Legislating 5G: Wisconsin's Next Wireless Generation

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Introduction

The spread of the mobile Internet has already reshaped much of modern society, and its next generation (5G) will bring the potential to deliver significantly faster and more reliable mobile data connections. The advanced capabilities of 5G networks could be the foundation for emerging technologies such as networked self-driving cars, automated industrial machinery, smart-city sensors and cameras, real-time augmented and virtual reality, remote health care, and more.

Policymakers are hard at work establishing regulatory frameworks for 5G at local, national, and international levels. Wisconsin is the Midwestern state that has most recently passed legislation affecting 5G, filling in a legislative gap; it was the last state in the region without a 5G law. The new regulatory framework will be in place just as wireless carriers are selecting the first sites for 5G deployment.

This report provides technical and legislative information about Wisconsin's 5G legislation and aims to inform future 5G policy considerations. First, the report briefly describes 5G and its important differences from prior network technologies. Next, the report highlights several of the major issues raised in policy discussions related to 5G: rural broadband access, international trade conflicts related to vendors such as Huawei, and purported health risks from cellular signals. Finally, the report describes the federal and state-level 5G regulations already in place and how Wisconsin's new legislation fits into that broader regulatory landscape.

What is 5G?

Cellular network technologies evolve in major leaps known as "generations." Each succeeding generation uses new technologies and infrastructure to offer faster speeds and a wider range of capabilities than its predecessors. The generations before 5G are the following:[1]

1G: The first generation of analog cellular technology emerged in the 1980s and supported only voice communication.

2G: The second generation of cellular technologies was digital and started to roll out in the late 1980s. This generation supported voice calling, Short Message Service (SMS) text messages, pictures, encryption, and e-mail.

3G: The third generation of cellular technologies launched around 2000 and marked the first widespread use of the "G" naming scheme (which was later applied retroactively to earlier generations). 3G made it possible for cellular connections to support Multimedia

1. Majid Irfan Baba et al., "Evolution of Mobile Wireless Communication Systems from 1G to 5G : A Comparative Analysis," International Journal of Scientific Research in Computer Science, Engineering and Information Technology 4, no. 1 (2018): 2–3, https://ijsrcseit.com.

Messaging Service (MMS) picture and video messages, games, streaming video, and e-mail attachments.[2]

4G: The fourth and current generation of cellular technologies debuted in 2011–12. This generation improved both network speed and quality as compared to 3G, making mobile data fast enough for high-quality multimedia, live high-definition video streaming and broadcasting, and location-based services like Uber and Google Maps.

5G will be the fifth major generation of cellular technologies and has the potential to not only improve cell service, but to fully replace home cable or DSL internet for many users. Compared to existing 4G technology, 5G can move more data at higher speeds and with extremely low latency.[3] To take advantage of these advanced capabilities, however, requires a new and substantially different cellular infrastructure.

Small cells

Traditional cellular networks run on "macro cells," which are typically tall radio towers with large antennas. High-power antennas on tall towers can transmit signals for miles around, blanketing wide areas with network coverage while successfully penetrating obstacles such as the walls of buildings.

5G can deliver faster speeds than 4G and prior generations when delivered via macro cell towers, but because of physical limits related to antenna size and radio wavelengths, the improvements are relatively modest. The generational leap promised by 5G comes from more complex "small cell" deployments.

Small cells are about the size of pizza boxes and resemble Wi-Fi routers more than cell towers. 5G small cells transmit radio signals with shorter wavelengths and higher frequencies as compared to macro cell towers. The different radio signals allow for much smaller, lower-power antennas than are used for 4G. Phones using 5G, therefore, can pack more antenna hardware into the same space, exchanging significantly more data at once.[4] Because of the low power requirements, battery-powered 5G devices like utility sensors or cameras can also be deployed almost anywhere and last a long time without wired power or Internet connections.

Small cells have downsides, however. Their short-wavelength signals cannot travel far and are easily blocked by obstacles such as buildings and trees. As a result, rather

2. A faster "3.5G" generation began to emerge in the mid-2000s, but was too costly, battery-draining, and unreliable for widespread adoption. Many consumers moved straight from 3G to 4G phones.

3. Latency is one of the major advantages of 5G, but it can be difficult to differentiate from "speed." Latency is the amount of time it takes any single piece of information to get from one point to another. It can help to think of data like water moving through a faucet. "Speed" (or bandwidth) is how much water flows out over time. The latency would be how long it takes water to start coming out after the handle is turned.

4. Amy Nordrum, "5G Researchers Set New World Record For Spectrum Efficiency," IEEE Spectrum: Technology, Engineering, and Science News, May 12, 2016, https://spectrum.ieee.org/.

than covering a city with just a few 4G towers, a high-speed 5G network requires a dense network of small cells. For optimal coverage, cells need to be installed on the sides of buildings, on utility poles, and in other areas where there might be conflicts over aesthetics, space, and access to rights-of-way.[5] While small cells are already in use to help fill in 4G "dead zones," where cell tower coverage is unreliable, 5G technology could lead to a dramatic surge in installations in just a few years.[6] Conflicts over the cost of installing small cells and control of the installation process are only likely to increase as 5G spreads.

5G and rural broadband access

5G technology has the potential to connect rural areas to better, more reliable internet service. While 5G has a lot to offer, however, it may benefit rural communities less than some would hope. Because the fastest 5G service comes from small cell deployments with limited range, it may still be prohibitively expensive to deliver that high-quality service to many rural areas. One small cell might only serve a handful of households at best—especially in rural areas where houses are often spaced far apart. Additionally, the infrastructure to connect small cells to providers' networks would cost just as much as (or more than) other proposed rural broadband expansions. As a result, wireless carriers report that they plan relatively little investment in rural infrastructure.

The FCC has created a Rural Digital Opportunity Fund to "inject $20.4 billion into high-speed broadband networks in rural America over the next decade," aiming to connect four million rural homes and small businesses to high-speed networks and "help support future 5G technologies."[7] However, none of the major cellular carriers in the United States aim to provide small cell 5G deployments in rural areas in the near future.[8] T-Mobile, for example, reports that it plans to deploy a "nationwide" 5G network by 2020, but the goal for that network is to make a network with 100 megabit per second speeds "available to 90 percent of Americans."[9] While this would be a significant improvement for many rural customers, 100 megabit per second speeds could already be made available using 4G technology, and the remaining 10 percent of Americans not covered by the T-Mobile network will most likely be rural residents. Verizon and AT&T have also

5. Section 2 of the act defines "right of way" as "the area on, below, or above a highway, as defined in s. 340.01 (22), other than a federal interstate highway; sidewalk; utility easement, other than a utility easement for a cooperative association organized under ch. 185 for purposes of providing or furnishing heat, light, power, or water to its members only; or other similar property, including property owned or controlled by the department of transportation."

6. Kelly Hsieh, "Global Small Cell Deployments and Installed Base Will Grow to 2.838 Million Units in 2018, Says TrendForce," TrendForce, March 14, 2018, https://press.trendforce.com/.

7. United States Federal Communications Commission (FCC), "FCC Chairman Pai Announces Major Initiatives to Promote U.S. Leadership on 5G and Connect Rural Americans to High-Speed Internet at White House Event," News Release, April 12, 2019, https://fcc.gov/.

8. Shara Tibken, "Why 5G Is out of Reach for More People than You Think," CNET, October 25, 2018, https://www.cnet.com/.

9. Roger Cheng, "With 5G and Sprint, T-Mobile Vows Cheaper Wireless Service than Ever," CNET, August 22, 2018, https://www.cnet.com/.

publicized goals of rapid 5G deployment, but neither has made significant public commitments to expanding rural service.[10]

While 5G will not amount to a wireless cure-all for rural broadband, it still has potential that deserves consideration. 5G may help to ease one of the major barriers to rural broadband development: the costly "last mile problem." In short, the most expensive part of deploying broadband networks to rural areas is not laying cable between large cities and small towns, but building the "last mile" connections to each individual home in an area.[11] Each individual home needs its own individual connection, and whether the wire is buried or hung on utility poles, those connections are costly both to make initially and to maintain. This expense has led many broadband providers to abandon efforts to roll out fiber optic network infrastructure, even despite significant public subsidies to support those costs. Subsidies for rural broadband might be used more effectively by carriers that use wireless 5G radio signals rather than expensive wired connections for the last mile.

International competition

The United States, South Korea, and China are racing to get nationwide 5G networks up and running. These three countries each have tech companies capable of 5G development, which has significant technical and financial barriers to entry. In the United States, chip maker Qualcomm has both developed 5G standards and is releasing 5G device components. In South Korea, tech giant Samsung is the leading maker of both the South Korean national network infrastructure and early 5G phones already in use.[12] Similarly, Chinese firms Huawei and ZTE develop and sell both 5G telecommunications infrastructure and 5G-capable mobile devices.[13]

Much of the international conflict around 5G centers on the Chinese firms Huawei and ZTE. Unlike Samsung, which is thoroughly integrated into the U.S. and international markets, Huawei and ZTE are relative unknowns in the United States. ZTE was once a top player in the U.S. cell phone market, but largely through sales of low-cost, no-contract devices under a variety of other brand names.[14] Huawei made limited inroads into the U.S. market before being effectively regulated out of the country.[15]

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10. Cheng.

11. DSLReports, "The Challenge of the Last Mile," December 9, 2016, https://www.dslreports.com/.

12. Chris Duckett, "Samsung Boasts It Is Leading the 5G Way in Korea," ZDNet, April 10, 2019, https://www.zdnet.com/.

13. Ericsson (headquartered in Sweden) and Nokia (headquartered in Finland) also play major roles in the development and implementation of 5G networks, but are not as closely tied to the three major competing countries (and their conflicts) as the other firms.

14. Steve Costello, "ZTE US Smartphone Share Slipping," Mobile World Live, November 6, 2018, https://www.mobileworldlive.com/.

15. Associated Press, "Huawei Sues U.S., Seeking to Overturn Sales Ban on Its Equipment," MarketWatch, March 6, 2019, https://www.marketwatch.com/.

Congress passed legislation in 2018 to ban several major government bodies' purchase or use of ZTE or Huawei technology, as well as to block Chinese-made telecommunications equipment from use in federal networks.[16] The latter provision effectively bans government contractors from using Huawei or ZTE devices. The bans stem from concerns that Huawei and ZTE might—knowingly or not—have embedded spying tools or software that could be used by the Chinese government. Further, U.S. authorities allege that Huawei's chief financial officer has violated U.S. trade sanctions against Iran and that the corporation has stolen trade secrets from T-Mobile.[17] Huawei denies all of these allegations, and has sued the federal government to overturn the bans.

Additional executive actions in May 2019 added further barriers between Huawei and American markets. First, President Trump signed an executive order barring all U.S. companies from buying, importing, transferring, installing, dealing in, or using telecommunications equipment from sources "owned by, controlled by, or subject to the jurisdiction or direction of a foreign adversary."[18] Shortly after the signing of the executive order, the Department of Commerce added Huawei and 70 of its affiliates to its "Entity List," a specific set of foreign people, institutions, organizations, and government subject to special restrictions on imports and exports.[19] Placement on the Entity List effectively bars imports and exports to and from the named entities by companies under the jurisdiction of the United States.[20] As a result, Huawei stands to lose access to Android software from Google and chips from Intel and other hardware manufacturers, both of which are crucial to some of Huawei's lines of business.[21] This loss could be a major competitive blow to Huawei, but the results of the rapidly changing international conflict remain essentially impossible to predict.

The status of the Huawei ban has fluctuated several times since its proposal and remains in question following the G20 meeting in Japan at the end of May 2019. At that meeting, President Trump told reporters, contrary to prior decisions and statements, that "US companies can sell their equipment to Huawei" provided the sale of the particular hardware does not present a "great national emergency problem."[22] Huawei remains on the Entity List, so U.S. companies' imports and exports with Huawei still require explicit

16. Colin Lecher, "Huawei Is Suing the US for Government Ban on Equipment," The Verge, March 6, 2019, https://www.theverge.com/.

17. Lecher.

18. Exec. Order. No. 13873, 84 Fed. Reg. 22689 (May 15, 2019).

19. "Entity List," *Code of Federal Regulations* Title 15, Supplement No. 4 to Pt. 744, 2019 ed.

20. "President Trump Declares National Emergency to Secure the Information and Communications Technology Critical Infrastructure Supply Chain" (U.S. Department of Commerce, May 15, 2019), https://www.commerce.gov/.

21. Ian King, Mark Bergen, and Ben Brody, "Top U.S. Tech Companies Begin to Cut Off Vital Huawei Supplies," Bloomberg, May 19, 2019, https://www.bloomberg.com. Note that Huawei could continue to use the Android Open Source Project (AOSP) version of Android software, but loses access to Google's licensed version and the related Google services such as the Play Store that supplies most Android apps.

22. David J. Lynch and Damian Paletta, "U.S. and China Agree to Restart Trade Negotiations Following Meeting between Trump and Xi at Group of 20 Summit," *Washington Post*, June 29, 2019, sec. Business, https://www.washingtonpost.com/.

government permission. It is not yet clear what hardware will or will not be permitted, and further U.S.-China trade negotiations will likely continue to reshape this trade landscape.

Health claims

Health concerns about 5G were a significant area of discussion in hearings and floor sessions for Wisconsin's new 5G legislation. For example, in the Assembly committee hearing for 2019 AB 234, members of the public, mostly representing Wisconsin for Safe Technology, expressed concerns about health risks from wireless technologies, including cancer, blood clots, diabetes, kidney disease, depression, memory loss, dizziness, vomiting, disorientation, pain, and more. On the Science page of that group's website, they state that "there are 1,000s independent [*sic*] studies on the health effects of wireless radiation." They provide links to four studies, one of which was peer-reviewed and none of which specifically investigated 5G radio signals.

There is significant doubt in the medical scientific communities regarding the health risks of 5G and wireless technology in general. In short, cellular technology such as 5G does not emit the kind of radiation that is typically associated with cancer and other health risks to humans, and studies have shown that many purported cases of sensitivity and health issues from radio signal exposure do not hold up to scrutiny. While there are other possible health effects stemming from prolonged radio frequency exposure, no major risks have been proven and more study is needed to demonstrate any such effects.

Claims about cancer risks are also subject to significant doubt. Electromagnetic radiation such as X-rays and gamma rays can lead to health issues such as cancers, but not all electromagnetic radiation is risky. Potentially hazardous radiation is known as "ionizing" radiation, which has enough energy to push electrons out of atoms—"ionizing" them.[23] Ionization can be a health risk when the ionized atoms are in DNA, as the DNA damage can lead to cancers. The radio waves used for cellular communication, including 5G, are non-ionizing radiation. This radiation does not have enough energy to cause the kind of cellular changes that can lead to cancer. Even the very highest frequency 5G radio waves are tens of thousands of times below the ionizing threshold.[24]

While there is no ionization risk, there is some possibility that radio waves could have other effects on the body. Major health risks have not been demonstrated, but cellular technologies are so new that there has not yet been enough time for the kind of broad-based, thoroughly vetted studies that could decisively conclude that there are no risks

23. United States Environmental Protection Agency (EPA), "Radiation Basics," accessed May 30, 2019, https://www.epa.gov/.

24. 5G uses radio waves up to 30 gigahertz (GHz) frequency, or about 3*1010 Hz. Conservative estimates of the minimum photon energy needed to ionize oxygen and hydrogen, which make up most of the human body in the form of water, are 10 electronvolts (eV), which correspond to ultraviolet light with a frequency of about 2.4*1015 Hz. That ultraviolet frequency is over 80,000 times higher than 30 GHz 5G waves.

whatsoever. It should be noted, however, that in repeated studies, individuals' claims of hypersensitivity to electromagnetic signals or adverse effects from exposure have not been substantiated.[25] The possibility of other effects over time does need further investigation.

According to Jonathan Samet, dean of the Colorado School of Public Health and World Health Organization advisor on cell phone radiation, "animal [studies] show responses that cannot be understood in terms of [our] current understanding of how electromagnetic radiation interacts with tissues."[26] Therefore, while there have been no conclusive demonstrations that cell phone signals pose specific harms to humans, "given the ubiquitousness of worldwide exposure…we need to understand if it does have health effects."[27] More research is needed.

5G legislation

About half of U.S. states have passed legislation related to 5G and other small cell deployments, according to the National Conference of State Legislatures (NCSL). Indiana was among the first states to pass this legislation, and that legislation became a model for a 2018 declaratory ruling by the FCC to set rules around 5G network deployment at the federal level.[28] The FCC rules preempt state and local-level regulations that would inhibit mobile service providers' ability to install hardware or otherwise provide 5G service in a state or local jurisdiction. The FCC rules have been challenged in court, but the Tenth Circuit has denied petitioners' motion to stay the regulations pending the outcome of the challenge.[29]

Across states, most 5G legislation has followed the same model as the Indiana law and FCC declaratory ruling. Both the FCC rules and states' 5G laws cover the following three subjects:

Caps on fees. The FCC set conditional caps on fees charged by state and local governments for access to rights-of-way and fees pertaining to 5G equipment installation, main-

25. See, e.g., G. James Rubin et al., "Are Some People Sensitive to Mobile Phone Signals? Within Participants Double Blind Randomised Provocation Study," *BMJ* 332, no. 7546 (April 13, 2006): 886–91, https://www.bmj.com/; G. James Rubin et al., "Do People with Idiopathic Environmental Intolerance Attributed to Electromagnetic Fields Display Physiological Effects When Exposed to Electromagnetic Fields? A Systematic Review of Provocation Studies," *Bioelectromagnetics* 32, no. 8 (2011): 593–609, https://www.bems.org/journal/; Regel Sabine J. et al., "UMTS Base Station-like Exposure, Well-Being, and Cognitive Performance," *Environmental Health Perspective*s 114, no. 8 (August 1, 2006): 1270–75, https://ehp.niehs.nih.gov/; Jonna Wilén et al., "Psychophysiological Tests and Provocation of Subjects with Mobile Phone Related Symptoms," *Bioelectromagnetics* 27, no. 3 (2006): 204–14, https://www.bems.org/journal/.

26. Julia Belluz, "A Comprehensive Guide to the Messy, Frustrating Science of Cellphones and Health," Vox, July 16, 2018, https://www.vox.com/.

27. Belluz.

28. Kaitlin Lange, "FCC Leader Says Indianapolis Leads Way in 5G Investment, Poised to Become National Model," *Indianapolis Star*, September 5, 2018, https://www.indystar.com/; United States Federal Communications Commission (FCC), "Accelerating Wireless Broadband Deployment by Removing Barriers to Infrastructure Investment," Declaratory Ruling Fact Sheet, September 5, 2018, https://www.fcc.gov/.

29. City of San Jose v. FCC, Nos. 18-9568, 18-9571, 18-9572, 2019 U.S. App. LEXIS 4015 (10th Cir. Jan. 10, 2019). Consolidated petitions have since been transferred to the Ninth Circuit.

tenance, or removal. Fees must reasonably approximate the government's "objectively reasonable" costs and must be no higher than fees charged to similar competitors.[30]

According to NCSL, "all states that enacted small cell bills charge application processing fees and impose annual fees on new attachments to public structures."[31] States vary in terms of the levels of discretion political subdivisions (cities, villages, towns, and counties) have to charge various fees. Lower fee caps could help wireless carriers save money while deploying new 5G hardware, but critics argue that caps unduly limit local authority and push too much of the cost of infrastructure onto already cash-strapped municipalities.[32]

Streamlining non-fee restrictions. The FCC placed restrictions on state and local governments' regulations for small cells, such as minimum spacing between cells and aesthetic requirements for the color, size, or visibility of equipment. Any restrictions must be "(1) reasonable, (2) no more burdensome than those applied to other types of infrastructure deployments, and (3) published in advance."[33]

According to NCSL, "all states that enacted small cell legislation allow providers to place poles and facilities[34] in public rights-of-way," and all states prohibit treating wireless providers differently than other applicants for right-of-way access.[35] States vary in terms of which political subdivisions are given jurisdiction over rights-of-way and the levels of discretion they have to govern right-of-way and utility access.

Timelines and processes for permits. The FCC requires authorities to act within certain time thresholds to review applications to install new wireless equipment. Authorities have 90 days to review applications for new small wireless structures, or 60 days for small wireless equipment on existing structures.[36]

According to NCSL, "all enacted legislation establishes timelines for reviewing, approving or rejecting small cell applications."37 States vary in terms of the lengths of the timelines and whether, unlike under the FCC order, a "deemed granted" provision automatically approves applications if authorities do not act on them in time.

In Wisconsin, bills to create a regulatory framework for wireless networking equip-

30. United States Federal Communications Commission (FCC), "Accelerating Wireless Broadband Deployment by Removing Barriers to Infrastructure Investment," par. 48.

31. Danielle Dean, "5G: The Future of Wireless Technology," National Conference of State Legislatures, June 2018, https://www.ncsl.org/.

32. Harper Neidig, "FCC Sides with Telecom Giants in Vote to Cap 5G Fees," The Hill, September 26, 2018, https://thehill.com/.

33. United States Federal Communications Commission (FCC), "Accelerating Wireless Broadband Deployment by Removing Barriers to Infrastructure Investment," par. 83.

34. In legislation and administrative rules, the various pieces of hardware installed to support cellular networks are typically referred to as "wireless facilities."

35. Dean.

36. United States Federal Communications Commission (FCC), "Accelerating Wireless Broadband Deployment by Removing Barriers to Infrastructure Investment," para. 101.

37. Dean.

ment such as small cells—2017 AB 348 and its companion 2017 SB 425—were first introduced in their respective chambers in the 2017–18 session, but both failed to pass. In the 2019–20 session, Representative Kuglitsch and Senator LeMahieu once again authored bills to regulate small cells and related 5G infrastructure: 2019 AB 234 and 2019 SB 239. The legislation, now 2019 Act 14, passed the legislature in June 2019 and was signed into law by Governor Evers in early July. According to the authors, the 2019 bills included several key differences from the 2017 versions in response to feedback received from municipalities and ongoing communication with wireless carriers. The authors stated in the public hearing for 2019 AB 234 that they raised the fee caps that political subdivisions can impose on wireless providers and increased local control over 5G infrastructure siting.

Regarding the three subjects shared in common among the FCC regulations and other states' regulations, Wisconsin's 5G legislation does the following:

Caps on fees. Political subdivisions are permitted to impose fees on wireless providers for use of rights-of-way and government structures and utility poles only insofar as they also charge other entities such as other wireless carriers or cable companies. Political subdivisions are permitted to charge application fees for permits, but may not do so for most maintenance or replacement of small wireless facilities.

Fees to place a wireless facility on a government utility pole that is used to carry electric distribution lines or for telecommunications or cable service must be governed by agreements between political subdivisions and wireless providers (subject to FCC rules and set by the Public Service Commission if an agreement is not reached). Fees for placing a wireless facility on a government utility pole not used for electrical power, telecommunications, or cable service are capped at $250 per facility per year but cannot exceed the actual costs to the government. This cap is slightly higher than the cap imposed by most other states.

Streamlining non-fee restrictions. Under the bill, political subdivisions' existing agreements with wireless providers remain in effect for 24 months after the effective date of the bill, after which the bill's restrictions apply. Political subdivisions are prohibited from exceeding federal or state regulatory requirements on communications services and facilities in rights-of-way. Political subdivisions are permitted to impose certain aesthetic requirements for wireless facilities. The state and political subdivisions are permitted to require wireless providers to repair damages related to activities in rights-of-way, and wireless providers must indemnify political subdivisions from liability and loss related to their activities in rights-of-way.

Timelines and processes for permits. Political subdivisions must approve permit applications within a set of specified time limits unless they interfere with rights-of-way or do not meet applicable codes. The bill does include a "deemed granted" provision such that applicants are allowed to consider an application approved if the state or a political subdivision misses a deadline.

In addition to those three major areas, the act also creates a study committee to "study laws, regulations, and ordinances regarding use by private entities of public rights-of-way," including the fees, policies, and procedures for that use.

Other Midwestern states' recent 5G legislation—all of which follows the overall policy structure of establishing fee caps, streamlined restrictions, and mandatory timelines for approval processes—includes the following:

Illinois: 2017 Public Act 100-0585.
Indiana: 2017 Public Law 261; 2018 Public Law 23.
Iowa: 2017 Senate File 431.
Michigan: 2018 Public Act 365; 2018 Public Act 366.
Minnesota: 2017 Chapter 94.
Ohio: 2017 HB 478.

To review legislation from across all fifty states, see NCSL's digests of "Mobile 5G and Small Cell Legislation" for 2018 and 2019.

Conclusion

Both small cell-based and traditional tower-based 5G have already been deployed in limited areas. Like past generations of mobile network technology, 5G will most likely grow in fits and starts at first while early adopters test how best to benefit from the new technology. Before long, however, 5G will be nearly everywhere, and it might seem difficult to remember a technical landscape prior to 5G connectivity and the technologies that it supports.

The modern Internet ecosystem of streaming video, location-aware apps, and social media relies on a level of connectivity that has existed for less than a decade, but already feels both indispensable and inescapable. 5G will almost certainly continue this trend as the ground-breaking technologies that 5G will enable promise to both enrich and complicate our digital lives. The new 5G legislation will almost certainly be put to the test as infrastructure emerges and conflicts arise between carriers, political stakeholders, and citizens. Both 5G infrastructure itself and the technologies that it enables will require ongoing attention to help ensure that policy can keep pace with the rapid pace of expansion into new technological frontiers. ▪