FCC Narrowbanding Requirements for UHF Transmission in the US

Most UHF radio licenses in the US are for the 450-470 MHz band. Many years ago, to allow each user to operate on his own channel, the FCC divided this 20 MHz band into 800, 25 kHz-wide channels. Frequency coordinators have allocated these 800 channels to users in various geographic regions around the country. As UHF usage increased, some regions ran out of channels. Accordingly, in 1995 the FCC announced a three-phase plan to double the number of channels to 1600 by licensing operation in narrower, 12.5 kHz channels:

Phase I: Restrictions on the certification of new radios
Phase II: Restrictions on *new* licenses
Phase III: Restrictions on *all* licenses

The FCC implemented **Phase I** in 1997 when they began certifying radios only if they were "capable of operating on 12.5 kHz or narrower channels, or with the equivalent efficiency." The term "equivalent efficiency" means transmitting 4800 bits per second through each 6.25 kHz of channel bandwidth. So if a radio transmits in a 6.25 kHz channel, it must be able to transmit at least 4800 bps. If it operates in a 12.5 kHz channel, it must be able to transmit at least 9600 bps. If it operates in a 25 kHz channel, it must be able to transmit at least 19200 bps. All Pacific Crest radios certified since 1997 have met this narrowbanding definition.

On 1/1/11, the FCC implemented **Phase II** of the narrowbanding plan and started issuing only 12.5 kHz licenses. People with existing 12.5 kHz licenses are unaffected. People with 25 kHz licenses will be unaffected until their license comes up for renewal at which point they will be licensed (probably) for 12.5 kHz operation only. If anyone does get a 25 kHz license it may require them to transmit at least 19200 bits per second. The FCC has been vague on this last requirement, however, and Pacific Crest believes it is safe to assume that the FCC will not grant any 25 kHz licenses after 1/1/11.

On 1/1/13, the FCC will implement **Phase III** of the narrowbanding license plan and require all users to transmit at least 9600 bps in 12.5 kHz or narrower channels. The FCC has stated that operating 25 kHz radios at 19200 bps will still be allowed. Unfortunately, they have also stated that it will *not* be allowed. Despite the mixed messages, it is prudent to assume that no one will be allowed to transmit data at any speed in a 25 kHz channel - regardless of an existing license stating otherwise. There is a possibility that the FCC will revoke valid 25 kHz licenses. If you are in the market for a new radio, therefore, you should buy a model that is capable of transmitting in 12.5 kHz channels and so will be legal after 1/1/13.

In summary, there are two dates, 1/1/11 and 1/1/13, which have an effect on three things: the validity of existing licenses, getting new licenses and using 12.5 and 25 kHz radios. The effects are illustrated in the tables below.

Existing Licenses	After 1/1/11	After 1/1/13
For 12.5 kHz operation	Valid	Valid but must TX @ 9600 bps or faster
For 25 kHz operation	Valid	Might be revoked

Getting New Licenses	After 1/1/11	After 1/1/13
For 12.5 kHz operation	FCC will issue	FCC will issue
For 25 kHz operation	Not issued except maybe for transmitting @ 19200 bps	FCC will not issue at all

Using 12.5/25 kHz Radios	After 1/1/11	After 1/1/13
12.5 kHz PDL Radio (e.g., HPB)	OK (with a license)	OK if speed ≥ 9600 bps
25 kHz PDL Radio	OK (with a license)	Probably forbidden
Any ADL Radio	OK (with a license)	OK if speed ≥ 9600 bps in a 12.5 kHz channel

Here are answers to some common questions specific to Pacific Crest radios:

Q: How does all this affect users outside the United States?

A: It doesn't. Some countries, like those in the European Union, already require 12.5 kHz licenses. Others, such as Australia, are moving in that direction. You should check with the regulatory agency in your country of operation to see what type of license is required.

Q: How can I tell if my PDL radio transmits in 12.5 kHz or 25 kHz channels?

A: For LPBs, Sitecoms and EDLs, look at the model number on the side of the radio. If it ends in "12" it's a 12.5 kHz model. If it ends in "25" it's a 25 kHz model. For HPBs, look at the part number on the label. The following are 25 kHz HPB part numbers:

- A02531
- A02533
- A02535
- 56651-42-00
- 56651-44-00
- 56651-46-00
- 56651-44-10
- 56651-46-03

All other HPB part numbers are 12.5 kHz models.

You can also connect your PDL radios to PDLCONF configuration software. The channel bandwidth is displayed on the Identification screen.

Q: All of my radios are receivers. How does any of this affect me?

A: It doesn't directly affect you because the new regulations pertain to transmission. However, if you use a 25 kHz radio to receive data from a 12.5 kHz transmitter, you will pick up the desired signal but also will be able to receive signal from a radio transmitting on an adjacent 12.5 kHz channel. The mixing of the two signals will make both unintelligible. In practice, using a 25 kHz radio to receive a 12.5 kHz transmission doesn't work well.

Q: I have a 25 kHz *PDL* radio. Is it 25 kHz only?

A: Yes. Only ADL-generation radios are user-configurable for operation at both 12.5 and 25 kHz. You can continue to use 25 kHz HPBs, LPBs, EDLs, RFMs, etc. until your license expires. However, you probably will not be able to renew your 25 kHz license and so will have to stop using your 25 kHz radio.

Q: I converted my 25 kHz PDL radio to be 12.5 kHz. Can I still use it (with a 12.5 kHz license) after 1/1/13?

A: Almost certainly. We have to insert the word "almost" in this answer because the FCC has stated in some documents that all radios capable of transmitting at a spectrally *inefficient* rate will be banned after 1/1/13. Spectral efficiency in a 12.5 kHz channel is at least 9600 bps – and a 12. 5 kHz PDL radio is capable of transmitting at 4800 bps. However, the FCC has also said the goal is to migrate everyone to 12. 5 kHz channels – regardless of the speed at which they transmit in these channels. This makes more sense because narrower channels allow more licenses – the ultimate goal of the FCC. Restricting the data rate within a channel doesn't make it narrower and doesn't allow more licenses.

Q: Will I be able to continue using an *ADL* radio after 1/1/13 even though it is capable of transmitting in a 25 kHz channel?

A: Yes. If the FCC decides to forbid use of a radio that is physically capable of transmitting in a 25 kHz channel, Pacific Crest will release a version of firmware that will prevent such transmissions, which will keep your ADL radio legal even according to the most conservative interpretation of the FCC policy for 1/1/13.

Q: How does the narrowbanding policy affect my GPS receiver?

A: If your GPS receiver includes an internal UHF radio transmitter, the same FCC rules apply to it as to stand-alone transmitters: no more licenses after 1/1/11 and no more use (probably) after 1/1/13. To see what type of radio you have, use the receiver's radio configuration software to connect to the radio. The channel bandwidth is usually displayed on an identification screen. If your GPS receiver's internal radio only receives, there is no effect as the FCC's narrowbanding policies affect only transmitters.

Q: My 25 kHz radio can transmit data at 19200 bps. This is the "equivalent efficiency" of 4800 bps in a 6.25 kHz channel, which is what the FCC has repeatedly said they want to achieve. So why do I need to switch to 12.5 kHz radios?

A: The FCC has equivocated on this point but has always been clear that their intent is to allow more licenses to be granted. The only way to do this in a limited frequency band (450-470 MHz) is to require narrower channel bandwidths. Therefore, Pacific Crest believes it is prudent to switch to 12.5 kHz-compatible radios on or before the expiration of your 25 kHz license.

Q: Will there be a Phase IV – a requirement to use only 6.25 kHz channels?

A: Perhaps, but the FCC has issued no statements on this. Note that the FCC continued to license 25 kHz operation for 16 years after they announced the plan to migrate to 12.5 kHz. Will they issue only 6.25 kHz licenses beginning 16 years from today? Time will tell. You can be sure, however, that if this day ever comes, we'll have a radio waiting.