



The Race to 5G Is On

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By Jessica Rosenworcel, Commissioner, FCC

If you are reading this in the U.S., there is a good chance you are looking at a smartphone or tablet. Moreover, if you are reading this on a smartphone or tablet, the odds are that you downloaded it over a fourth-generation — or 4G — wireless connection.

4G is the fastest, most reliable mobile broadband technology presently available. The U.S. leads the world in 4G wireless deployment. In fact, while we are home to less than five percent of the globe's population, we have nearly half of all 4G subscriptions worldwide.

So far, so good. But if we want our wireless future to be bold, we need to do more than rest on our 4G laurels. Because efforts to develop the next generation of wireless technology are already under way. In short, [the race to 5G is on](#).

I can see this clearly from where I sit at the Federal Communications Commission. The world's wireless economies are busy planning for 5G service, with speeds ranging from one to 10 gigabits per second. South Korea and Japan have plans to deploy 5G services by the time they host the Olympics in 2018 and 2020, respectively. The European Commission has committed to support 5G research with South Korea. In China, three of the nation's ministries have jointly established a group to promote the development of 5G technologies. There is no need for the U.S. to stay stuck in the starting gate. We can build on our 4G success — if we get going right now.

But what's the big deal? Why should we even be in this race? Why isn't our lead on 4G good enough?

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Our mobile economy is growing — fast. We are moving from networks designed for analog voice to networks designed for high-speed digital data. Consider the video we are already watching online, plus upcoming services like those just announced by HBO and CBS. Add to this the emerging possibilities for viewing ultra-HD video on tablets and televisions. Then consider that the Internet of Things is around the bend, featuring billions of machines with sensors relying on a steady stream of data delivered wirelessly. Stand back, and you can see that the demands on our airwaves are growing at a breathtaking pace.

To meet these demands, we need to think differently about spectrum — the airwaves around us responsible for carrying this data load.

Today, the bulk of our 4G wireless networks are built using spectrum frequencies from 600 megahertz to 3GHz. This is the sweet spot for current mobile communications.

But the 5G future could look different — very different. Instead of sticking to this limited range, we could look up. Way, way, up. In fact, it's time to bust through our old 3GHz ceiling. We should take a look at spectrum up to 60GHz and maybe all the way up to 90GHz. At these ranges, we can aggregate airwaves in ways that are not possible with our traditional 4G frequencies. This will allow data-intensive applications to ride on channels of magnitude much larger than they do today — much like a four-lane highway expanding to 100 lanes or more.

But at these stratospheric frequencies, there are propagation challenges. While these super-high signals can carry a significant amount of data, they do not go far. However, we can turn this limitation into a strength by combining big bands of these high frequencies with small-sized antennas packed close together. This can create powerful networks at much lower cost. More than that, it can mean wireless services can reach further into buildings at faster speeds than ever before. This is especially useful in cities where population density makes delivering meaningful mobile speeds a special challenge.

To do all of this, however, requires that the U.S. get going. The good news is that this month the FCC adopted its first inquiry into **high-band frequencies**. It has the less-than-exciting title of **Use of Spectrum Bands above 24 GHz for Mobile Radio Services**. No matter. This is critical, because it starts a technical conversation among wireless stakeholders. Moreover, it is time to get moving. Because the race to 5G is on — and our mobile future depends on it.

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