5G POLICY PRIMER: THE U.S. COMPETITION-BASED INDUSTRY MODEL IS WINNING THE GLOBAL “RACE” TO 5G

JANUARY 2020 UPDATE
The United States is leading the push to 5G with investment and smart spectrum policy, building on robust infrastructure that was fostered by a light-touch regulatory environment. The federal government can help lead by removing barriers and promoting infrastructure deployment.

A popular talking point is that the U.S. is at risk of “losing” the race to 5G deployment. Such breathless reports give inadequate attention to the great strides U.S. operators and the government are making to advance 5G. Some policymakers suggest the U.S. can “win” by nationalizing our communications infrastructure or adopting a top-down approach to growing private, heterogeneous networks. But this approach would slow—not advance—national objectives and remove the biggest advantages we have in the race: robust competition and light-touch regulations, both of which spur world-leading innovation and investment.

American carriers are our competitive advantage, and they are aggressively pursuing 5G. Every major U.S. carrier has conducted trials, begun deployments in initial cities, and announced the arrival of 5G in communities across America by the end of 2019.
WHAT IS 5G?

5G is the fifth generation of wireless technology. It will be the most robust wireless communication technology deployed to date and will enable faster and more powerful networks, and a dramatic change in how we live, work, and play. Smart cities, autonomous cars, industrial Internet of Things (IoT), connected health care, and distance education will rely on the 5G network's **ultra-fast speeds, massive device connectivity, ultra-reliability, ultra-low latency, and better capacity and coverage.**

5G is not brand new. It is not a flash cut technology. 5G will build on the existing, robust LTE and LTE-Advanced technology and infrastructure that has made the United States a global leader in technology and connectivity. 5G represents an evolution of technology, not an overhaul. The diagram below shows this evolution along several key performance indicators by comparing the International Telecommunications Union’s requirements for theoretical peak performance for LTE (IMT-Advanced) and 5G (IMT-2020).
U.S. INDUSTRY IS DEPLOYING
5G RAPIDLY

The major national wireless carriers are in what some in the press have dubbed an “early 5G arms race,” making the broad introduction of 5G service in the United States imminent. Every national U.S. carrier has already conducted trials and begun deployments in initial cities across the U.S. 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. The latest Ericsson Mobility Report forecast nearly 270 million 5G subscriptions by the end of 2024 in North America, which would account for more than 60 percent of mobile subscriptions.

AT&T is rapidly deploying advanced LTE technologies that will serve as the runway to 5G throughout the country. AT&T continues to upgrade cell towers with LTE-Licensed Assisted Access (“LTE-LAA”), which achieves theoretical peak speeds of up to 1 Gbps.

AT&T has a mobile 5G+ network live in parts of 35 cities – Atlanta, Austin, Baltimore, Charlotte, Cleveland, Dallas, Detroit, Houston, Indianapolis, Jacksonville, King of Prussia, Las Vegas, Los Angeles, Louisville, Menlo Park, Miami, Miami Gardens, Nashville, New Orleans, New York City, Oakland, Ocean City, Oklahoma City, Orlando, Phoenix, Philadelphia, Raleigh, Redwood City, San Antonio, San Bruno, San Diego, San Francisco, San Jose, Waco and West Hollywood.

AT&T 5G is now live for consumers in 19 markets. Millions of consumers and businesses across Baltimore, Birmingham, Ala., Bridgeport, Conn., Buffalo, Detroit, Indianapolis, Las Vegas, Louisville, Ky., Los Angeles, Milwaukee, New York City, Philadelphia, Pittsburgh, Providence, R.I., Rochester, N.Y., San Diego, San Francisco, San Jose, Calif., and Washington D.C. market areas can now access AT&T’s 5G network using the Samsung Galaxy Note10+ 5G.

AT&T continues capital investment and acquisitions of spectrum. Spectrum fuels the wireless industry and will power future 5G growth. AT&T’s plans to offer innovative data and video services on its wireless network. This will require reliable access to sufficient spectrum and capacity to support new services. AT&T will continue to invest in obtaining additional spectrum to meet long-term needs.

We expect 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.

To support massive 5G data use, AT&T is virtualizing its network. AT&T is expanding deployment of software-defined networking, as well as related elements like white box (replacing traditional proprietary routers inside cell towers with new hardware built around open standards that can be quickly upgraded via software) and Network AI (deploying open source software in AT&T’s centralized network cloud and in AT&T’s edge cloud). Having already virtualized 71 percent of its network, AT&T plans to reach 75 percent virtualization by 2020.
Sprint is building a foundation for 5G. Sprint is “building a strong foundation in LTE” that will “pave the way for an innovative 5G network to take the customer experience to a whole new level.” In 2019, its 5G “network investments of $1.2 billion grew year-over-year for the fourth consecutive quarter.” Sprint has also deployed 27,000 small cells to “significantly improve customers’ network experience in targeted locations.” Sprint nearly doubled the number of Massive MIMO radios on-air” with about 3,000 units deployed.” Its MIMO radios are supported by 128 antennas on its 2.5 GHz mid-band spectrum in partnership with Ericsson, Nokia, and Samsung.

Sprint launched commercial 5G in nine markets. Sprint launched commercial 5G in areas of Atlanta, Chicago, Dallas-Fort Worth, Houston and Kansas City, and the company expects to launch service in areas of Los Angeles, New York, Phoenix and Washington, D.C., in 2020. Sprint’s True Mobile 5G network will cover approximately 2,100 square miles and 16 million people total across all nine market launch areas. It notes that “[w]ith 204 MHz of spectrum and more than 160 MHz of 2.5 GHz spectrum in top 100 markets, Sprint is uniquely positioned with enough capacity to deliver a nationwide 5G mobile network using licensed spectrum.” Additionally, Sprint recently announced its upcoming 5G device with OnePlus, adding to its collection of smartphones with LG and Samsung, as well as a hotspot device from HTC.

T-Mobile has been upgrading its LTE network and deploying 5G-ready infrastructure. T-Mobile’s “4G LTE on 600 MHz now cover[s] 156 million people and 1.2 million square miles” meaning 99% of Americans are now covered by its LTE network. T-Mobile aims to be in 9.5 million homes by 2024 through its Home Internet service that uses a 4G router operating over its LTE network. After its merger, it will upgrade the network to 2.5 GHz spectrum and 5G compatible hardware. Moreover, T-Mobile is adding 25,000 small cells to activate LTE-LAA technology, which adds extra capacity and speed, while paving the way for 5G. T Mobile announced a $3.5 billion partnership with Nokia to speed deployment. So far, T-Mobile has accomplished the world’s first standalone 5G data session on a multi-vendor 5G RAN and the world’s first 5G data call and video call on 600 MHz.

T-Mobile has taken a “multi-spectrum” strategy to 5G preparedness. T-Mobile has assembled a portfolio of low-, mid-, and high-band spectrum for 5G. In 2017, “T Mobile made its largest network investment ever, tripling its low-band spectrum holdings by purchasing 45% of the spectrum sold in the US government’s 600 MHz auction – 31 MHz nationwide.” “These holdings cover 100% of the U.S.” T-Mobile also has “an impressive volume of mid-band spectrum to deploy 5G.” Additionally, its successful participation in mmWave auctions quadrupled its average nationwide mmWave spectrum position. With its merger with Sprint approved, it will utilize its low-band and mmWave spectrum, along with Sprint’s mid-band spectrum to “deliver a broad and deep truly nationwide 5G network.”

In December 2019, T-Mobile launched its nationwide 5G network, “covering more than 200 million people and more than 5,000 cities and towns.” Additionally, T-Mobile also extended its nationwide 5G coverage to its prepaid service, Metro PCS. Additionally two 5G phones, OnePlus 7T Pro 5G McLaren and the Samsung Galaxy Note10+ 5G are available for pre-order.

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Verizon has made 5G “the linchpin of its entire corporate strategy” and is laying the groundwork for 5G. Verizon “made the strategic investment in millimeter wave spectrum that enable[s] ultra-wideband 5G services” through its purchase of Straight Path Communications and XO Communications which included 28 and 39 GHz licenses. In terms of fiber, XO Communications added 1.2M fiber route miles to Verizon’s “already dense, nationwide fiber infrastructure.” Verizon also signed a $1.1 billion, three-year fiber and hardware purchase agreement with Corning. On top of that, Verizon ramped up its fiber installations to a run rate of over 1,000 route miles per month. It is upgrading its LTE network through densification and the integration of carrier aggregation, 4x4 MIMO, and 256 QAM – in 1,500 markets. Furthermore, Verizon has already successfully trialed edge computing and cloud-native technology, and achieved full virtualization of baseband functions.

Verizon’s mobile 5G network is currently available in 31 cities, including Washington D.C., New York, Atlanta, Chicago, Denver, Detroit, Minneapolis, and Phoenix. Customers have a choice of several different 5G devices: the LG V50 ThinQ 5G, the moto z3 and z4 combined with the 5G moto mod, the Samsung Galaxy S10 5G or the Inseego MiFi® M1000. The chief executive of Verizon’s wireless business, Ronan Dunne, noted that fixed wireless is just “the first opportunity” for 5G, and that “quickly [Verizon] will move to the overall 5G mobility play” beginning in 2019. Indeed, in 2019, Verizon and Nokia announced a mobile 5G milestone: “handing off a signal seamlessly to a vehicle traveling between two radio sectors.” Additionally, customers already have access to 5G-ready YouTube TV through Verizon’s partnership with Google.

SMART SPECTRUM POLICY IN THE U.S. IS ADVANCING 5G

THE FCC HAS BEEN DOING ITS PART TO MAKE SPECTRUM AVAILABLE

FCC Chairman Pai has championed forward-thinking spectrum policy and light-touch network regulation. In April 2019, The White House and FCC Commissioner Ajit Pai unveiled an ambitious new proposal to build on the 5G Fast Plan and help accelerate broadband deployment to unserved and underserved communities. 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

“You need to make more spectrum available to win the race, and right now we’ve made more spectrum available than any other country in the world, in fact, four gigahertz more than second-place China.”

FCC Commissioner Brendan Carr
Clearing broadcasters and deploying wireless services in the 600 MHz band following the incentive auction, which made 70 MHz of licensed spectrum available for commercial wireless use.

Proposing rule changes and licensing frameworks to unleash additional spectrum for 5G services in the 2.5 GHz band, the 3.3-3.45 GHz band, the 3.5 GHz band, and the 3.7-4.2 GHz band.

Moving aggressively to make nearly 5 GHz of spectrum available for flexible wireless use in the 24 GHz, 28 GHz, 37 GHz, 39 GHz, and 47 GHz bands, beginning with a 28 GHz auction in November 2018.

Congress has been pushing to support new network technology and infrastructure. The enactment of the RAY BAUM’S Act, including parts of the MOBILE NOW Act, in the 2018 omnibus appropriations bill paves the way for future auctions. The law directs the FCC to focus on commercializing mid-band and millimeter wave spectrum and includes provisions to expedite communications facility siting.

Congress is also considering several bipartisan bills related to 5G spectrum and network build-out:

Future wireless growth will continue to depend on more spectrum. We support a light-touch regulatory approach to infrastructure deployment, which will allow carriers to deploy spectrum more efficiently and spur carriers to continue the momentum on 5G deployment.
SMART INFRASTRUCTURE POLICY IS SPEEDING DEPLOYMENT

Following decades of effort to rationalize wireless facilities siting, the federal government has been promoting streamlined rules and predictable timetables for decisions about facilities placement. This enables updates and modifications of existing facilities and will speed the placement of newer, smaller cells that will promote 5G.

The FCC and the Executive Branch have been eliminating barriers to wireless infrastructure deployment. The FCC has developed time lines and “shot clocks” to govern local review of siting requests, barred state and local moratoria on telecommunications deployment, and clarified the limits on state and local fees for small cell deployments in the rights-of-way. A January 2018 Presidential Executive Order on Streamlining and Expediting Requests to Locate Broadband Facilities in Rural America directed federal property managing agencies to “accelerate the deployment and adoption of affordable, reliable, modern high-speed broadband connectivity in rural America.”

Congress has been doing its part. Parts of the recent RAY BAUM’s Act address siting on federal lands. Section 6409 of the Middle Class Tax Relief and Job Creation Act of 2012 likewise addressed timelines and discretion for local and state review of siting applications. Congress is considering additional steps.

“The STREAMLINE Small Cell Deployment Act, will help to accelerate laying the foundation of next-generation 5G mobile by streamlining siting processes for small cell deployment, including by defining “small cells,” and providing more uniformity for how state, local, and tribal authorities treat siting requests.

Some states have taken progressive steps to encourage infrastructure investment in their communities. Many states have adopted sensible infrastructure regulation to speed deployment. To date, 30 states plus Washington, D.C. and Puerto Rico have enacted legislation that streamlines regulations to facilitate the deployment of 5G small cells. This is another indicator of success in preparation for next generation networks.
DEBUNKING COMMON MYTHS ABOUT CHINA AND THE RACE TO 5G

MYTH: CHINA IS WINNING THE RACE TO 5G BECAUSE IT HAS THE MOST CELL SITES PER SQUARE MILE AND PER PERSON.

Reality: The raw number of cell sites in a country is not all that informative. There is much more that goes into the 5G equation, including the technology built into the network, whether the network will be standalone or will rely on existing infrastructure, how much 5G spectrum is available, and the geographic realities of the areas being covered. A simple tally of cell sites does not capture the nuance required to measure 5G progress. In the United States, thousands of cell sites that have been deployed for decades host multiple carriers and services for wide coverage. At the same time, private entities are investing in new sites and network densification. And a continued focus from the FCC to eliminate barriers to wireless infrastructure deployment and encourage 5G investment—such as its recent action to make small cell deployment less burdensome—will hasten the investment in 5G.

MYTH: CHINA BETTER SUPPORTS INDUSTRY ACCESS TO SPECTRUM FOR 5G.

Reality: First, China lags behind the United States in 5G spectrum—not the other way around: “[R]ight now we’ve made more spectrum available than any other country in the world, in fact, four gigahertz more than second-place China.”46 Second, China pursues a wholly different spectrum policy than the United States. China makes spectrum available mostly to a small number of state-owned enterprises. In the United States, there are four major private carriers and hundreds of smaller carriers, who compete for customers and spectrum. The U.S. approach recognizes that competition will yield the best results—spectrum will end up with the operator that values it the most and will accordingly put it to its highest and best use. The United States’ commitment to competition and light regulation flows from Congressional direction in the earliest days of wireless. As part of the Omnibus Budget Reconciliation Act of 1993, Congress directed the FCC to regulate the wireless industry with a light touch. The FCC and Congress have repeatedly recognized that this regulatory philosophy enabled a vibrant wireless sector to flourish. Thus far, the United States’ bet has been a good one, enabling the United States to become the clear global leader in 4G.

MYTH: CHINA WILL REAP MOST OF THE REWARDS OF INNOVATION IF IT “BEATS” THE WORLD TO 5G DEPLOYMENT.

Reality: The argument that China will seize “sustained leadership and the potential to capture a greater share of the benefits associated with 5G” if 5G is commercially available in that country before it is in the United States is flawed.47 The argument only looks at speed to market and fails to look at the market itself. A deeper look at the Chinese versus American markets shows the fallacy in the argument. The U.S. market is characterized by robust competition; the Chinese market, which is controlled by the government, is highly concentrated. The U.S. market has risen to the top globally because of the federal government’s commitment to light-touch regulation; the Chinese market is defined by rigid regulation. To say that the two markets are apples and oranges would not do the distinction justice. Even though China’s approach might give that country some speed-to-market
advantages, ultimately, the Chinese regime is one that will stifle innovation and experimentation. The United States, on the other hand—by facilitating competition and lightly regulating emerging technologies—will foster innovation and experimentation. The result is that while U.S. carriers began to deploy 5G in 2018, China only trialed it; China is still playing catch up. The global leader in 5G technology will not simply be the first country to offer commercial 5G, but instead will be the country that fosters investment and innovation in networks and the businesses and social uses that the networks enable.

NOTES

1 Fierce Wireless, The Lowdown on 5G in mid-2019: where it’s at with AT&T, Sprint, Verizon and T-Mobile (July 12, 2019), https://www.fiercewireless.com/5g/5g-deployments-where-it-s-at-5-sprint-verizon-and-t-mobile

2 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-surge-increase-network-spending-q1


4 See id.

5 2017 SEC Form 10-K for AT&T at 2.

6 AT&T Innovation Blog, Setting the Record Straight on 5G Evolution (Apr. 19, 2019), http://about.att.com/innovationsblog/5g-evolution-record

7 AT&T Newsroom, AT&T is Deploying White Box Hardware in Cell Towers To Power Mobile 5G Era (March 25, 2018), http://about.att.com/story/att_deploying_white_box_hardware_in_cell_towers.html

8 AT&T Innovation Blog, Network At AT&T’s Framework for Its Open Source Efforts That Will Drive Our Software-Defined Network in 2018 and Beyond (March 27, 2018), http://about.att.com/innovationblog/at-frameswork

9 AT&T Newsroom, AT&T Drives Path to Nationwide Mobile 5G with Multi-Gigabit Speeds (Feb. 20, 2018), http://about.att.com/story/multi-gigabit_mobile_5g.html

10 Id.


14 Sprint Newsroom, Sprint 5G Overview (May 22, 2019), https://newsroom.sprint.com/sprint-5g-overview


17 Newsroom.com, sprint-5g-coverage-expands-to-include-16-million-people-in-nine-markets


19 Sprint Press Release, Sprint 3Q 2017 Form 10-Q for Sprint at 42 (arguing that Sprint’s “substantial spectrum holdings are sufficient to allow us to continue to provide consistent network reliability, capacity, and speed, as well as to provide current and future customers a highly competitive wireless experience”).


22 T-Mobile Newsroom, T-Mobile and Nokia Ink $3.5 Billion, Multi-year 5G Network Agreement (July 30, 2018), https://www.t-mobile.com/news/nokia-5g-agreement


24 See, e.g., id. T-Mobile is in a unique position with 5G, with its unsupplemented population holdings and multi-spectrum strategy. While other wireless companies must kick customers off their congested LTE networks to build out 5G, the Un-carrier is building 5G on wide-open airwaves . . . A multi-spectrum strategy is critical to delivering a breakthrough consumer experience—an experience that includes national coverage and reliability from low band spectrum, reliable capacity and consistent mobile broadband speed with mid band spectrum and multi-gigabit hotspots in urban areas and on campuses with millimeter wave”.


26 Id.


31 Id.

32 Id.

33 Id.

34 Mike Dano, For Better or Worse, Verizon Bets the Farm on 5G, Fierce Wireless (July 24, 2019), https://www.fiercewireless.com/5g/editor-s-corner-for-better-or-worse-verizon-bets-farm-5g

35 Verizon Communications Inc., Q4 2018 Earnings Call (Jul. 24, 2018)

36 Verizon Newsroom, There’s 5g, then there’s Verizon 5G Ultra Wideband (Sep. 11, 2018), https://www.verizon.com/about/news/theres-5g-then-theres-verizon-5g-ultra-wideband

37 Id.


39 Id.


41 Id.

42 Id.

43 Id.


47 Id.