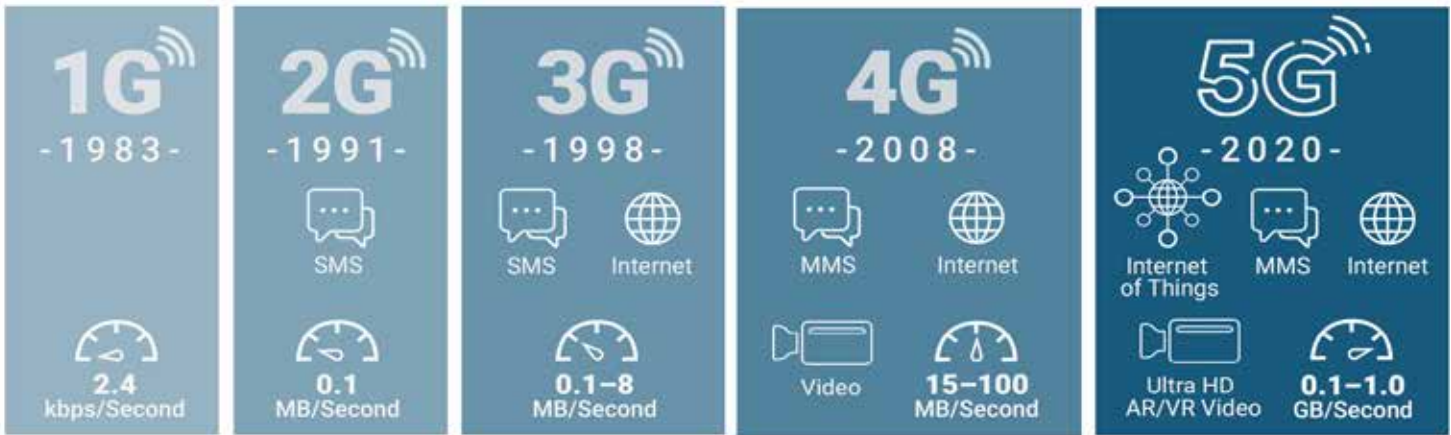


# 5G CONNECTIVITY FOR HEALTHCARE: YOUR TIMELINE FOR SUCCESS





## What is 5G?

Everyone's talking about 5G. But what is 5G? When will you get 5G? What does 5G mean for you?

5G is going to change your life, maybe slowly and imperceptibly at first. But it will impact everything mobile from how you stream video to how you interact with "smart" things.

We're here to try to clear up some of the questions you may have about 5G and give you an idea of what you can expect in the coming years.

5G is going to change our lives, professionally and personally. It is expected that 5G technology will have the same revolutionary effect on our society as did the introduction of transformative technologies, such as electricity and cars.

But what is 5G? Simply put, 5G is the fifth generation of cellular wireless/mobile technology. First there was 1G that was built from nothing – a clean sheet of paper. Every subsequent generation of cellular technology (2G, 3G, and 4G) has been incrementally built on top of the preceding generation and offers increased capacity and speed. 5G will continue this evolution but promises large-scale improvements. Specifically, 5G promises to deliver 1) speeds of 1 to 10 Gbps, up to 10 times faster than 4G, 2) ultra-low latency <1 mSec, and 3) effective IoT to a massive number of devices.

5G's higher speeds, lower latency, and greater bandwidth will change what we expect from wireless technology. In healthcare, that revolution will be life changing and will affect every aspect of the healthcare ecosystem from diagnostics, monitoring, virtual care, and more.

So what does this mean in your day-to-day world? Imagine large data uploads and downloads, such as MRIs, to take only one or two seconds instead of minutes. Applications, such as medical IoT sensors and monitors, will become faster, more reliable, and more ubiquitous. You'll get critical communications (CriC) in real time. Communications between caregivers at the hospital and emergency personnel in ambulances or life flights will be instantaneous. Remote robotic surgery commands that require immediate responsiveness will become a reality. There can be no delay from when the surgeon issues a command and when it is actually deployed. And we will try to remember what life was like before 5G. This is the promise of 5G.

So when does all this happen?

### 5G is Here, Now

We've all seen the ads, 5G is here, now. But it was a long time in the making. It took about 25 years to go from first-generation analog cellular (1G), introduced in the eighties, to digital: 2G, 3G, and then to 4G, introduced in 2010 in the U.S. 5G has been in the works since 4G was released. Now that 5G is here, you can be sure that behind the scenes work is already happening for 6G.

It's estimated that by 2024, 25% of mobile data traffic will be carried by 5G networks. So even if you don't yet have 5G personally or professionally, chances are you, your co-worker, or your employer will soon. The number of 5G subscriptions will reach 190 million by the end of 2020 and an incredible 2.8 billion by 2025.<sup>1</sup> Networks are projected to support a 66% increase in the number of mobile devices going from 3 billion to 5 billion. Of those, 60% will be 5G capable.

5G is most likely where you are already, especially if you're in an urban area. All the major carriers are rolling out fixed and mobile 5G services. Currently there are 118 5G networks globally. But it's predicted that number will reach 206 by the end of 2021.<sup>2</sup> We'll need all those new networks too. According to Omdia, there were 63.6 million global 5G connections as of Q1 2020, which represents a 308.66% growth over Q4 2019.

<sup>1</sup>Ericsson Mobility Report June 2020

<sup>2</sup>Ghosh, Iman. Visualizing the State of 5G Networks Worldwide. VisualCapitalist. Oct 6, 2020. <https://www.visualcapitalist.com/visualizing-the-state-of-5g-networks-worldwide/>



## Will 4G Go Away?

The short answer is not now and not for some time. If you have a 4G smartphone, don't throw it out yet.

5G is not replacing 4G. Rather, for the foreseeable future, 4G LTE will work alongside 5G in a complementary manner and there will be no hard cut over. 4G and 5G will coexist. 5G as it exists today, still requires 4G to anchor and coordinate the 5G network and device behaviors. For instance, if you have a 5G phone and it drops the 5G signal, the phone will fall back on 4G LTE so there's no interruption in your service.

There are three frequency bands that 5G networks can operate on: sub-3 GHz (the low-band), 3 GHz to 7 GHz (the mid-band), and the faster 24-GHz (and above) millimeter waves (mmWave). 4G currently operates on the lower bands, which are the traditional frequency bands used for cellular networks. The mid-bands include CBRS frequencies at 3.5 GHz and the 6 GHz unlicensed frequency.

## When Will 5G Really Arrive for Me?

The answer depends on where you live, what carriers you have, the availability of 5G devices, what type of building(s) you're in, and most importantly, what type of communications infrastructure you currently have.

If your healthcare system is in a major metropolitan area, you saw 5G coverage and the availability of 5G devices grow in 2020, but slowly due to the pandemic. By 2021, you'll start to see more advanced 5G use cases such as URLL (Ultra Reliable Low Latency), video transfers and IoT applications like remote monitors and sensors.

So why is 5G taking so long? Good question. Let's begin with the 5G infrastructure. There are a number of factors involved in rolling out 5G. The first includes the high cost to physically implement the 5G millimeter wave (mmW) network. Second is the acquisition of local regulatory approvals for construction of the antennas. Because of the shorter wavelengths, 5G requires far more wireless antenna connections than 4G, which is one of the primary reasons it is now only widely available in densely populated cities.

Over the next 10 to 15 years, 5G will also drive a new global cellular infrastructure. It's estimated that telecom companies will invest as much as \$275 billion into 5G infrastructure before 2025. IHS released a 5G Economic Impact White Paper predicting that 5G's full economic benefit should be realized by 2035 and could produce up to \$13.2 trillion worth of goods and services enabled by 5G mobile technology and support up to 22.3 million jobs.<sup>3</sup>

## 5G Devices

You can't make a 5G call if you don't have a 5G phone. The number of new devices, including smartphones,<sup>4</sup> constantly grew during 2020 in part driven by the introduction of the Apple iPhone 12. A report from Strategy Analytics forecasts that Apple will become the leader in 5G smartphones surpassing Samsung.

<sup>3</sup>The 5G Economy: How 5G Technology will Contribute to the Global Economy, IHS Markit, November 2019.

<sup>4</sup>Ericsson Mobility Report June 2020

## TIMELINE

### 2018 and prior

- Early fixed wireless access deployment
- Early 5G mobility demonstrations

### 2019

- First 5G android phones
- Four major carriers roll out 5G islands in 35 cities
- Limited rollout of 5G devices
- 5G operational in 13 NFL stadiums
- 4G OnGo (Citizens Band Radio Service [CBRS]) goes live
- OnGo handsets available

### 2020

- 5G device ecosystem expands
- 5G handsets reaching 8.9% of smartphones
- The first 5G iPhone expected
- Greater deployment of 5G networks
- 5G coverage: broad areas of 4G equivalence
- OnGo spectrum auction
- OnGo handsets expand
- Wi-Fi 6 expands

### 2021

- Early, advanced 5G use cases (URLL and IoT)
- 5G coverage: expanded outdoor urban/suburban
- 5G indoor coverage remains problematic
- Private 5G emerges
- OnGo update increases with vertical expansion

### 2022

- 5G phones hit mainstream consumer
- Advanced networking models
- Hybrid networks start to grow

### 2023

- 5G subscribers are expected to reach 1.1 billion

### 2024

- About 25% of mobile data traffic will be carried by 5G networks (1.3x more than 4G/3G/2G traffic today)<sup>4</sup>

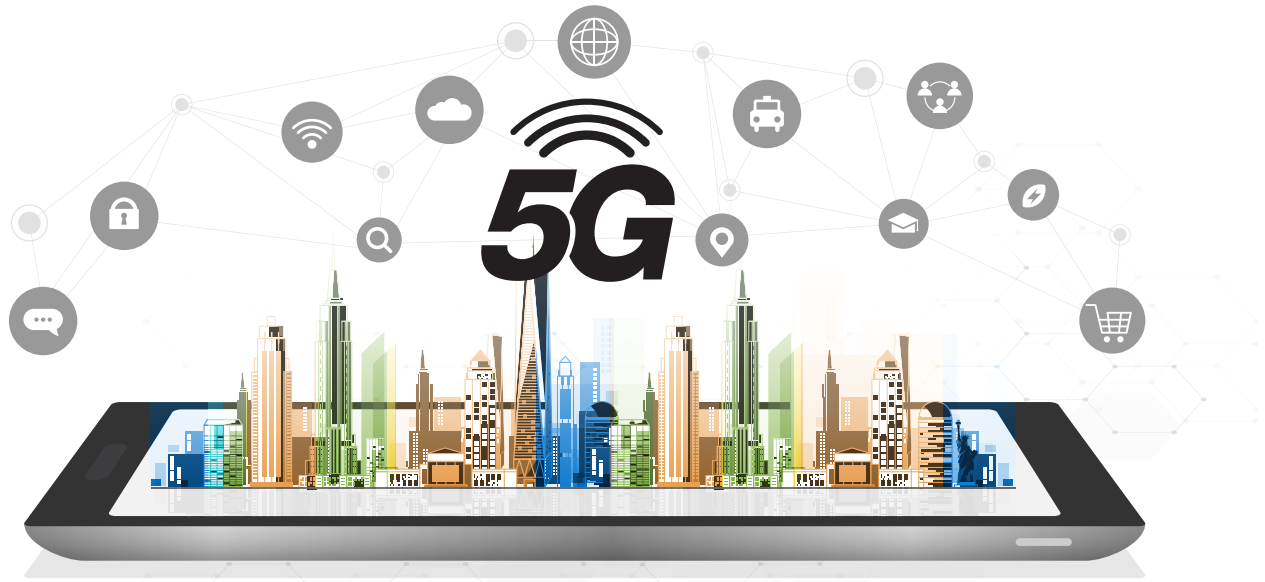
### 2025

- 5G subscribers are expected to reach 2.8 billion

"As carriers roll out 5G in the United States, a significant number of consumers will adopt the service quickly – if it delivers on its promise of faster speeds and better coverage," said Kevin Westcott, Vice Chairman, Deloitte LLP, U.S. Telecom, Media, and Entertainment

According to Deloitte's first U.S. Connectivity and Mobile Trends survey, 67% of consumers said that they would be more





likely to buy a new smartphone once 5G-compatible handsets are available.<sup>5</sup>

As the 5G ecosystem grows, so will coverage and the number of medical devices equipped for 5G. These can include wearables, robotics, telemetric equipment, sensors, and more. It's expected that by 2022, 5G devices will become mainstream. If consumers have 5G personally, they will demand it in the workplace. Massive medical IoT may not be functional until a fully native 5G network is operational in parallel with the legacy 4G network – maybe in five years.

Concurrent with the growth of 5G devices is the growth of 5G subscriptions. It's estimated that there was approximately 190 million 5G subscriptions worldwide by the end of 2020. By the end of 2025, it's forecasted that there will 2.8 billion 5G subscriptions globally.<sup>6</sup>

### The OnGo (CBRS) Factor

Contributing to the growth of 5G is the growth of OnGo (Citizens Broadband Radio Service [CBRS]), which is often used in conjunction with DAS and Wi-Fi to provide better, more reliable wireless coverage. In June 2020, the FCC began a summer-long auction of 70 megahertz of the OnGo 3.5-GHz band. This movement to OnGo gives you a better transition path to 5G. An additional 80 MHz of the OnGo 3.5 GHz is already available today by non-mobile operators.

## About Us

With more than 40 years of experience connecting people and devices, Black Box is dedicated to helping customers embrace the future by ensuring business continuity and accelerating digital transformation. As a trusted solutions integration partner, Black Box designs, deploys, manages, and maintains a full range of technologies that support Connected Buildings, a Digital Workplace, and Customer Experience. With deep expertise in 5G, OnGo, in-building wireless, edge networking, data centers, and cybersecurity, the Black Box team delivers secure, consistent, and latency-free connectivity to enterprises of all size and scope.

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### 5G and LTE Technologies

Does 5G mean you should avoid investing in LTE technologies? No. LTE growth will continue. Since many bands currently used for 3G and LTE will be reallocated to 5G over the coming years, building a strong RF path today will ensure a solid 5G foundation tomorrow.

### The 5G Evolution

5G can help increase efficiency while reducing costs particularly as IoT fuels innovation in healthcare. A functional 5G network gives any healthcare system a distinct competitive advantage in terms of patient care, clinician satisfaction, and critical-care communications.

Expect 5G technology to make its way into the existing frequency bands over the coming two to three years. Massive IoT may not be functional until a fully native 5G network is operational in parallel with the legacy 4G network – maybe in five years. Remember that after about seven years of deployment, 4G LTE has just now reached maturity and is far from obsolete. You should expect 5G to follow a similar timeline. We are at the beginning of a seven plus-year evolution.

To discuss your 5G implementation, contact us. One of our wireless experts will evaluate your current system and provide upgrade options.

<sup>5</sup>2020 Preview: 5G devices go mainstream; Bevin Fletcher, Dec 23, 2019; FierceWireless.com

<sup>6</sup>Ericsson Mobility Report June 2020

