

# Technical information for offshore providers

## 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 a offset carrier basis.

Some limited exemptions for ground and aircraft equipment will also apply. However it is expected that these exemptions will not be significant and will be of a limited duration. 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, users 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, including information on funding 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.

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 should 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. Sufficient time should be allowed for a double AIRAC cycle to ensure the changes can be accommodated.

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
118.0583	8.33	118.060
118.0667	8.33	118.065

Operating Frequency (MHz)	Channel Spacing	Displayed and Transmitted
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.

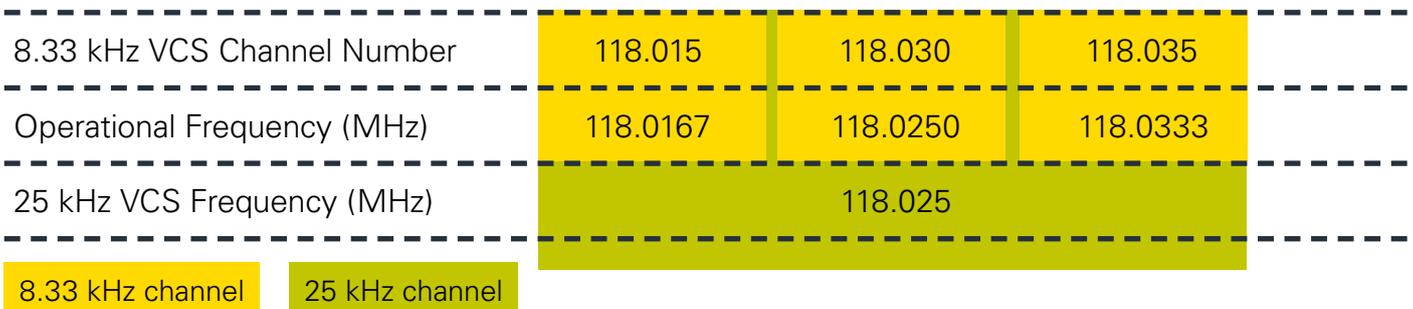
Although the 8.33 kHz assignment may have an identical operating frequency to the previous 25 kHz assignment, all 6 of the digits shown in the 'Displayed and Spoken' column must be selected to ensure that the radio is operating in the 8.33 kHz channel spacing mode.

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**



## Conversion Process

Most aircraft (that are required to carry a radio) must convert before the 31 December 2017. Ground stations must then follow and frequency conversions must take place before 31 December 2018.

For offshore assignments this will take place on 31 December 2018. Please ensure that revised channel numbers are confirmed and used in 2019. Relevant entries in the AIP and associated documents will be revised, however users should be aware that static documents will be out of date and that the continued use of 25kHz channels will potentially cause harmful interference to other aeronautical users. This includes equipment presets.

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.

## Exemptions

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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.

Although the CAA will confirm exemptions when they have been reviewed, it is anticipated that these exemptions will not be significant and that they will be of a limited duration. Any exemptions granted will not delay the change in UK legislation. In line with existing advice, users are encouraged to upgrade early.

## 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 a direct conversion cannot be accommodated.

### Interference to adjacent channels

- Q. Can I continue to use my 25 kHz radio to 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.

### 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.

## 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)

## Appendix A – IR Key Milestones

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Date	Description	IR 1079/2012 Reference
17th November 2013	All radios placed on the market must be 8.33 kHz capable	Article 4(1)
17th November 2013	All new ground radio installations and upgrades must be 8.33 kHz capable	Article 4(2/4)
31st December 2016	Submission of exemption requests to the European Commission	Article 14(3)
1st January 2018	All aircraft operating in airspace with carriage of a radio is required will be equipped with 8.33 kHz capable radios	Article 5(4)
31st December 2018	All frequency assignments to be converted to 8.33kHz channel spacing	Article 6(10)

## Appendix B – Full list of IR exempted allocations [Article 2(4a)]

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Allocation Description	Frequency (MHz)
Emergency frequency	121.5
Auxiliary frequency	123.1
VHF Data Link	136.725, 136.775, 136.825, 136.875, 136.925, 136.975
ACARS	131.525, 136.875, 136.925, 136.975
Offset Carrier Operations (CLIMAX)	Various Allocations