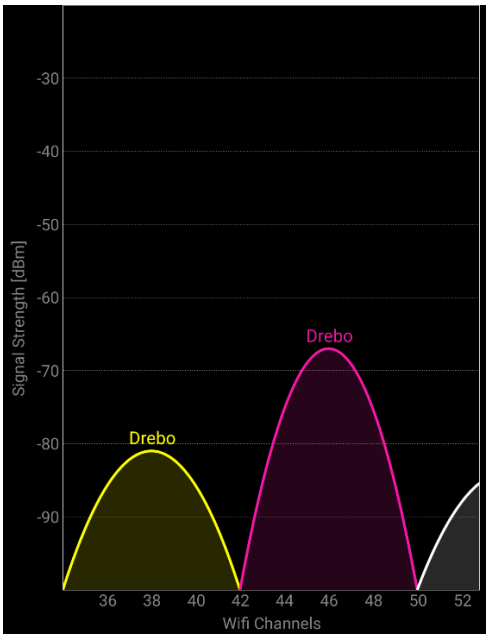
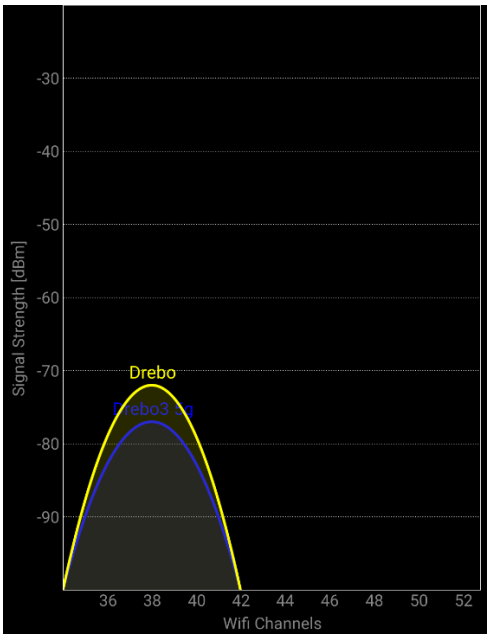
Channel Separation and HT Mode

The idea behind channel separation, is to avoid “adjacent channel interference.”

The newest N and AC wireless technology is designed to share channels. In other words, two wireless devices broadcasting on the same channel, play nice with one another. They take turns in sending/receiving data.

In the illustration on the left, you see good channel separation in the 5Ghz radio broadcast:





The illustration on the right, shows two signals sharing the same channel. Though not ideal, it’s still ok because today’s wireless don’t mind sharing a channel.

The illustration also shows, what is known as “HT Mode,” or, channel width. That has to do with how WIDE the signal is (technical term is channel bonding).

In 2.4Ghz wireless, you can have a channel width of either 20Mhz or 40Mhz, with 40 being twice as fat as 20.

The signals above are all 20Mhz. If, however I were to change the HT Mode to 40Mhz, the signals would overlap, causing adjacent channel interference.

That would be like someone walking in on a conversation and talk without anyone asking them to. (They don’t play nice!)

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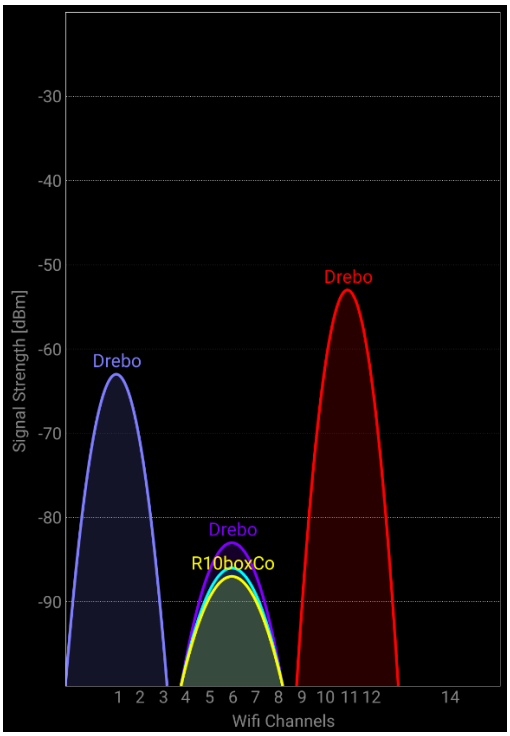
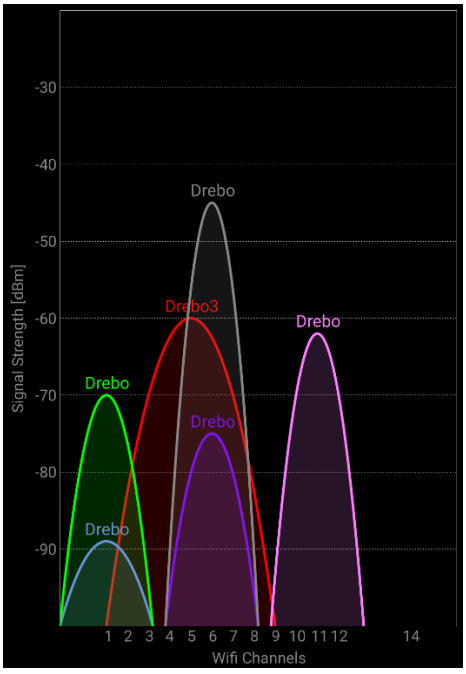
The illustration below, also shows good channel separation, this time, in the 2.4Ghz radio. Again, even though you see several signals sharing channel 6… that's ok because they're very polite and take turns sharing the channel.



An example of wireless signal interfering with one another is:

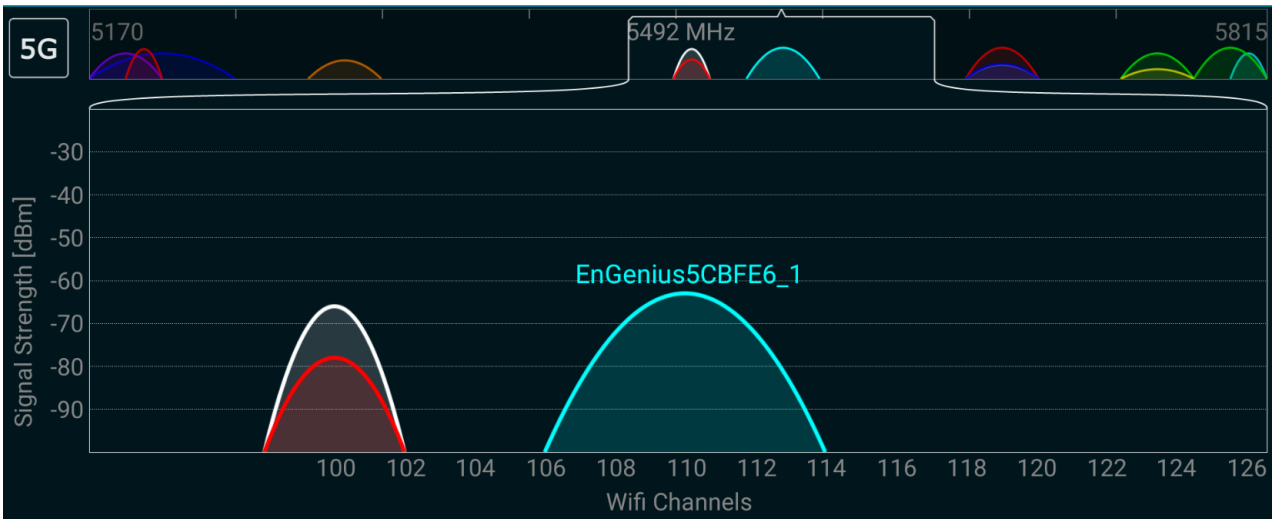


You see that channels 1, 6 and 11 have access points with good channel separation but, UNFORTUNATELY, someone threw a strange access point in the mix on channel 5! Not only that… it is set to 40Mhz which is now causing adjacent channel interference with the first four wireless signals.

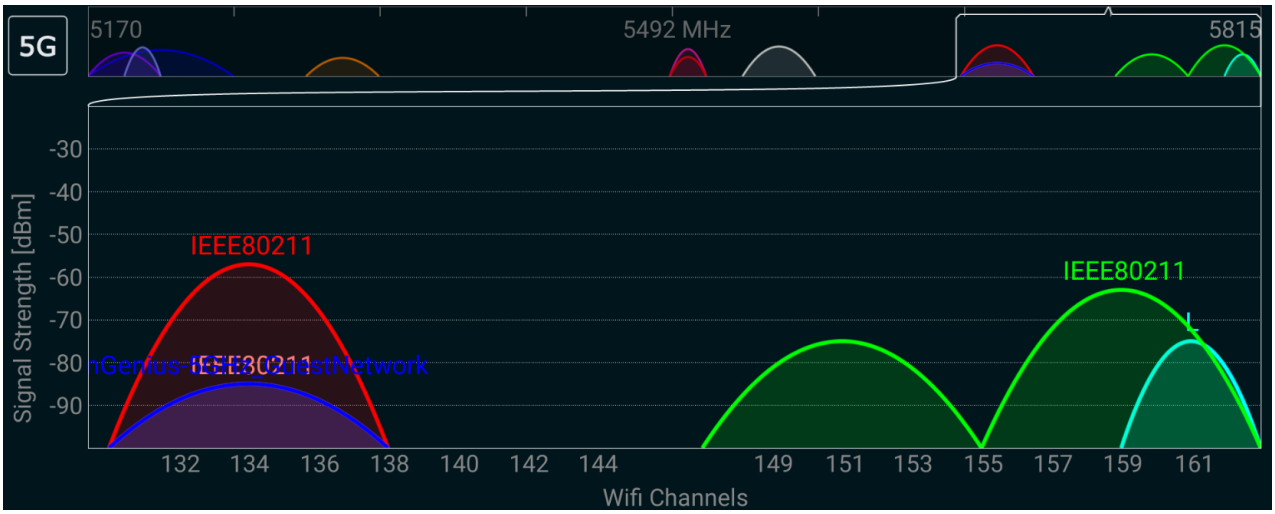
VERY RUDE!

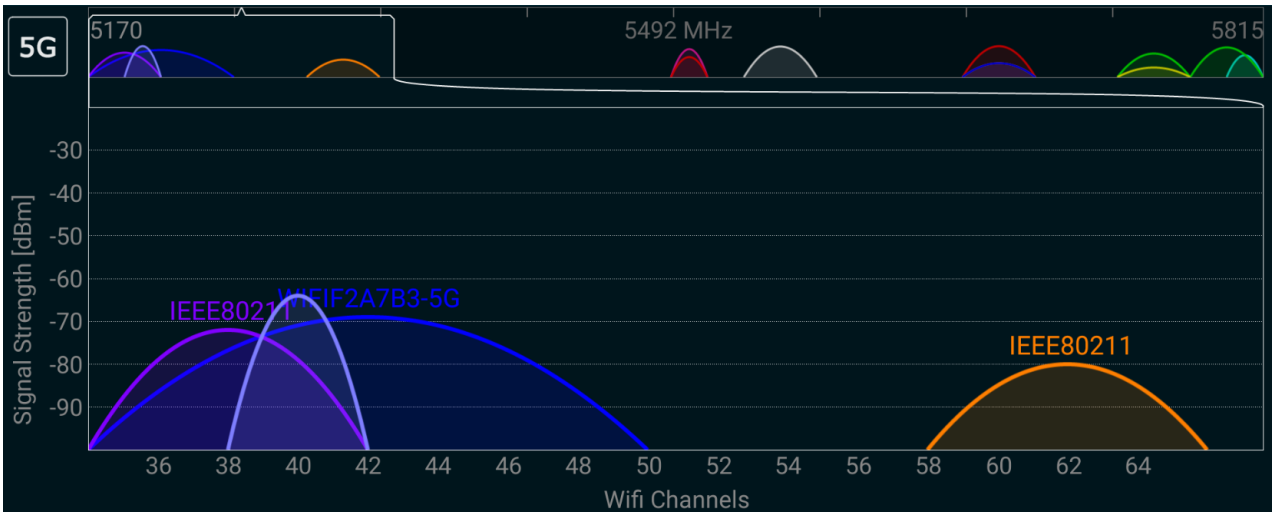
Channel Separation and HT Mode

In this example, you see great channel separation, channel sharing and even though the signal on channel 110 is set to 40Mhz (twice as wide as the others that are 20Mhz) there is NO interference.



In the next two examples, following what was explained, it's easy to see which wireless signal may be the cause of interference in your wireless network:





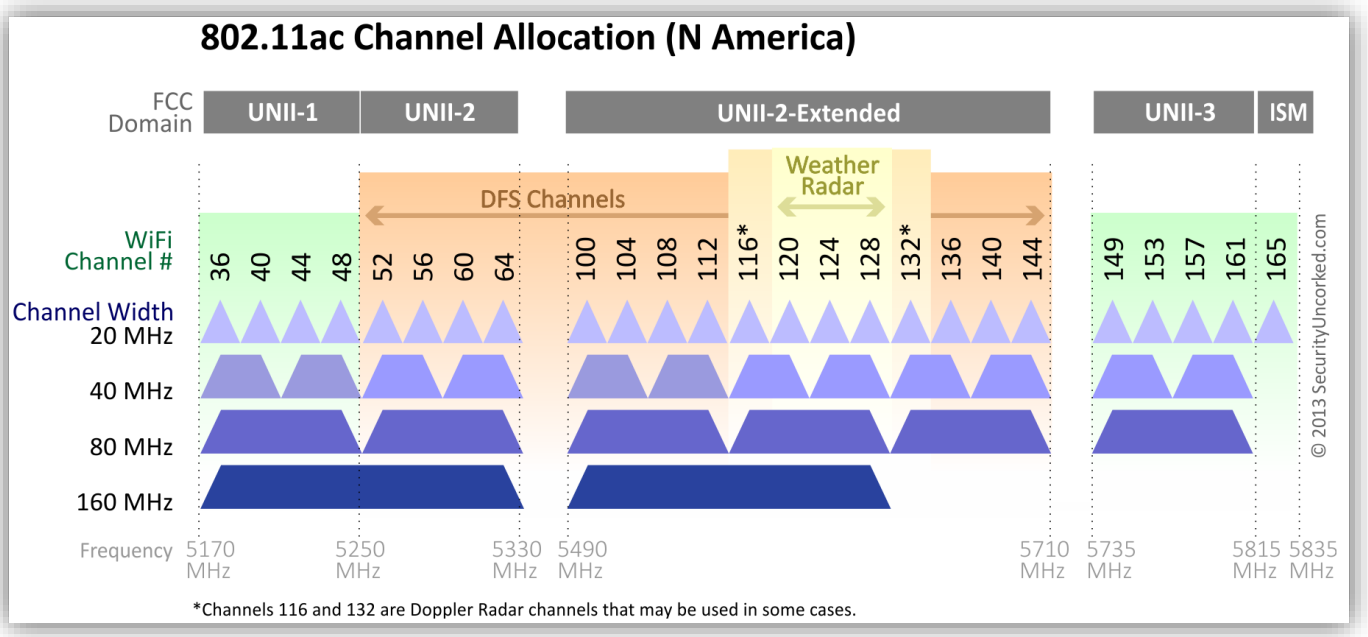
Channel Separation and HT Mode

Today's consumer wireless routers and access points are broadcasting dual band (2.4Ghz and 5Ghz).

On the 5Ghz side, there are certain default channels they like to use, namely channels 36 thru 48, and, 149 thru 161.

To make sure your wireless doesn't interfere with theirs (better yet, so they DON'T interfere with yours!), avoid those channels!

The channel allocation graphic below*, shows us the available channels and how to best separate then when changing HT Mode (channel width):



Many older routers won't give you the DFS channels shown above. EnGenius access points, that have the "GREEN" check box selected, will also not allow for DFS channel selection. This just means.. UNCHECK THE GREEN BOX.

Note: If your 5Ghz allows for greater channel width, make the channel as wide as you like because, then you'll really see a performance increase. Just make sure the signals DO NOT overlap.

Everything described are best practice settings to fine tune your wireless network.

*Link: http://securityuncorked.com/2013/11/the-best-damn-802-11ac-channel-allocation-graphics/