

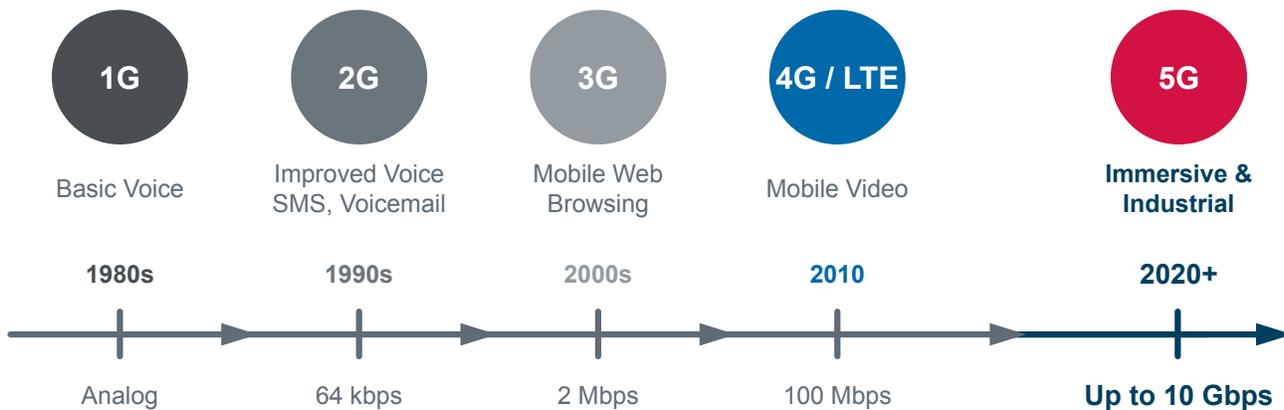
Understanding the 5G Opportunity

– Michael Mack, Portfolio Manager

Over the past year, the topic of 5G has attracted a lot of attention. Investors have been seeking answers as to what 5G is, and how they should invest based on what they find.

The Basics of 5G

5G stands for “Fifth Generation”. This is not new terminology, as it’s been seen over the past few decades in 4G, 3G, and so on. Each generation of technology has brought faster speeds and new capabilities: 1G was for standard voice only calls, 2G offered text messaging, 3G internet browsing, and 4G HD video streaming. Now, 5G is expected to enable a broad range of technologies like autonomous vehicles and the Internet of Things by expanding the bandwidth capabilities of data processing centers.



Source: AmericanTower

At its core, 5G is a set of standards agreed upon by industry professionals that establishes specific criteria for wireless cellular technology. The most important criteria are:

- **Speed:** how fast data can be sent and received
- **Latency:** the delay between when a request is sent and when it is processed
- **Capacity:** the number of devices and amount of traffic that can be supported

Speed

“Speed” refers to how fast data can travel through a wireless signal. For example, speed is the amount of time it takes to download a video on your phone, or how quickly it takes a web page to load. Currently in 4G, downloading a movie from a streaming service on your cell phone could take 2 minutes and 20 seconds, or 140 seconds. With 5G, that number could drop to just 2 seconds. 5G uses higher frequency waves, meaning higher amounts of data can be transmitted in the same space, to offer faster download speed. Estimates indicate 5G has the potential to increase speeds 10 to 100x faster than that of 4G (WSJ).

Latency

“Latency” can be a confusing concept because it is a hidden factor. Using the previous analogy about downloading a video on your cell phone, the time between when you click download and when the actual download begins is referred to as “latency”. Everyone wants and notices speed, but as technology expands into areas like driverless cars, latency becomes very important. Imagine you are playing a video game online and the screen begins to “buffer”. You would most likely lose. This example is transferable into self-driving cars as well: a car connected to the internet has potential to “buffer”, or hit a dead zone, causing the car to lose control. Estimates expect latency to be 5-10x lower with 5G, therefore eliminating these problems (AmericanTower).

Capacity (Spectrum)

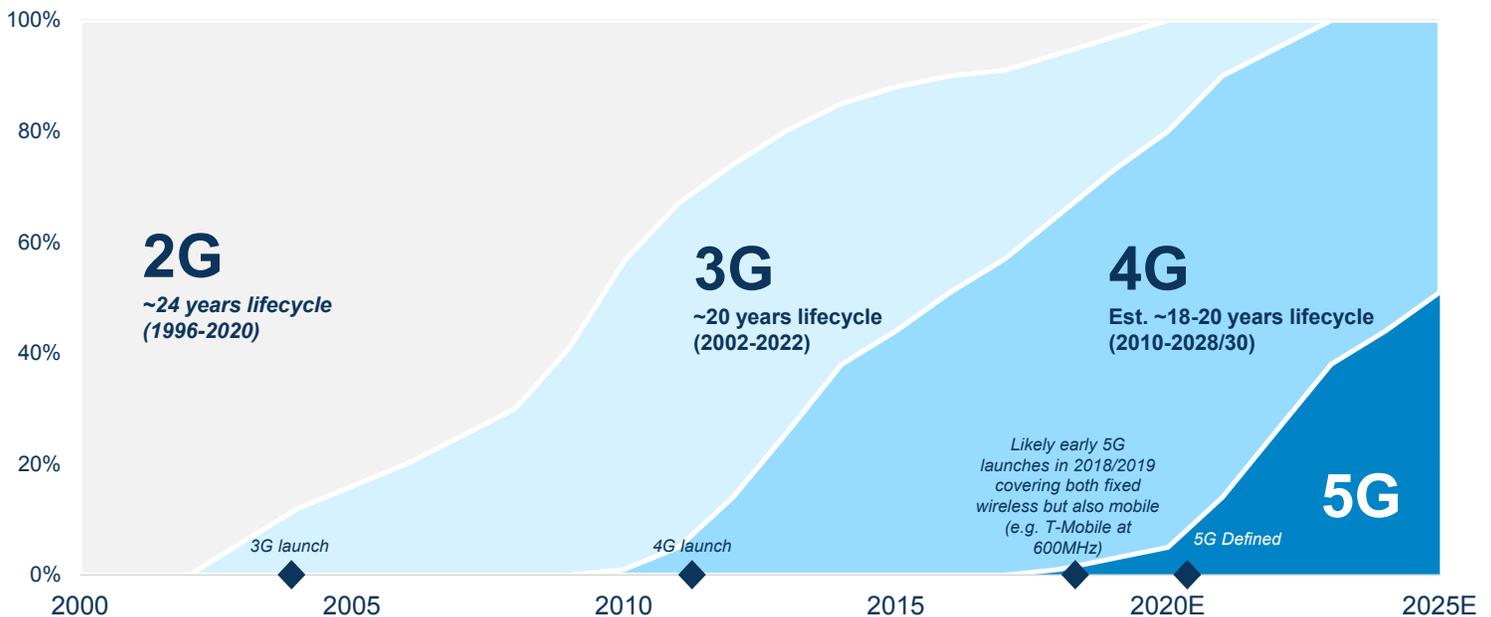
“Spectrum” refers to the number of radio frequency signals. There has been a lot of talk about running out of spectrum for wireless providers to meet increasing demand. All wireless communication occurs on a specific frequency, like a car radio, for example. AM radio channels range from 560 to 1600. Each radio channel represents a different frequency. The same concept applies to our phones. As we communicate with each other, we are connecting to a cell phone tower using different radio frequencies. As data increases, we are running out of capacity to support all of these devices. Since 5G can operate on higher frequencies, this increases the spectrum, or the numbers of channels your radio has. Estimates are that 5G will increase capacity by 3x (Samsung).

It's Not Just 5G

While talk still circles around the 5G rollout, we have a decade long runway for the 4G network buildout to be complete. It will take time to buildout 5G. Until then, the increasing need for data will continue, calling for plenty of demand for more 4G cell phone towers. The chart below shows that even when a new generation emerges, the old generation remains in use for another decade.

U.S. Market Share of Connectivity Standards

2000 – 2025E, based on % devices



Source: AmericanTower

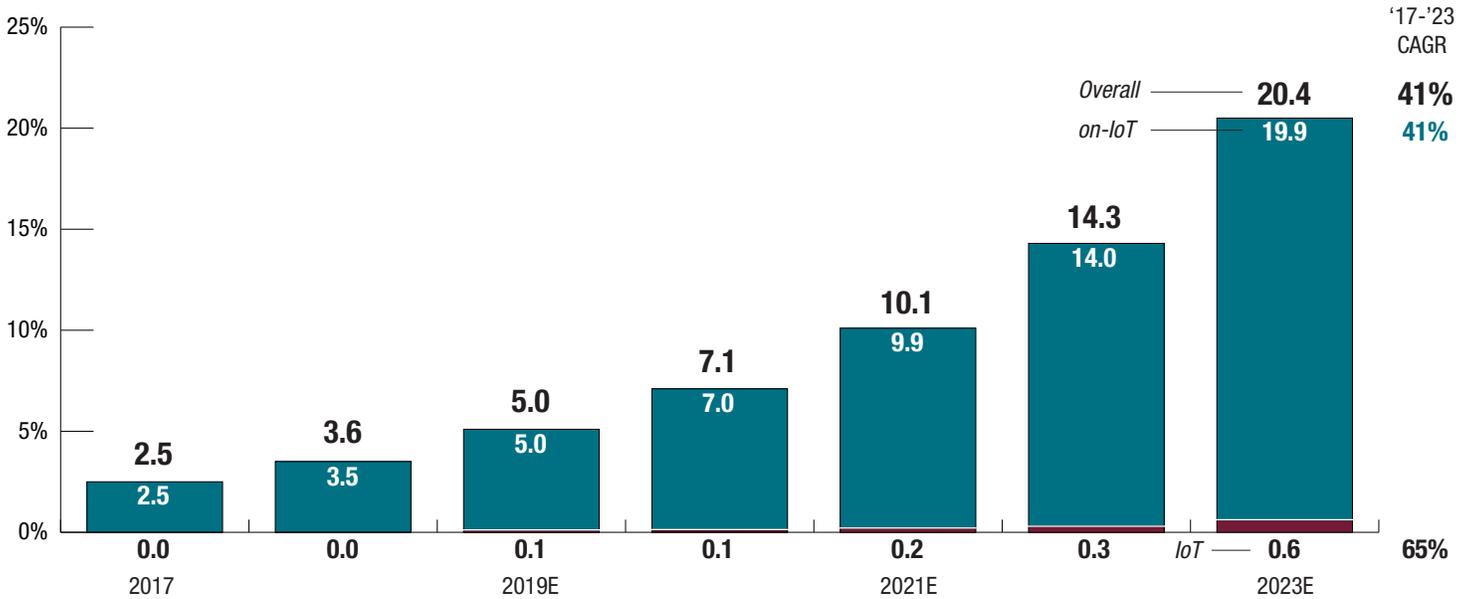
Support Needed For 5G

The buildout of 5G will involve a broad range of technology providers:

- Semiconductors will need to make 5G enabled chips.
- Networking equipment companies will need to build 5G enabled servers, routers, and switches to transfer signals across the cellular network.
- More cell phone towers will be needed to serve the same area to support 5G.

U.S. Total Monthly Mobile Data Traffic (Exabytes)

2017 – 2023



Source: AmericanTower

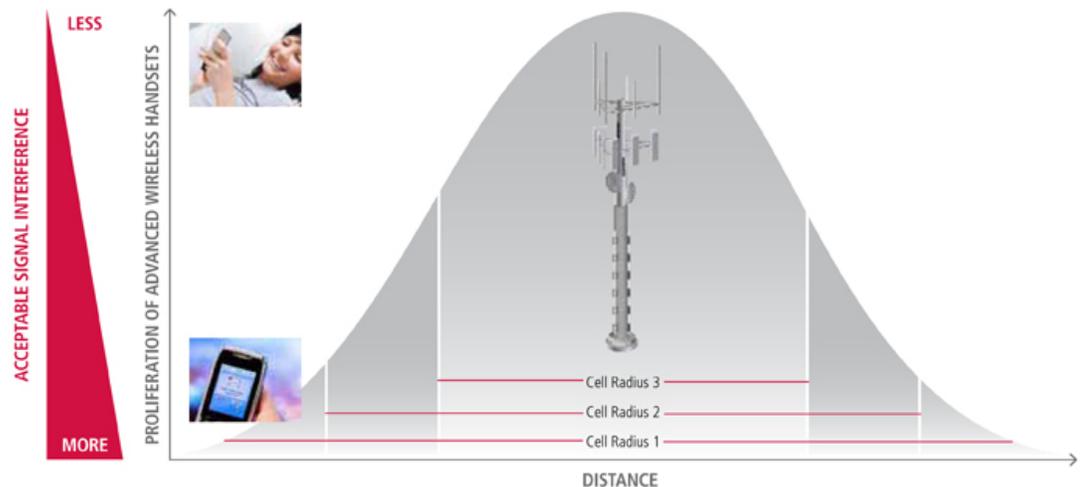
Increasing Data Consumption + 5G = More Cell Towers

Internet traffic is currently on track to double every two years. This increasing traffic is currently overwhelming the existing cell tower infrastructure, resulting in the need to build more towers to support the demand. Beyond this, 5G will require more cell towers to cover the same amount of space. 5G utilizes higher frequency waves that offer higher speeds but are unable to travel as far. This means 5G cell towers will be unable to cover the same distance, resulting in a need for more cell towers to cover the same areas.

Narrowing Cell Radius

Signal Strength Curve

As devices become more advanced, the increasing demand for high-bandwidth applications and higher quality of service result in a narrower range at which signals can be transmitted. As a result, carriers are investing in denser networks.



Source: AmericanTower

Cell Tower REITs Offer A Pure Play

Investors looking to invest in the 5G theme need to figure out how they prefer to invest. We believe cell tower real estate investment trusts (REITs) present an attractive opportunity to invest in 5G themes while being less impacted by global economic factors. Regardless of where the market goes, we anticipate the need to expand cell phone tower networks will press on, creating an opportunity in the companies most exposed to this buildout.

How to Invest

Pacer ETFs offers a unique ETF that allows investors to take advantage of cell tower real estate investment trusts (REITs).



The **Pacer Benchmark Data & Infrastructure Real Estate SCTR ETF (SRVR)** offers investors a tax efficient way to invest in the companies providing the foundation for the 5G build-out. With exposure to data and infrastructure real estate and C-Corps, SRVR identifies and invests in crucial REIT companies.

Visit www.paceretfs.com or call **1-877-337-0500** to learn more.

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