

5G

What To Consider When Choosing a 5G Solution

A MACH Networks White Paper



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In an era where digital agility defines market leaders, enterprise businesses must strive to be at the forefront of any speed or connectivity revolutions. The embrace of cellular broadband is not just a trend—it's a transformative shift across sectors, heralding the rise of 5G as the new standard. The unparalleled value of 5G is becoming the cornerstone of modern business operations, propelling industries into a future where speed and reliability are not just competitive advantages but necessities.

The revolutionary benefits of 5G include:

- ✓ A new class of primary or backup connectivity for businesses of all sizes
- ✓ Faster speeds, lower latency, and higher capacity
- ✓ The agility to deploy solutions quickly and efficiently
- ✓ The ability to easily move connectivity from one site to another
- ✓ Better connectivity for businesses or vehicles that are on the move
- ✓ Increased reach for digital signage, video surveillance, and a wide range of IoT applications

With these considerations in mind, many organizations are either considering or already deploying 5G solutions as part of their mission-critical network architecture.

In this article, we're going to talk about things to consider when choosing a 5G solution. But first, we're going to talk a little bit about the different spectrum layers used in 5G because the value of 5G can vary based on coverage and available spectrum.

Types of 5G For Enterprises and SMBs

The performance of 5G can vary greatly and is dependent on coverage and available spectrum. This means that based on the location of the business, performance will be dependent upon coverage and the different layers of available 5G services.

Coverage Layer

The Coverage layer is also referred to as low-band 5G. Low-band 5G uses sub-2 GHz frequencies which is the same spectrum used by 4G LTE. Although the speed and capacity are lower than other 5G layers, the signal propagation is good (which means it can penetrate obstacles) and frequently travels further,

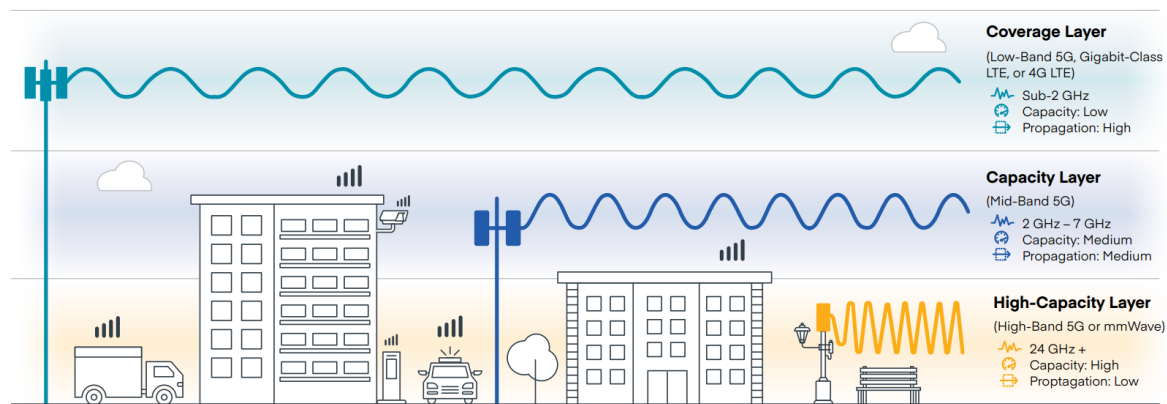
which is why your cell phone works fine when you are indoors. However, what is gained in signal penetration can also limit the speed at which you conduct business.

Capacity Layer

The Capacity layer is also referred to as mid-band 5G. Mid-band uses 2 – 7 GHz and has medium capacity, high speeds, and moderate signal propagation. While the signal in this layer travels pretty far and carries a lot of data, it doesn't penetrate obstacles or walls as well as the coverage layer. However, it offers a good balance between performance and signal propagation and works with various bandwidth-intensive latency-sensitive applications. This is the sweet spot for 5G and represents services such as Verizon's C-Band connectivity.

High-Capacity Layer

The High-capacity layer is also referred to as mmWave. High-capacity uses > 7 GHz and has higher capacity and speeds but lower signal propagation. This layer carries a lot of data, but it won't travel very far, and the signal will not penetrate obstacles, glass, or walls very well, and it can be interrupted by a storm. That said, when the high-capacity layer signal has a clear line of sight to the tower, it can move a lot of data very quickly.



So why does this matter? Let's say you have two buildings. In building one, we have a modem or a router inside the building. This would be appropriate for anybody who needs a fair amount of bandwidth. It would be able to get coverage off the coverage layer and maybe the capacity layer. If you locate it close to the edge of the building near a tower, you will probably pick up the capacity layer also from the inside of the building.

However, if you really want the fastest speeds possible, or you're in an area where the capacity layer isn't super strong, you can put an adapter outside of your building to improve the signal propagation. If this adapter has a clear line of sight to a 5G tower and high capacity is available, it will give you the fastest possible speeds. This strategy will also help you with the capacity and the coverage layer because it doesn't have to overcome any interference from obstacles, glass or walls.

Applications Suitable for 5G

5G is an attractive technology for a growing base of applications. These include primary or backup connectivity for fixed locations, temporary or pop-up businesses, vehicles, and a wide variety of IoT applications.

Fixed Locations

5G now provides a feasible and cost-effective alternative to landline services. Distributed enterprises can use 5G to provide better performance and higher capacity than a wired connection, with the advantage of being provided by a single provider. Businesses can also add 5G as a failover solution for their wired connections, providing higher reliability without having to trade off speed and capacity. For organizations looking for a high-performance alternative to their existing wired LAN architecture, a private 5G network can deliver more control and better security while complementing their existing Wi-Fi infrastructure.

Temporary Locations

5G provides instantaneous connectivity when a pop-up store or construction company needs to provide its own network connectivity for business-critical applications such as point-of-sale or temporary internet access. As an additional advantage, 5G provides Day-1 Internet connectivity that can easily be moved to different locations as the business dictates.

Vehicles

Connected vehicles can only function as far as their network reaches, making 5G the premier solution of choice for mobile healthcare, public safety vehicles, public transportation, fleet connectivity, and more. The speed and security offered by 5G give emergency response vehicles fast and secure access to life-safety applications, while public transportation services can easily capitalize on those same benefits and offer efficient guest Wi-Fi and/or precise telemetry data.

IoT

The capacity of 5G means more devices can be connected at once; in some cases, as many as 1 million devices per square mile. Many of these devices require large amounts of bandwidth to perform their designated functions. This includes applications for smart cities, AI-enabled image recognition, immersive and interactive kiosks, real-time digital signage, and many more.

How can I determine which 5G type my business needs?

Indoor vs. Outdoor Connectivity

For fixed locations, such as stores and offices, achieving the best 5G coverage in an indoor setting – particularly in areas with low propagation – may require an external 5G adapter. Using an adapter versus an external antenna mitigates signal loss between the adapter and the router. On the other hand, in some cases, the reception will be strong enough indoors that the deployment will only require an indoor router with an embedded 5G modem or an indoor 5G adapter. Your service provider should make this assessment and recommend the best solution based on these variables.

Adjunct vs. All-in-one Connectivity

An adjunct solution means the 5G adapter is connected to any router with the suitable port size and processing power to handle the higher speeds of 5G. The advantage of an adjunct solution is that there are many router options. An all-in-one solution is an enterprise-class router with one or more embedded 5G modems that recognize the compatible 5G adapter, making hardware monitoring and management much easier.

Dual Connectivity

Dual connectivity is a technology that enables a 4G and 5G connection to occur simultaneously and using multiple carriers. Through dual connectivity, the 4G LTE network acts as an anchor band supplemented by 5G. When connected to a 5G modem, it allows traffic requirements to determine whether an LTE connection is sufficient to transmit data at an acceptable rate or if the traffic should be passed to the speedier 5G signal. Nonetheless, regardless of your site architecture, the key to 5G adoption is to always deploy with consideration for the future in mind. This means that even if you don't have the desired 5G spectrum in your area currently, buying a 5G router now will ensure you're ready to take advantage of that technology as soon as it's available – without sacrificing connectivity today.

Even if 5G service is not yet available at your location, it is likely that it will be in the near future, and virtually all 5G routers already support 4G LTE services. Therefore, buying a 5G router now will ensure you are ready to take advantage of 5G technology as soon as it is available in your area without having to sacrifice the connectivity needs you have today.

Questions to Answer Before Choosing Your 5G Connectivity Solutions

So, where do you start? Here are some steps you can take to help determine if 5G is a good fit for your organization's needs. Start with basic foundational questions such as: What problem am I trying to solve? Do we need primary or backup connectivity? Or maybe both. And is this a permanent, temporary, or a mobile application?

- 1. How will 5G provide my business with a competitive edge?**

Examine your organization from a visionary perspective. Are there ways to improve operational efficiency, scale rapidly, or enhance customer and employee experience using 5G applications such as virtual reality, HD video streaming, interactive kiosks, immersive experiences, and more?

- 2. How will 5G be incorporated into my network architecture?**

If you've already incorporated 4G LTE into your WAN architecture, the move to 5G may just be a matter of assessing coverage in your area and adding 5G capable devices to your network infrastructure. If you're transitioning from wired or hybrid WAN to an all-wireless WAN architecture, be prepared to choose equipment, carriers, and rate plans that best suit your needs.

- 3. Which provider offers the best value for my different locations?**

Take the time to research and meet with Managed Services Providers who understand the nuances of 5G deployments, fully managed WWAN, and your unique business goals. Do they provide 5G coverage for your sites and fleets? Do they represent just one carrier or multiple carriers to ensure service at virtually any location? Do their rate plans fit your budget? Will you have a dedicated point of contact for each site? Is the network managed by qualified network administrators?

MACH Networks Fully Managed 5G Solutions

At the end of the day, the solution you choose really depends on the problem you are trying to solve. The solution will depend on what spectrum and coverage is available at your location. Regardless of what you have today, the "Big 3" carriers are continually working to provide better coverage and higher speeds and will continue to do so for the foreseeable future. As far as hardware is concerned, it should be 5G capable, reliable, manageable, and available where and when you need connectivity. This means enterprise-class hardware from companies like Cradlepoint should always be part of an enterprise-class solution. As far as coverage, no single carrier has 5G coverage everywhere, so for multi-site deployments, you will want to ensure you have a partner that can provide 5G service on multiple carrier networks.

MACH's fully managed, enterprise-class 5G solutions are specifically designed for scalability, security, and manageability, catering to the distinctive requirements of today's businesses that want 5G technology to be a transformative force. With our enterprise-class hardware and unlimited data plans on the nation's 3 largest carrier networks, MACH has a solution that will meet your customers' specific needs.

Learn more at www.MACHNetworks.com

Thank you to Cradlepoint for contributing content.