# What’s the difference between 5G and Wi-Fi?

5G is the umbrella term for the fifth generation of cellular network technology, and it encompasses a lot of different elements. Cellular or mobile networks rely on licensed spectrum bands, which are auctioned off to the highest bidder. Carriers, like Verizon and AT&T, have to pay to use those bands. To roll out coverage, they have to build a network of connected base stations capable of sending out a signal that’s strong enough for the network to serve multiple people (thousands in urban areas) at once. To recoup their investment and further expand network infrastructure, they rely on us paying subscriptions.

Wi-Fi relies on an unlicensed spectrum that’s free for anyone to use but has a relatively weak signal. We pay an internet service provider (ISP) to deliver the internet to our door, and then we use a router to fill our house with Wi-Fi. Using the same Wi-Fi frequency band as your neighbors can be a problem, especially if you live in a very densely populated area with limited bandwidth. The two frequencies that Wi-Fi uses are 2.4GHz and 5GHz. In simple terms, 2.4GHz has a lower potential top speed but penetrates better, so it has a longer range than the higher frequency, 5GHz, which can deliver faster speeds but doesn’t penetrate things like walls as easily.

It’s worth noting that 5GHz Wi-Fi has absolutely nothing to do with 5G mobile networks. Though Verizon 5G home internet does cross that boundary.

The prospect of download speeds between 1Gbps and 10Gbps and upload speed, or latency, of just 1 millisecond (ms) has people excited about a more robust 5G network. Those speeds are comparable to what you’d see from a physical, wired connection. However, the reality is we won’t typically get anywhere near the theoretical top speeds. And even if we did, it wouldn’t be for at least a few more years.

An April 2021 study by Opensignal revealed T-Mobile offered the fastest average 5G download speed of around 71.3Mbps, with download speeds reaching 103.6Mbps in New York and 108.8Mbps in Virginia. In comparison, AT&T's fastest average 5G download speed was 54.9Mbps and Verizon came in at 47.7Mbps.

The actual speed of your 5G connection will depend on many factors, including where you are, what network you're connecting to, how many other people are connecting, and your connected device. The aim is to achieve a minimum download speed of 50Mbps and a low latency of 10ms. That will represent a major improvement over current average speeds, but just as with 4G LTE, 5G coverage is expanding slowly. Currently, we're at an *average* download speed of around 57Mbps, according to a study from Speedcheck. That means that the minimum is far less than that.

It's also going to work hand-in-hand with not just Wi-Fi but also earlier generations of cellular technology, so 4G LTE will continue to be offered as a fallback and will likely keep evolving and getting faster.