

2020

How to Boost Your Wi-Fi Speed



Monument.AL IT

Alan D. Monument
Monument.AL IT Pty Ltd
5/17/2020

Adapted from an article by **Jamie Lendino** (<https://www.extremetech.com/computing/179344-how-to-boost-your-wifi-speed-by-choosing-the-right-channel>) on April 19, 2017.

How to Boost Your Wi-Fi Speed by Choosing the Right Channel

Maintaining sustained high Wi-Fi speeds from your Wi-Fi Access Point (WAP) can be challenging in many situations. A number of factors come into play; such as how your router is configured and where it is placed, whether there's interference from other nearby Wi-Fi access points or electrical sources, whether you live in an apartment or a detached house, how far your devices are from your access point, etc. Fortunately, there are ways to avoid and fix slow transfer speeds.

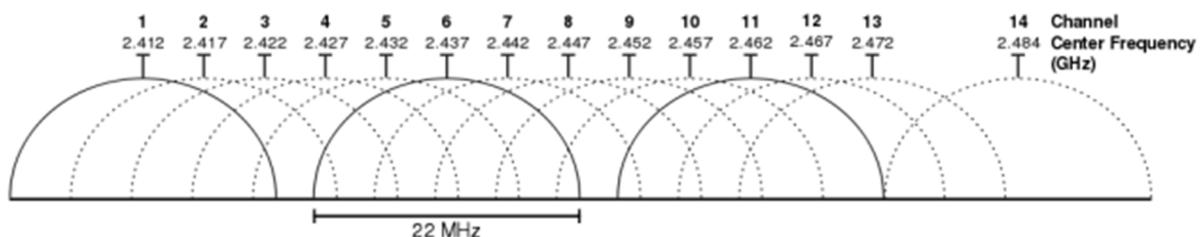
Most routers have their Wi-Fi channel set to Auto by default. This setting can be interrogated and changed by logging into the router via a web browser and looking at the *Wi-Fi* section of your router's configuration. So, are some channels faster than others you might ask? Some channels are indeed faster — but that doesn't mean you should change them without exploring your environment further.

2.4 GHz Channels 1, 6, and 11 (802.11b and g)

The majority of higher-end dual-radio routers and computer devices now incorporate the newer 5GHz band as well as support the older 2.4GHz band. Lower-cost devices with less expensive chipsets will be using the 2.4GHz band, which means this band will continue to be used in the majority of Wi-Fi installations into the future.

All versions of Wi-Fi up to and including 802.11n (a, b, g, n) operate between the frequencies of 2400 and 2500MHz. These 100MHz frequencies are separated into 14 channels of 20MHz each.

Unfortunately this results in every 2.4GHz channel overlapping with at least two, if not four, of the other channels (see diagram below). Just like listening to overlapping radio broadcasts where one radio station overlays the other making it difficult to understand the conversations, these overlapping channels are not good — in fact, it's the primary reason for poor throughput on our Wi-Fi wireless networks.



You will see from the diagram that channels 1, 6, and 11 are spaced far enough apart that they don't overlap with other channels. If you are using 802.11 with 20MHz channels, you should therefore always stick to channels 1, 6, and 11 — if you want to use 40MHz channels, be aware that the airwaves might be quite congested, unless of course you live in a detached house in the middle of nowhere.

What channel should you use if you live in a crowded area?

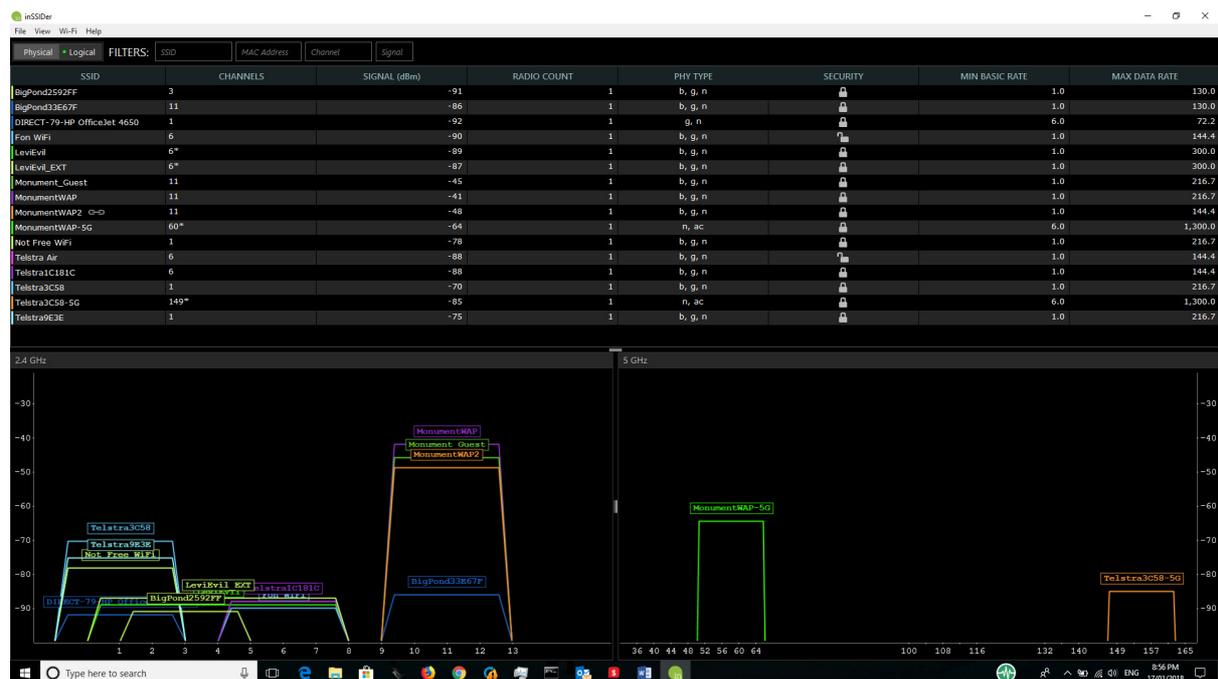
To achieve maximum throughput and minimal interference, channels 1, 6, and 11 are your best choices. However, depending on the other wireless networks around you, one of those channels might be a better option than the others.

As an example, if you're using channel 1, but someone next door is unfortunately using channel 2, then your throughput will drop dramatically. You would need to change to channel 11 to completely avoid that interference, although channel 6 would be pretty good as well with only a partial overlap with channel 2.

Note that it is very important that you don't use a channel other than 1, 6, or 11 otherwise you will then be the cause of local interference, and you will be experiencing the double whammy of everyone on the two channels either side of yours, will be impacting your throughput too.

In an ideal world, you would need to talk with all your neighbours and get every router to use channels 1, 6, or 11. Most routers nowadays usually default to one of these 3 channels and a problem will only occur when somebody has changed their router configuration to another channel. Be aware that interior walls do a pretty good job of attenuating (weakening) a signal. If there are brick walls between you and a neighbour, you could probably both use channel 1 without interfering too much with each other. But if the walls are thin (or there is a lots of windows), you should both configure your routers to use different channels.

There are tools that can help you determine the clearest channel, such as [Vistumbler](#) or [InSSIDer](#) (see image below), that will display information about all the SSIDs (**S**ervice **S**et **I**Dentifiers) that your computer's wireless network adapter is currently receiving from all the other active Wi-Fi Access Points around you. By default, an SSID is usually named for the wireless adapter or router; such as Linksys, TP-LINK, or Telstraxxxxxx. You will need to know the SSID of your network to connect to it, and if your wireless network is protected you will also need to provide a password to authenticate and successfully connect to it.



Adjacent and Co-Channel Interference

You can use any of the above utilities to graphically select the best channel for your location, and/or you can simply switch between channels 1, 6, and 11 until you find the one that works best for you. In the previous screen I am using channel 11 (the tall orange column). Note that another access point (the lower blue column) is also using channel 11 but its signal is quite weak and shouldn't impact my throughput too much. Also note that a neighbouring access point has been set up to use channel 3 and this is impacting the other neighbour's using channels 1 and 6 around it.

The *metageek* web site has a great easy-to-digest page on this whole topic, together with example diagrams at <https://www.metageek.com/training/resources/adjacent-channel-congestion.html>.

The Windows 10 Microsoft App Store has a free **Network Speed Test** app that can be used to test the download and upload speeds to identify the fastest candidate connection. Other operating systems and versions of Windows can use the **Speedtest** web site at <http://www.speedtest.net> to accomplish the same (see screen image below).



5GHz Channels (802.11n and 802.11ac)

More modern wireless technology also uses the new 5GHz band in conjunction with the 2.4 GHz band. The best thing about this new band is that it provides much more radio spectrum space at the higher frequencies, and offers 23 non-overlapping 20MHz channels.

Starting with 802.11n and continuing with 802.11ac, wireless technology in general became much more advanced than the prehistoric days of 802.11b and g. If you own a decent 802.11n or 802.11ac router (i.e. if you acquired a router in the last several years), it likely has some hardware inside that chooses the right channel automatically for you and modifies the output power to maximize throughput and minimize interference.

5GHz channels are faster than 2.4GHz but reception and performance drops off with distance from the access point, whereas 2.4GHz although slower will work at greater distances.

If you're using the 5GHz band, and your walls aren't paper-thin, then attenuation and the general lack of 5GHz devices should mean there's likely to be little interference in your apartment — possibly even allowing you to use the fatter 40, 80, and 160MHz channels if you feel like it.

Eventually, as everyone upgrades to newer hardware and moves towards 5GHz, picking the right channel will mostly become a thing of the past. There may still be some cases where it makes sense to fine-tune your router's channel selection. However when you're dealing with MIMO setups (up to eight in 802.11ac), it's generally a better idea to let your router do its own thing. To learn more about MIMO see the article **What Is Multiple-In Multiple-Out (MIMO) Technology?** by Bradley Mitchell at <https://www.lifewire.com/mimo-wifi-routers-818332>.

[Cover photo: MoD/MOD](#)