118.090
118.1000	8.33	118.105

2018 first phase 8.33 kHz assignments <FL195. Future assignments are expected to be on new 8.33 kHz frequencies.

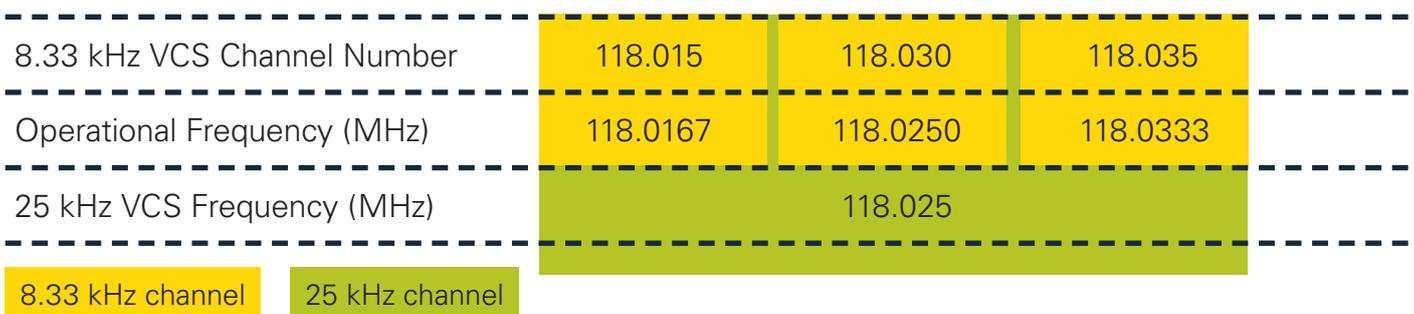
Although the 8.33 kHz assignment may have an identical operating frequency to the previous 25 kHz assignment, all 6 of the digits shown in the 'Displayed and Spoken' column must be selected to ensure that the radio is operating in the 8.33 kHz channel spacing mode.

Selecting xxx.x00/.x25/.x50/.x75 will put the radio into '25 kHz mode'. Some radios have an 8.33/25 kHz switch so that only the relevant mode frequencies will be selectable/displayed. The table and diagram below illustrates the differences between referencing the same frequency in 25 kHz and 8.33 kHz channel modes.

**Table 2 - 8.33 kHz/25 kHz Frequency and Display Table**

Operating Frequency (MHz)	Channel Spacing & Op B/W (kHz)	Displayed	Spoken
118.0250	25	118.025	One One Eight decimal zero two five
118.0250	8.33	118.030	One One Eight decimal zero three zero

**Diagram 1 - 8.33 KHz/25KHz Frequency and Channels**



## Aeronautical Information including the AIP

NATS AIS (Aeronautical Information Service) have indicated that due to the number of changes AIP changes of this nature will not be updated as expected under the usual process.

To avoid confusion the CAA will maintain an AIP supplement (initially released on the 15th February 2018 and updated monthly) that lists completed and proposed conversions (looking forward 60 days).

In addition a CSV (Comma Separated Value) file will be hosted on the CAA's website and will be updated weekly. This data and supplement text will be updated automatically by the CAA at the appropriate point during the conversion process, this process will be triggered when we are informed that a ground station wishes to convert.

Submission of AIP changes are therefore unnecessary as at a suitable time NATS AIS will update the relevant parts of the AIP with the information contained in the supplement. In addition a FIR NOTAM will be generated each time the supplement is updated to ensure airspace users are aware of the requirement to check the supplement in the absence of updated AIP data. Therefore, under normal circumstances aerodrome specific NOTAMs are not necessary.

If additional changes are to be applied (such as a change to the DOC) these should be notified through the usual process

Third party information providers will have access to data produced by the CAA, however it is advisable that individual aerodromes check with these providers that data has been updated.

## Conversion Process

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Most aircraft (that are required to carry a radio) should have converted before the 31 December 2017. Ground stations must then follow and frequency conversions must take place before 31 December 2018. In a majority of cases the CAA recommends that conversions take place at the time of the radio licence renewal in 2018 and that other preparatory changes are accommodated in good time.

Ground stations should also be aware that relevant safety cases must be made before the conversion and that equipment is approved through the CAA regional office and fully tested.

Once a channel has converted, operation of a 25kHz radio within the designated DOC is no longer supported and the channel is no longer protected as such. 'Shoulder' channels could be populated and any transmission from a non 8.33 radio could potentially interfere with others.

(See flowchart overleaf)

## Conversion at time of Licence renewal

8 - 10 weeks prior to intended conversion date (usually radio licence renewal)

**Inform CAA radio licensing of intention to convert to 8.33 kHz channel spacing on a specific date.**

Upon receipt of Radio License Renewal Notice (6 weeks prior to renewal date)

**Ensure renewal is for 8.33 kHz channel spacing and follow instructions from licensing. Responses should be sent as soon as possible to avoid delay.**

Await confirmation from CAA regarding assigned frequency and confirmation of ANO approval for change.

Licence renewal date (2018)  
**Frequency conversion becomes effective.**  
**Ground stations have 30 days to complete conversion. Please notify CAA of intended date and when conversion is complete.**

## Conversion on alternative date

Upon receipt of Radio License Renewal Notice (6 weeks prior to renewal date)

**Inform radio licensing that you would like to continue utilising a 25kHz licence until a future date.**

8 - 10 weeks prior to intended conversion date

**Inform CAA radio licensing of intention to convert to 8.33 kHz channel spacing on a specific date.**

**Licensing will then provide instructions to progress.**

Following confirmation of assigned frequency and confirmation of ANO approval from the CAA:

Ground stations have 30 days to complete conversion. Please notify CAA of intended date and when conversion is complete.

Please note if radio licensing are not informed of intention to convert a 25kHz renewal will be automatically generated.

## Exemptions

Member states have the ability to request limited duration exemptions. These exemptions must be associated to a safety or military requirement. If any ground stations have concerns regarding the ability to safely convert during 2018 they are encouraged to contact the CAA on the contact details within this document.

In addition states may apply for limited duration 'local measure' exemptions to assist with the transition. The CAA, along with associations and key stakeholders, has identified a small number of common frequencies that may qualify for a limited duration exemption from the 8.33kHz implementation.

## Engineering issues

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### Frequency Allocations

Q. Will my frequency allocation change?

A. Initially, in most cases, existing frequency allocations based on 25 kHz spacing will remain the same, however upon switchover to their corresponding 8.33 channels, documentation and procedures will need to be updated and promulgated to show this. Table 2 illustrates this change.

Generally, most allocations will remain on the same centre channel, however in some cases assignments may be moved to different channels if direct conversion cannot be accommodated.

### Interference to adjacent channels

Q. Can I continue to use my 25 kHz radio to transmit and receive 8.33 kHz transmissions?

A. Please be aware that any transmission incorrectly operating in 25 kHz mode has potential to impact on operators on adjacent channels operating in allocated 8.33 kHz channels. Equally any receivers still operating incorrectly in 25 kHz configuration may receive interference from legitimate 8.33 kHz transmissions on adjacent channels. Following the initial changeover new assignments will begin to utilise the 8.33 kHz 'shoulder channels' next to existing assignments, as shown in diagram 1. This will apply to assignments within the UK and further afield including mainland Europe.

### Frequency Exemptions

Q. Will the CAA be applying for any exemptions under article 14?

A. The Regulation makes provision for temporary exemptions to be granted by the European Commission, in cases where the overall impact on the network is demonstrably minimal. Each Member State's National Frequency Manager has to apply for any exemption. The CAA, along with associations and key stakeholders, has identified a contained number of channels that may qualify for a temporary exemption from 8.33 kHz implementation, in order to provide an extended time window for end users to enable radio replacement. These exemptions are identified in CAP 1606.

### Status in Europe

Q. Will we still need to implement the IR if we are leaving the European Union?

A. Given the timing of the IR implementation date, and the preliminary discussion around potential dates that the UK will formally exit the EU it is expected that the IR will be implemented before this date and any impact of the UK exiting the EU will not affect the IR. Regardless of the details of the exit arrangements, given the borderless nature of radio transmissions and the impact on neighbouring states of frequency assignments in the UK (and vice-versa), implementation of 8.33 kHz channel spacing in the UK remains essential. The UK is one of the largest consumers of VHF radio spectrum in Europe, with a large diversity of aviation operations; 8.33 kHz channel spacing will allow current and future demand for VHF assignments to be met and use spectrum efficiently, as well as not impacting on the rest of Europe in this area.

## Carrier Offset Assignments

- Q. How do I ensure carrier offset assignments remain in 25 kHz mode?
- A. As indicated by the text of the IR, offset carrier assignments are out of scope and can continue to operate in 25 kHz mode. This is because offset carrier operations are not compatible with 8.33 channels. The CAA frequency management team should be contacted if an assignment is currently operating as offset carrier (or CLIMAX). The frequency management team will ensure these are appropriately highlighted in the co-ordinated frequency management tables.

## Direction Finding Equipment (DF)

- Q. Does DF equipment need to be upgraded?
- A. Any DF equipment that is specifically tuned to local frequencies (such as the tower frequency for an airfield) may need to be upgraded in order to provide the same capability on 8.33 kHz channel spacing. Where a system is installed which does not have an external radio the unit may need to be returned to the manufacturer to have the necessary hardware upgrades applied. Where an external radio is used as part of the DF system, the radio will likely need to be replaced or upgraded. Users are advised to check with equipment manufacturer as soon as possible. Hardware changes to antennas and feeders are not thought to be necessary.

Where DF equipment is used in a distress and emergency scenario (i.e. only tuned to the emergency or search and rescue frequencies) the equipment will continue to operate as previously.

## Aircraft continuing to operate 25kHz radios

- Q. Can aircraft continue to utilise 25 kHz radios to communicate with a ground station that has not converted?
- A. Yes this is acceptable. However all aircraft will be required to utilise a 8.33 kHz capable radio once a ground station has converted. Users that are not equipped can expect to be significantly restricted operationally.

## Further Resources

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The following links and documentation may provide additional detail:

### IR 1079/2012

<http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32012R1079&from=EN>

### Link to the CAA 8.33 webpage

<https://www.caa.co.uk/General-aviation/Aircraft-ownership-and-maintenance/8-33-kHz-radios/>

### Link to Eurocontrol 8.33 webpage

<http://www.eurocontrol.int/833>

### Channel numbering overview

<https://www.eurocontrol.int/sites/default/files/article/content/documents/communications/2016-03-frequency%20table.pdf>

## Contact Details

Further technical questions can be sent into the CAA 8.33 VCS mail box. Please note that this address is not for GA aircraft funding enquiries: [833VCS-radios@caa.co.uk](mailto:833VCS-radios@caa.co.uk)