POLICY PRIMER: AN OVERVIEW OF 5G DEPLOYMENT, STANDARDS, AND SECURITY

JANUARY 2020 UPDATE
EXECUTIVE SUMMARY

5G is critical to the future of the U.S. economy. In remarks at the White House event on 5G in April 2019, President Trump noted that 5G networks could create 3 million jobs and contribute $500 billion to the U.S. economy. At the same event, FCC Chairman Ajit Pai called 5G an “American success story,” noting that the U.S. leads the world in commercial 5G deployment. By investing in 5G, the U.S. can create tremendous economic opportunity at home and remain competitive abroad in the technology sector.

The major national wireless carriers are in what some in the press have dubbed an “early 5G arms race,” meaning we are on track for the broad introduction of 5G service in the United States. By mid-2019, all four major U.S. carriers had deployed 5G in markets across the country while committing to continue to expand their 5G service and offerings.

AT&T is poised to continue to lead on 5G. Today, AT&T has a mobile 5G+ network live in parts of 35 cities and AT&T 5G is now live for consumers in 19 markets. AT&T expects to deploy 5G using a combination of mmWave and sub-6 spectrum. Sub-6 5G will provide broad coverage, with nationwide coverage planned in the first half of 2020. We will also continue deploying 5G over mmWave spectrum (5G+) in select areas, which will offer our best wireless experience and will be deployed in dense urban and high traffic areas; mmWave opens up more spectrum, which will ultimately capable of reaching 1+ Gbps speeds on a mobile device.

The government can help ensure the U.S. advantage through sensible policies. Eliminating unnecessary regulations and barriers to deploying small cells is crucial, and we applaud the FCC’s recent actions on this topic. Likewise, smart spectrum policy will help ensure the timely availability of spectrum assets needed for commercial use.

AT&T has prepared white papers on key 5G topics – deployment, standards, and security. Below are the key takeaways from these important topics.

China is not winning the “race” to 5G because it has the most cell sites per square mile and per person. More important than raw numbers are the characteristics of tower sites, the geographic realities of areas being covered, and the amount and band of available spectrum.
THE COMPETITION-BASED INDUSTRY MODEL IN THE U.S. IS WINNING THE GLOBAL “RACE” TO 5G.

- 5G will be the most robust wireless communication technology deployed to date and will ultimately enable faster and more powerful networks. 5G is an evolution of technology, not an overhaul.

- Every national U.S. carrier has already conducted trials and begun deployments in initial cities across the U.S.1 The latest Ericsson Mobility Report forecasts nearly 270 million 5G subscriptions by the end of 2024 in North America, which would account for more than 60 percent of mobile subscriptions.2 By contrast, while U.S. carriers began to deploy 5G in 2018, China only trialed it during this time. China is still in catch-up mode.

- The FCC has worked hard to help sustain U.S. leadership in 5G by making additional low-, mid-, and high-band millimeter wave spectrum available for 5G services. In 2019, the FCC completed two mmWave auctions and is presently in its third auction of mmWave spectrum, which will be used for 5G. The U.S. is leading the world in high-band millimeter wave spectrum allocations to support 5G, thanks to the FCC’s and NTIA’s expeditious work on spectrum. The government’s continued leadership and light-touch regulatory approach will help to build momentum on 5G deployment.

1 See Mike Dano, Verizon, AT&T Show Surprise Increase In Network Spending in Q1, FierceWireless (May 7, 2018), https://www.fiercewireless.com/5g/verizon-at-t-show-surprise-increase-network-spending-q1.

THE GLOBAL STANDARDS PROCESS IS ROBUST AND EFFECTIVE IN ADVANCING U.S. GOALS.

- Global standards are critical for interoperability among networks and devices. Standards foster the economies of scale needed for global development of new technology.

- The global telecommunications ecosystem has a history of collaborating on standards. This is not a government-driven process. It is largely left to private experts—engineers, scientists, and other builders—to debate problems and solutions, working toward consensus in a transparent way.

- AT&T wouldn’t have committed to launch mobile 5G if we weren't completely comfortable with 3GPP’s work. 3GPP operates under detailed procedures to ensure regional balance and transparency. No country, region, industry segment, or company can dominate 3GPP’s activities or its outputs.

- All countries and companies wait for the common standards to be developed to manufacture equipment and deploy 5G. Any non-standard deployment will not be scalable or interoperable with other networks.

Some mistakenly believe that China dominates 5G because its companies have made the most “contributions” to 3GPP, the global standards organization for 5G. The raw number of contributions reveals little. Many contributions are supported by other members. And there is no “quality-control” for submissions, so not all initial contributions are of equal merit, and some contributions are duplicative. Finally, contributions do not automatically become part of a specification; they must go through a rigorous consensus process. **U.S. carriers have been leading in open, transparent, and collaborative standards work.**
FUTURE WIRELESS NETWORKS WILL HAVE UNPRECEDENTED SECURITY.

- Several innovations in network design and wireless technology will intersect to create a highly secure and resilient 5G network. We will have more agile and layered security as we transition from centralized core and radio access networks to distributed, virtual networks.

- 5G technology compliments a new network segment, the Mobile Edge, which includes elements traditionally part of the Radio Access Network and Mobile Core. As critical functions migrate to the Mobile Edge, carriers are implementing new and embedded security functionalities to ensure a highly secure mobile network, including:

  - Distributed Denial of Service (DDoS) detection and mitigation at the edge of the network to enhance the ability to respond to attacks and reduce potential broader network impact.

  - Stronger encryption for over-the-air interface and encryption of each device’s IMSI to further secure device consumer-specific information.

  - A Security Edge Protection Proxy that will mitigate vulnerabilities in prior technology (e.g., SS7 and Diameter) and attacks when subscribers are roaming between different carriers’ networks.

  - In addition, wireless providers are increasingly deploying network components that are virtual instead of relying on the hardware of the past. As network operations are virtualized, through Network Functions Virtualization and Software Defined Networking, 5G’s virtual and cloud-based network systems will allow for more adaptable security because they can be quickly adjusted, removed, or replaced using software, reducing the likelihood that an entire network would be impacted by a cyberattack.

Some believe the move of 5G to the edge will make networks less secure. To the contrary, network virtualization, edge computing power, device management, and automated threat detection and response will create more flexible and secure networks.

These white papers provide an overview of three critical topics facing future wireless networks: the pace of deployment, standards, and security. Policymakers and others interested in the future of wireless communications should review them to understand better how the U.S. private sector is building the foundation for the future digital economy. Policymakers should protect the U.S. commitment to a regulatory environment that promotes bottom-up innovation so that the U.S. can remain the global leader in technology.