

# Special Topic: 5G Networks

## The Promise and Potential of 5G

In an ever more interconnected world, strong and healthy digital infrastructure enables innovation in national economies and governmental services to flourish. Increasingly, the deployment and application of cutting-edge innovations and emerging technologies — many of which have yet to even be imagined — will depend on a growing range of next-generation 5G network capabilities.

5G services are designed to bring truly “anytime, anywhere” connectivity to support myriad user devices and countless potential applications. By combining complementary and diverse technologies — fiber, mobile, satellite, WiFi and even high-altitude aerial platforms — next-generation 5G networks have the potential to provide the most robust internet connectivity yet, with faster speed, better security, improved reliability and lower latency. It will take a diverse ecosystem of technologies and supporting infrastructure to fully unlock and enable these capabilities and expanded connectivity. Different capabilities and key requirements will help deliver on the range of functions promised by 5G applications: ultra-fast data speeds will enable unlimited storage on the cloud and computing -on-demand, which in turn will unlock a range of AI use cases; low latency and high network reliability will support self-driving cars and smart infrastructure; and dense networks (i.e., the internet of things) will support smart cities and smart homes. A complete understanding of the full suite of technologies in the 5G landscape is critical to ensuring that complementary and coordinated policies support not only the application of 5G capabilities but also the foundational and enabling technologies.

The substantial performance advantages of 5G have the potential to unlock new use cases that extend far beyond connecting people and traditional internet-enabled devices to enabling internet connections for millions of previously unconnected devices (i.e., the Internet of Things). The implications span supply chain logistics, automated and connected vehicle deployment, energy production and consumption, and many other industrial and consumer applications. A 5G ecosystem capable of supporting this scale of flexibility and connectivity would drive widespread productivity gains, cost savings and new investment opportunities across the global economy.

The expansion and improvement of connectivity help meet the accelerating demands of the digital economy across the board. It is difficult to overstate the transformative impact of these anticipated capabilities. One estimate expects that 5G technologies will boost annual U.S. gross domestic product by \$500 billion and create 3 million jobs.<sup>1</sup>

## The State of the 5G Landscape

Early-adopter countries stand to gain significant and long-lasting competitive advantages from leading in standards-setting, deployment of 5G infrastructure and the development of 5G-enabled innovative products. Competitive advantages stemming from early leadership in standards-setting will have long-lasting ripple effects when it comes to powering 5G deployment and the development of mobile, IoT and other technology ecosystems enabled by 5G. U.S. leadership that helps set the trajectory of 5G-related standards will help unlock these competitive advantages. The country that leads the 5G technology and standards development process effectively sets the foundational layer of the global communications infrastructure and reaps these rewards.

The United States is a proven global leader in communications technology, and the industry continues to fuel American innovation by aggressively reinventing and improving foundational technologies. However, many countries with impressive innovation profiles — such as China, South Korea, Japan and countries in Europe — also have their eyes on the 5G-enabled economy, and the United States cannot afford to stand still in the pursuit of 5G leadership.

5G networks will provide critical enabling infrastructure for IoT deployment and a host of other applications. For that reason, the networks must be secure, resilient, and interoperable — enabled by competitive and sustainable supply chains that allow industry to quickly scale their networks to support data- and computation-intensive technologies and services. However, anti-competitive practices by some international companies appear designed to tilt the global playing field to achieve market dominance and risk eroding important U.S. security, resiliency and competitiveness goals to the disadvantage of their competitors. When it comes to 5G deployment, U.S. competitiveness and security go hand-in-hand, and countering these threats with carefully considered policy actions will be critical to delivering the full promise of 5G.

Stakeholders in U.S. 5G competitiveness are taking important steps toward 5G readiness to deliver on this promise. Wireless companies alone are poised to invest \$275 billion in 5G wireless infrastructure over the coming years, deploying more than 300,000 small-cells to support 5G services.<sup>2</sup> Technology firms are investing aggressively in R&D across 5G infrastructure and use cases, and are taking

significant R&D assets to global standards bodies to shape standards development. U.S. satellite operators are investing heavily in the development and deployment of high-throughput next-generation satellite networks. The Federal Communications Commission (FCC) has moved aggressively to make new radio spectrum available for wireless, while still considering new spectrum for other technologies in the 5G ecosystem. This newly available spectrum can facilitate the deployment of 5G infrastructure for a whole constellation of innovative 5G technologies. Presidential action targeting efficient and effective spectrum use reflects a shared federal commitment to this long-term vision of U.S. technological competitiveness.<sup>3</sup> However, more can and must be done to remove obstacles to 5G readiness.

## Looking to the Future of 5G

Investments in digital infrastructure support innovation over the long term, especially when it comes to technologies as game changing as the ones that underpin 5G. Digital infrastructure allows the benefits of new technologies to ripple through the economy and reach all corners of society. To build a robust innovation infrastructure that supports fast and secure connectivity across all sectors of the economy and every segment of society, the United States should take the following actions:

### 1. Streamline permitting processes and fees for 5G

**deployment.** Local governments need to embrace 5G as a foundational technology required to attract and retain industry; advance education, health care and other governmental services; and ensure their economies are competitive. The FCC has provided guidance, but local government has a critical role to play in fostering 5G deployment.

### 2. Ensure predictable and efficient licensing for communications satellites

At the federal level, the FCC should facilitate an expeditious process for granting certain types of routine satellite license applications for 5G deployment, similar to the processes in place for routine Earth stations. This facilitation would enable a more predictable and efficient licensing process, allowing U.S. licensed satellite operators to deploy next-generation infrastructure more quickly and attracting more investment in the United States as a regulatory venue of choice.

**3. Ensure spectrum availability.** The federal government should continue to ensure the timely availability of low-, mid- and high-band spectrum for 5G technologies — including wireless, satellite and high-altitude platforms. It should

continue to invest in efforts to improve efficiency of spectrum use, leveraging licensed and, when necessary, shared spectrum regulatory frameworks, and promote access to bands that spur commercial investment in new and groundbreaking technologies, while ensuring that users in areas such as weather, national defense, public safety, critical infrastructure and aerospace can continue to meet critical mission requirements.

**4. Support R&D and standards-setting.** The federal government should support U.S. leadership in standards-setting by providing strong intellectual property protections and playing a global leadership role in advocating for good governance practices in standards bodies. The federal government should also continue to support those private sector R&D investments that enable active participation in and significant contributions to standards bodies.

### 5. Pursue a market-based approach, driven by private sector investment

The private sector is best positioned to drive innovation and security in 5G. The federal government should not intervene, regulate, or attempt to impose a new market structure for 5G deployment.

### 6. Promote 5G equipment interoperability and supply chain security

A secure and resilient 5G network relies on equipment interoperability, trustworthy and transparent supply chains, and detailed risk assessments for infrastructure deployment. Countries should carefully consider security and supply chain issues when it comes to 5G deployment. The federal government should also work with other countries through international standards bodies to ensure that 5G networks are secure and interoperable on an international scale.

**7. Adopt vendor diversity requirements.** The federal government should address supply chain security issues and encourage other countries to align their approaches by adopting vendor diversity requirements. Adopting this approach to 5G-related equipment stimulates competition and ensures that no single vendor can monopolize network infrastructure.

## ENDNOTES

1 Accenture. *Smart cities: How 5G can help municipalities become vibrant smart cities.* [Link]

2 Accenture. *Accelerating future economic value from the wireless industry.* [Link]

3 The White House. (2018, October 25). *Presidential memorandum on developing a sustainable spectrum strategy for America's future.* [Link]