**5G: Why is this simply not another G?**

While the G in 5G means it’s a new generation of wireless technology, that is where the similarity ends.

Commercially, every new generation has primarily been defined by its increased data transmission speeds. But from an innovation perspective, each of the modern leaps in wireless network technology has brought distinct change: The second generation (2G) allowed for voice transmission, the third generation (3G) opened the door to mobile data and rich content, and the fourth generation (4G) brought a speed boost that ushered in the app and mobile-streaming revolution.

5G, for fifth generation, is the foundation for communications and computing of tomorrow that will bring at least three new advancements:

- Greater speed (to move the increasing volumes of data we produce)
- Lower latency (to be more responsive)
- Ability to expand beyond computers and phones to encompass the Cloud and a whole new universe of devices (estimated in the billions) attached to the network

Practically speaking, 5G will one day be powerful enough to deliver smart factories and real-time virtual reality, yet practical enough to replace wired home broadband. 5G is targeted for limited consumer rollout by year’s end and broader commercial rollout in the second half of 2019. Fulfillment of 5G’s true promise will likely happen in several years.

**What potential will 5G unlock?**

People will be able to access online content faster, for sure, but there are greater complexities and indeed greater opportunities at play with 5G.

Perhaps one of the simplest ways to think about 5G is as an enabling infrastructure. Much the way that roads and power grids formed our industrial infrastructure, the infrastructure enabling 5G will form a backbone and central nervous system to build out an intelligent and fully connected society. The ability to “watch and click,” “view and buy,” or “speak and order” in the same experience will become real.

It will connect and bring intelligence to billions of machines that will, in turn, create business opportunities and new experiences across the U.S. and around the globe. 5G will unlock the potential of new mobility solutions, make smart cities truly intelligent, and enable businesses and people to realize the full promise of the Internet of Things (IoT).

**How does 5G work, and why is it different from other network rollouts?**

Like other cellular networks, 5G networks will use a system of cell sites to send data via radio waves. But 5G networks will also rely on networks of small cells, transmitting data over much shorter distances. A lot of the 5G network infrastructure build-out is to expand capacity. Bottom line with 5G is that you can get more data into and through the network. As such, 5G networks need to be much smarter than previous systems, as they’re juggling many more, smaller cells and more technologies in those smaller cells.

**Why is spectrum allocation important to the success of 5G?**

Having enough spectrum has always been one of the biggest challenges in the wireless industry. A good way to think about spectrum is the highway analogy: The amount of spectrum you have determines how many lanes exist on the communications highway. With more data (like cars on a highway), the more lanes (spectrum) are required.
In July 2018, the Federal Communications Commission (FCC) took a vital step to advance 5G closer to its full technical and commercial potential when it greenlighted a proposal to explore reallocating part of the mid-band – or “Goldilocks” – spectrum for new commercial and terrestrial use, including 5G. This is important because the mid-band spectrum offers greater capacity and speed than low-band spectrum and larger coverage areas than high-band spectrum.

To stay competitive, Intel believes it’s crucial that U.S. regulators open bigger slices of the mid-band spectrum (3.7 to 4.2 GHz) to 5G. Without access, Americans and the American economy will not be able to reap the full benefits of 5G. Unlocking key spectrum to 5G will open the floodgates of development for a new range of mobile broadband experiences and services – from virtual and augmented reality gaming to 3D mobile video and more.

Why is 5G critical to global competitiveness?

It’s estimated that by 2035, the 5G industry value chain will be worth $2.5 trillion¹. By 2035, the “multiplier effect” of 5G will produce $10 trillion in revenue and $420 billion in annual U.S. GDP². The U.S. requires policies that help foster 5G’s growth and the right balance of policymaker support and private sector innovation to make the 5G opportunity a reality. There are two foundational issues:

1. **Spectrum:** Make mid-band spectrum available expeditiously.
2. **Removing barriers to deployment:** Making 5G widespread requires additional 5G-equipped cell sites. Local city governments must have resources and ordinances in place to balance consumer concerns and urban planning with infrastructure build-out requirements. U.S. regulators must also ensure that equipment certification regulations, standards adoption and processes for 5G are published in a timely manner. Clear guidance will provide the certainty needed to avoid delays and optimize 5G performance.

What is Intel’s role in delivering on the 5G promise?

Intel has been an industry leader in defining, prototyping, testing and delivering 5G standards and solutions now – not in the lab but in the field – as part of real-world trials with partners across the globe, notably early 5G networks at the Winter Olympics in Korea. These trials aim to bring 5G solutions to market that will make the 5G opportunity a reality. There are two foundational issues:

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