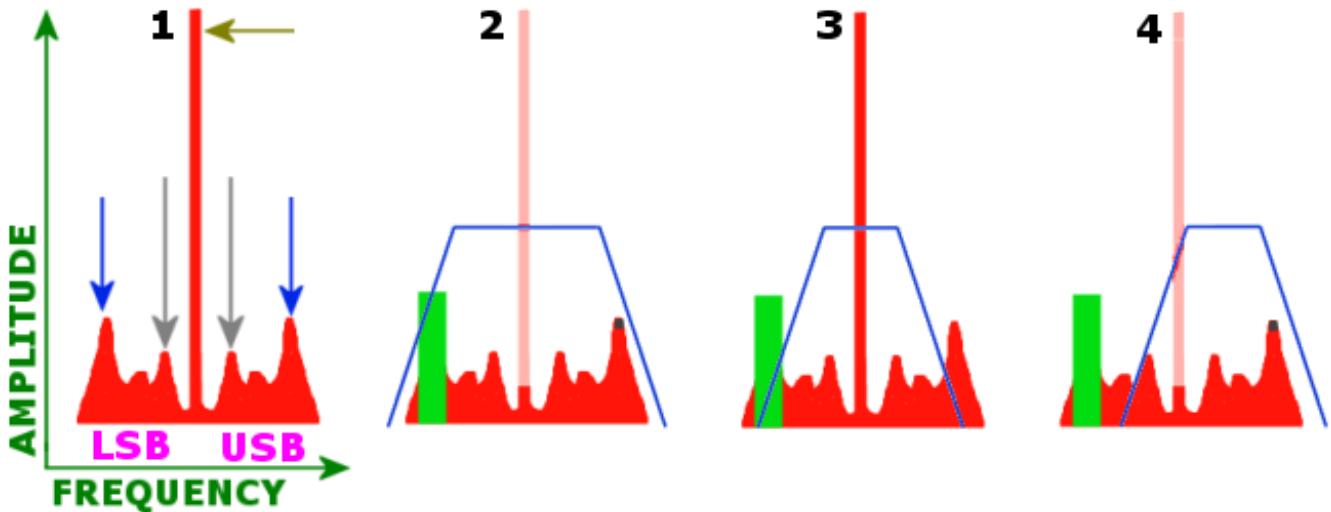


Si4734 Offset Tuning

Maximum Offset Tuning Equals One Bandwidth
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The information below is not guaranteed to be free of errors.



In **1** notice the high energy carrier (gold arrow) and positioning of the LSB and USB audio. Lower tones (gray arrows) are close to the carrier; while, higher tones (blue arrows) are far. In **2** a 6-kHz filter passes noises (green) in AM-mode. In **3** a 4-kHz filter drops fidelity and still passes noise. In **4** upward (USB) offset-tuning of the 4-kHz filter attenuates the noise and boosts fidelity.

Compare a carrier dropout (selective fading) in **2** and **4**. In **2** the 6-kHz filter has 3 kHz of fidelity, the USB peak (black dot) can mix with noise, and up to 6 kHz noise can be emitted. In **4** the offset tuned 4-kHz filter has *nearly* 4-kHz of fidelity and noise of *only* 4-kHz may be emitted.

PL-390 Filter	Station Tuned	Distortion Noted	Maximum Offset Tuning	Ceramic Filter -6dB
6 kHz	6125 kHz	6132 kHz	$6131 - 6125 = 6$ kHz	12 kHz
4 kHz	6125 kHz	6130 kHz	$6129 - 6125 = 4$ kHz	8 kHz
3 kHz	6125 kHz	6129 kHz	$6128 - 6125 = 3$ kHz	6 kHz
2 kHz	6125 kHz	6128 kHz	$6127 - 6125 = 2$ kHz	4 kHz
1 kHz	6125 kHz	6127 kHz	$6126 - 6125 = 1$ kHz	2 kHz

The PL-390's audio was examined using a Fast Fourier Transform (FFT) program I created. The Si4734 DSP has filter bandwidths of 1, 2, 3, 4, and 6 kHz. They do not correspond with filters (*ceramic* or *mechanical*) in analog radios. They are different in two ways. First, they represent the width of audio emitted. To get 6 kHz of audio from a centered (around the carrier) analog filter, a ~12 kHz filter is needed. And this leads us to the second difference: DSP filters have a shape that may be very tight. Analog filters have a more gradual slope, as defined by -6 dB and -60 dB specs.

In the chart above, each filter was offset tuned until distortions were noted. The maximum offset equaled the filter bandwidth. A Si4734-based radio can be offset tuned by nearly the entire width of the filter. Some offset tuning, along with upping the volume, often helps with SWL and DX. Offset tuning up or down helps with adjacent interference and distortion related to selective fading.

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