

Editorial – Bandwidth

One piece of ham radio information we don't seem to talk about much is **bandwidth**, and maybe rightly so. This piece covers a very small but relevant subsection of the topic.

It's a radio setting and a signal configuration that's important, but by default, most of our radios set that appropriately, and we never concern ourselves with it. Still, if you use one bandwidth setting, and attempt to communicate with another station that's on a different bandwidth setting, you might sound to the other station like you have a bad cold.

Definition

Bandwidth is simply the amount of frequency spread your signal is occupying while talking, or the frequency range your radio is expecting to receive. There are two primary bandwidth settings in the VHF and UHF FM world, and we refer to them simply as **narrow** and **wide**. Some radios also include a third setting, but we'll focus on these two primary ones. When you're using your radio to communicate on simplex, as long as you and the other station are using the same bandwidth setting, that should work fine for you. The problem typically exhibits itself only when you're trying to communicate through a repeater, and you start sounding like Donald Duck.

Repeater bandwidth

In Utah, all repeaters are mandated by the **Band Plan** to use the **wide** bandwidth setting, meaning that your radio should also be set to the wide bandwidth setting to communicate through repeaters here. However, the policies in other states might differ from what you're used to, and you'll need to be aware of their bandwidth setting requirements before attempting to travel and use their repeaters.

One useful online tool for locating repeaters at any location, and discovering their bandwidth requirements, is **RepeaterBook.com**, which also has a free app you can install on your phone. Otherwise, select the **wide** bandwidth setting if you're unsure.

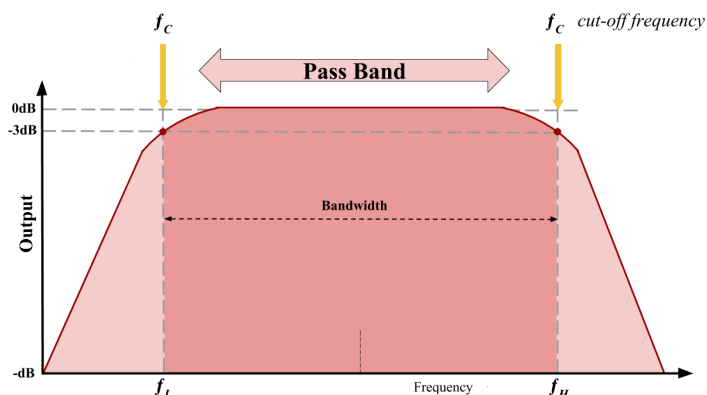
Bandwidth on HF

Bandwidth applies to HF (high frequency, or 1.8 MHz through 29.5 MHz) as well. For SSB (single sideband), the bandwidth is variable, but the maximum is typically about 3 kHz. Other modes, such as CW, FT8, and RTTY tend to occupy a smaller bandwidth, each



unique to the characteristics of the particular mode.

HF receiver bandwidth can be adjusted by several internal circuits, including band-pass filters, notch filters, and others. Many modern rigs have a control to adjust the **passband** width.



Antenna bandwidth

The bandwidth of an antenna is the frequency range within which it can effectively receive or transmit a signal. Typically, we consider "effective" to mean the range of frequencies for which the antenna presents an SWR of 2.0:1 or lower, known as the **SWR bandwidth**. If the antenna SWR is too high for the desired frequency range, we often use a tuner on HF, or a passive matching system on VHF to lower the SWR, and reduce the loss due to feed line attenuation.

The SWR bandwidth is determined by *the entire antenna system* (antenna, tuner / match, feed line, connectors, wire thickness, etc.) within the target frequency range. Furthermore, the antenna system can inadvertently include objects that it **couple**s with, such as metal gutters, swing sets, and any nearby conductive object, thereby also affecting its bandwidth.

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