

## Q EXPLAINS 8.33 RADIOS

The Scene:

*Q's workshop. Stage right Technician in white coat slices head off dummy with laser gun disguised as fuel sample tester. Stage left technicians arming gyro with rockets. Stage centre Bond emerges from smoke wearing white dinner jacket and adjusting cuffs. Admires gyro. Looks cool.*

Q: Ah 007, do sit down and please don't touch anything... now pay attention. You will see that your new glider, Cumulus 2, has an 8.33kHz radio fitted.

BOND: Yes I picked up something about that from Mimi Labonq when I was in the Café René recently. Why has Eurocontrol changed to 8.33 kHz channel spacing, Q?

Q: Well 007, Europe says it's running out of VHF frequencies because of the demand from commercial operations. The areas where a frequency is used have to be separated to avoid interference, for example the radio horizon between 2 airliners flying at 36,000ft is about 860km so a single upper route sector frequency can consume an area stretching from Calais to Nice and from Brest to the Rhine; the French are always difficult. At lower levels frequencies can be reused closer together but there are lots of them. Frequency reuse is not really an issue for light aircraft and small airfields but it is they that have to bear the main cost of introducing 8.33 kHz channel spacing and that was recognised by Eurocontrol in their consultation but it went ahead anyway and is now the law. This is clearly a problem built in mainland Europe but we have to comply....even you 007 (*smirks*).

BOND: So Q, how does this 8.33 kHz radio work then?

Q: Well, with your old 25 kHz radio life was very simple 007. You dialled up a frequency and that is what you got. All the frequencies were 25 kHz apart and the bandwidth of the receiver was set so you could hear transmissions in the 25 kHz of the spectrum you selected. Your 8.33 radio is much more cunning however, so pay attention 007 while I explain how this new gadget works.

The new radio will operate on 25 kHz or 8.33 kHz depending on what you select. If you select one of the current frequencies, such as 132.000 it will operate just like the old radio but if you select a new one such as 132.005 it will give you 8.33 functionality. Some radios have a switch to enable them to operate in 25 kHz only mode to save you having to dial through all the 8.33 channels to get to the one you want. Useful if you are operating with the American cousins as the USA does not use 8.33 but you need to make sure you have turned that switch back to 8.33 for European operations. Some frequencies will remain designated as 25 kHz (such as 121.5, data link and those that use multiple transmitters including FIS and upper sector frequencies) but most will change to 8.33. Which is which will be decided by the network manager so let's see how that will work in practice.

If ATC sends you to 132.000, as I mentioned earlier it will be because that is a 25 kHz frequency and your radio will function just like the old radio. However, if they send you to 132.005 it will be because it is an 8.33 channel and when you select that your radio will stay on frequency 132.000 but operate in 8.33 mode with 8.33 bandwidth. If you select 132.010 the radio will change to frequency 132.0083, again in 8.33 mode. So Bond, the first lesson is that the number you dial up on your new radio is not necessarily the same as the frequency it uses!

BOND: Rather like a person who says one thing and means another then!

Q: Now, now 007, we're a strictly PC organisation here. Anybody can mean the complete opposite of what they say. Just pay attention! Take a look at the table and you can see that for every 25 kHz of spectrum you can have one 25 kHz frequency or three 8.33 kHz channels but not both. The "channels" you select (.005 .010 .015 etc) are named like that for ease of reference but the corresponding frequencies the radio uses are really 8.33 kHz apart (.000 .0083 .0166 etc). Note that you cannot select 132.020 etc because it does not exist!

Old 25 kHz Radio	New 8.33 kHz Radio				
	What you select on the dial			What the radio gives you	
WYSIWYG	The number you see	25kHz Frequency	8.33 kHz Channel	Frequency	Functionality
132.000	132.000	132.000		132.000	25
	132.005		132.005	132.000	8.33
	132.010		132.010	132.0083	8.33
	132.015		132.015	132.0166	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	132.0416	8.33
132.050	132.050	132.050		132.0500	25

The second lesson is that though an "old" 25 kHz of spectrum such as 132.00 can be used for one 25 or for three 8.33 kHz channels in this new arrangement, it cannot do both in the same area.

Are you still paying attention there 007? I need to tell you what can go wrong and I will be asking questions at the end!

You have no need to concern yourself with whether a frequency is 25 or 8.33 kHz because when you go to a published or allocated frequency your new radio will sort it out for you. If you accidentally select 132.005 when you should have selected 132.0 you will be on the right frequency but with a narrower bandwidth but the chances are that you will be able to communicate. But if you select 132.0 when you should be on 132.005 your radio will be in 25 kHz mode and you are likely to cause interference on several 8.33 channels and you may hear transmissions from adjacent frequencies. So 007, you will need to take care with this gadget.

Bond: What about all my gliding buddies? Will they still be able to use their existing 25 kHz sets?

Q: Not quite. However, they will be able to keep their 25kHz sets for use only on 25kHz channels such as 121.5 and a few common gliding and other air sport 25 kHz frequencies that will be exempted for a few more years. But after 31 December 2017, in the UK they will need an 8.33 radio where communication with an 8.33 frequency becomes necessary, eg when flying cross-country. France and some other countries have decided to issue exemptions to their aircraft to carry on using 25kHz radios but the CAA is pressing on.

Bond: Very English and very Alan Bennet then.

Q;. Indeed 007. Now take care of this new gadget because it is expensive – even though the CAA gave us a 20% rebate. And do try not to get into trouble again, otherwise you could be replaced by one of those Greek Bonds, which I understand are still very cheap just now.

With apologies to Ian Fleming