

# What 5G Will Mean to Consumers—and When

In the long term, plenty. But the changes will come slowly.



Magic Leap, an augmented-reality company that overlays graphics on a user's surroundings, is working with AT&T to capitalize on 5G.

*By Marc Vartabedian* Sept. 12, 2018 10:04 p.m. ET

Each of the modern leaps in wireless network technology has brought distinct change: The second generation—aka 2G—allowed for voice transmission, 3G ushered in the app revolution, and 4G brought a drastic speed boost.

Now, the highly anticipated 5G wireless networks are expected to be powerful enough to bring us mass-market automated cars and real-time virtual reality, yet practical enough to replace wired home broadband.

But, while 5G will begin rolling out to consumers by year-end, fulfillment of its more lofty promises might not happen for years, experts say. And a prohibitively costly infrastructure build-out that involves unsolved challenges also stands in the way. In short, groundbreaking 5G applications could be ahead, but at first it might not seem all that different from what we have today.

Chief among 5G's promises is that its use of shorter-frequency radio waves could allow it to carry enough extra data to vastly extend the reach of internet connections. Current 4G LTE networks can handle smart deadbolts and dog collars, but they don't have the bandwidth to allow for complex, self-controlled systems—think autonomous cars that communicate with each other to choreograph a synchronized parking effort in the heart of New York City.

5G is about connecting “things with other things,” says Sandra Rivera, senior vice president for the Network Platforms Group at [Intel Corp.](#) [INTC -2.29%](#), one of the leading chip makers that are engulfed in a global race to develop and roll out the technology, along with telecoms such as [AT&T Inc.](#) and [Verizon Communications Inc.](#)

Latency—the lag between when a request for a website or video is made and when the network responds—will have a big part to play in the success of 5G networks. Ultimately, 5G latency could be reduced to one-tenth of what it is with 4G, according to the International Telecommunication Union, a United Nations agency that develops technical network standards. The future of virtual reality and augmented reality depends greatly on this.

“With higher speeds and lower latency rates, our mobile 5G network will eventually unlock a number of new, exciting experiences for our customers,” says AT&T's chief technology officer, Andre Fuetsch.

AT&T is aiming high. It announced in August that it would equip a community in Texas with 5G to enable pilot programs with the ultimate goal of creating a synchronized urban transportation network—including flying taxis from Uber and autonomous vehicle fleets from startup Drive.ai.

Augmented-reality headset maker Magic Leap formed a partnership with AT&T in July to take advantage of the carrier's 5G ambitions. Magic Leap's headset requires powerful processing to seamlessly overlay graphics on the surrounding environment and adjust the view in real time.

## **Infrastructure challenge**

Among the biggest challenges for the fulfillment of 5G's potential: Because 5G waves are positioned so much closer together, they can't travel very far on their own. 4G towers currently

can deliver service for up to 10 miles. True high-bandwidth 5G towers can only deliver service up to 1,000 feet. 5G waves also can have difficulty penetrating walls and windows, and could even be hindered by new leaves on trees during the spring.

Carriers say the solution to those problems is more cell towers, but that presents its own difficulties. Making 5G a widespread reality, even within cities, requires thousands of new towers. Building all those extra 5G-equipped towers is expensive, especially for a country as sprawling as the U.S.

“Nobody has figured out how to build that infrastructure out yet,” technology consultant Chetan Sharma says. “The math required to make that work isn’t practical.”

As a result, the first iterations of 5G to reach consumers likely won’t be “true 5G” that’s powerful enough to enable a host of glitzy applications, Mr. Sharma says. Speeds should certainly be faster, but some carriers say 5G will act like an extension of the main technology behind 4G, known as LTE (for Long Term Evolution).

These initial 5G rollouts will run on low- or mid-band spectrum, meaning speed would be 10% to 20% faster than current 4G service with low-band 5G, and up to three times as fast for mid-band 5G, Mr. Sharma estimates. Lower-band spectrum rollouts require less cell-tower infrastructure.

The first applications will include fixed wireless access for the home, sports venues equipped with remote-controlled high-resolution cameras, and connected shuttle services in cities, according to several large carriers.

## **Early days**

AT&T will begin introducing 5G in 12 U.S. cities this year, with the disclaimer that “actual speeds are lower and will vary” from what is theoretically possible, according to a company announcement in August. Mr. Feutsch says lower latency and faster speeds will be among the first effects consumers will notice.

Verizon has similar efforts under way, focused on providing home broadband via 5G.

Even with its initial limitations, 5G’s technical improvements could tear up the playbook for how people get internet. Wired and wireless technology could blur: As the wireless-centered companies pose new threats in markets dominated by cable companies, so too could [Comcast](#) and others adopt the technology to compete.

There likely won't be any 5G smartphones in the U.S. until next year. In August, [Sprints](#) - 1.38% announced a partnership with [LG Electronics](#) to launch a 5G phone in the first half of 2019. For Qualcomm Technologies Inc., a leading smartphone chip maker, the first phase of 5G that will be rolled out next year is focused on mobile broadband—smartphones, tablets, connected PCs—says Danny Tseng, a technical marketing staff manager at the company.

Flashier consumer applications, such as vehicle-to-vehicle communication—a key step in making autonomous cars a reality—and digital TV broadcasting aren't part of the focus of the first 5G rollout, Mr. Tseng adds.

*Mr. Vartabedian is a Wall Street Journal reporter in San Francisco. Email him at [marc.vartabedian@wsj.com](mailto:marc.vartabedian@wsj.com).*

*Appeared in the September 13, 2018, print edition as 'What 5G Will Mean for the Consumer.'*