

5G Cellular Broadband Will Change Our World

5G is a buzzword these days. This cellular technology offers 10 Gigabytes per second networking speeds, which is a quantum leap from its predecessor, 4G LTE which offers only 100 Megabytes per second speeds.

It has already been implemented by companies Telstra and Optus in Sydney and Melbourne. It is also being used in China by over 60 million users. Other countries such as Philippines, Monaco, and Ireland already offer 5G services as well, albeit in a more restricted fashion. Elsewhere in the world carriers are readying the infrastructure to support 5G. It is set to change the world, and here's how.

The applications of 5G are endless, but some particular ones come to mind.

For home-use, it will change the world in the following ways (among others.)

- 1) **Fixed Wireless Access:** Consumers will use 5G technology as their primary broadband at home. It outstrips conventional broadband, including fiber-optic connections, by a long mile, offers superior connectivity and ultra-low latency.
- 2) **3D Video Calls:** The bandwidth offered by 5G can make such 'holographic videos' a reality. Currently, 10 Gigabit connections exist, but they are widely dispersed due to prohibitive costs. With 5G being accessible to virtually everyone, video calls will soon be made in 3D, akin to your favorite Star Wars or Star Trek film!
- 3) **Wire-Free Home Security Monitoring:** You can already monitor your home's security remotely, but with limitations. The quality of the video you can see, particularly when you are on the go, for instance on the highway on your way to another destination, is quite poor. 5G technology will enable real time monitoring of home security through integration with the latest security systems.
- 4) **Immersive Gaming:** 5G technology will make online Virtual Reality (VR) and Augmented Reality (AR) far more accessible. Gamers want low latency, and the bandwidth required to carry AR and VR data across a network is significant.
- 5) **Cloud Gaming:** No longer do you need to build an expensive PC or buy the latest Playstation or Xbox, in a small way, Cloud Gaming is already here. The host machine runs the video game for you, and on your most basic device, you can play the game over a network with maximized graphics settings. But, latency is still an issue. Cloud gaming is still clunky today. 5G offers ultra-low latency and intense bandwidth to accommodate such gaming needs. And, what's more, you can play it on the go! Play your favorite console or PC games from a handheld device while you wait at the doctors, and more!

In other spheres, 5G has major implications as well:

- 1) Automotive: Fifth generation (5G) technology is expected to be a game changer for the automotive industry. The possibility for vehicles to be connected to other vehicles, pedestrians, roadside infrastructure, or application servers enables the development of multiple revolutionary services.
- 2) Mobile Broadcasting: While such technology has already existed for a while, it is with limitations. Broadcasting videos, mobile tv, and the like requires high bandwidth and low latency for superior quality videos. The quality of videos is severely limited in 4G LTE technology, but 5G will open this world up to unprecedented levels.
- 3) Smart Cities: Smart Cities may be described as an ecosystem of ecosystems where the underlying communications infrastructure is critical for economic growth and quality of life. These cities will experience superior growth, retention of business investments, and superior quality of life from the vast multitude of devices connected through the Internet of Things (IoT.) Such an undertaking requires lightning fast networking with ultra-low latency, possible only with 5G technology.
- 4) Healthcare: The healthcare industry, globally, is all set for a paradigm change with an increasing adoption of devices with sensing equipment, technology and telemedicine evolution. Telemedicine is when doctor appointments, along with a certain amount of real-time checking of the biology of the patient, occur over a network instead of in person. Small hospitals and towns can benefit from specialist doctors sitting thousands of miles away. But, for this, cost-effective, very high bandwidth internet with ultra-low latency is required. 5G can make this a reality.

For those who want to know about the technology behind 5G, here's how it works:

5G uses a method of modulating a digital signal across several different channels to reduce interference called Orthogonal Frequency-Division Multiplexing (OFDM.) It uses wide bandwidth technologies such as sub-6 Ghz and mmWave in order to use multiple signals wavelengths to carry data. While, fundamentally, it operates on the same mobile networking principles as 4G LTE, 5G will bring wider bandwidths by expanding the usage of spectrum resources, from sub-3 GHz used in 4G to 100 GHz and beyond. 5G can operate in both lower bands (e.g., sub-6 GHz) as well as mmWave (e.g., 24 GHz and up), which will bring extreme capacity, multi-Gbps throughput, and low latency.

As one can see, 5G technology has significant implications in all areas of our lives. It is the quantum leap from 4G LTE technology that makes this possible. It is no small increment, moving from 100 Megabits per second to 10 Gigabits per second, it is a 100 fold increase in bandwidth. And, utilizing multiple frequencies at once, the latency is extremely low, in fact, even lower than traditional fiber optic broadband can offer. Both these improvements over existing technology, and the widespread availability and low cost due to its cellular nature, all make 5G the technology of the future. It's already present in some countries, but set to take the world by storm as supporting and dependent technologies develop alongside it.

