

The FCC and the Future of 5G

The next-generation of wireless technologies – known as 5G – is here. Not only is it expected to offer network speeds that are up to 100 times faster than 4G LTE and reduce latency to nearly zero, but it will also allow networks to handle 100 times the number of connected devices, revolutionizing business and consumer connectivity and enabling the “Internet of Things.” Leading policymakers are making it a top priority to ensure that industry has the tools it needs to maintain U.S. leadership in commercial 5G deployments. Below is an overview of the underlying foundation of 5G deployments (*i.e.*, spectrum), how it is managed by the Federal Communications Commission (“FCC”), and recent FCC actions and efforts to help the U.S. win the race to 5G.

Spectrum: The Basic Building Block

- Spectrum refers to the radio frequencies over which communications transmissions travel, making it the basic building block of a variety of systems
 - Examples: Radio and over-the-air broadcast television, wireless cellular networks, Wi-Fi networks, and satellite systems
- Spectrum has different characteristics
 - Generally the “lower” the frequency, the further it can travel
 - “Higher” frequencies tend to travel less far
- The amount of spectrum, or “bandwidth”, is also important
 - The larger a spectrum channel, the more data that can be transmitted and the quicker it can be transmitted
- Spectrum can be licensed or unlicensed
 - Licensed spectrum gives rights to particular radio frequencies in particular areas – broadcasters and wireless licensees hold licenses
 - Some frequencies are available for all to use without a license – like Wi-Fi, garage door openers, and baby monitors

Spectrum Regulation at the FCC

- The FCC regulates non-federal use of spectrum
- It decides:
 - Which spectrum is licensed or unlicensed
 - Who the licensees are
 - How much spectrum is associated with each license
 - Where the geographic area is that the license covers

What is 5G?

- Wireless networks are classified by generation
 - 1981: First generation (1G) wireless networks were developed, providing analog wireless voice
 - 1990s: 2G enabled digital voice, increased capacity, and introduced text messaging

- 2000s: 3G brought wireless data, providing consumers access to the Internet everywhere they go
- 2010: 4G LTE (LTE is a communications protocol developed by standards organization 3GPP) first deployed, delivering high-speed wireless broadband
- 5G is the next generation of wireless networks

Spectrum for 5G

- While 5G is not frequency-specific, 5G wireless networks will require a mix of low-, high-, and mid-band spectrum – likely relying more on spectrum with wider bandwidths in upper and mid-band ranges
 - Low-band spectrum (under 2 GHz) travels longer distances with minimal signal interruption and is good at penetrating building structures
 - High-band spectrum (above 24 GHz) travels shorter distances, but offers higher capacity (particularly because it is available with wider bandwidths) and faster speeds
 - Mid-band spectrum (between 2 and 24 GHz) offers a blend of coverage and capacity

Recent FCC Spectrum Activities to Support 5G

- Low-Band Spectrum
 - 600 MHz:
 - Spectrum formerly designated for broadcast television was the subject of the FCC’s Congressionally-mandated Broadcast Incentive Auction, whereby some TV stations agreed to give up their spectrum rights in exchange for a buyout, funded by auction bidders.
 - The FCC auctioned the spectrum in 2017, and licenses were issued in 2018. Operators that obtained this spectrum must deploy it consistent with the FCC [rules](#).
- Mid-Band Spectrum
 - 2.5 GHz:
 - The 2496-2690 MHz (“2.5 GHz”) band was allocated for “wireless cable” by commercial and educational entities. In 2019, the FCC adopted [rules](#) that allow the spectrum to be used for mobile broadband. A priority filing window was first opened to provide rural Tribal Nations an opportunity to obtain unassigned 2.5 GHz spectrum. The remaining spectrum will be made available to commercial licensees on a county basis through an overlay auction, the [procedures](#) for which the FCC is currently requesting public input.
 - 3.5 GHz:
 - The 3550-3700 MHz (“3.5 GHz”) band was historically used, in part, for unlicensed operations and government and non-government satellite use. In April 2015, the FCC adopted [rules](#) ([modified](#) in 2018) for the more complete use of the band in a new Citizens Broadband Radio Service (“CBRS”) using a three-tier priority structure, managed by on-line database systems. The FCC [completed](#) an auction of this spectrum in 2020, and providers are now in the process of deploying this spectrum.

- 3.45 GHz:
 - On March 17, 2021, the FCC adopted [rules](#) to make 100 megahertz of spectrum in the 3.45-3.55 GHz (“3.45 GHz”) band, which was allocated for federal use, available for full-power commercial wireless services across the contiguous United States. Existing federal users will still have access to the spectrum on a protected basis where and when they need it, and the FCC will auction the remaining spectrum. The FCC is currently seeking [comment](#) on the procedures to be used for the auction, which is expected to begin in October 2021.
- 3.7-4.2 GHz:
 - The 3.7-4.2 GHz band (“C-band”) was historically used for satellite downlink service, delivering content to broadcasters, cable companies, and others. On February 28, 2020, the FCC adopted [rules](#) to reallocate the 3.7-3.98 GHz portion of the band for 5G wireless services, clearing the lower 280 megahertz and repacking incumbent satellite operators in the upper 200 megahertz of the band, with 20 megahertz reserved as a guard band. The FCC [completed](#) an auction of the spectrum in 2021. It was the highest grossing spectrum auction conducted by the FCC, raising more than \$80.9 billion in gross proceeds. The FCC is now in the process of issuing licenses to winners for wireless deployment, and incumbent satellite operators are in the process of clearing the spectrum.
- 5.9 GHz:
 - The 5850-5925 MHz (“5.9 GHz”) band was designated for use, and licensed by the FCC, to support dedicated short range communications (“DSRC”) services (including, among other applications, automotive applications). The FCC adopted [rules](#) on November 20, 2020 to repurpose the lower 45 megahertz of the 5.9 GHz band for unlicensed use and require the Intelligent Transportation System radio service to use cellular vehicle-to-everything-based technology in the upper 30 megahertz of the band. The [rules](#) will become effective July 2, 2021, except for the rule requiring existing DSRC licensees to notify the FCC by the transition deadline (July 5, 2022) that they have ceased operating in the 5.850-5.895 GHz portion of the band. The FCC is also seeking additional [public input](#) on the band. Comments and replies are due June 2, 2021 and July 2, 2021, respectively.
- 6 GHz:
 - The 5925-7125 MHz (“6 GHz”) band was used by fixed microwave and satellite operators. On April 24, 2020, the FCC adopted [rules](#) to make available the full 1,200 megahertz of spectrum in the 6 GHz band for unlicensed use such as Wi-Fi. Low-power operations are permitted indoors throughout the band, and higher power operations are permitted both indoors and outdoors in certain portions of the spectrum – all of which are under the control of an Automated Frequency Control (“AFC”) system. The FCC also requested input on the potential for unlicensed devices to operate both indoors and outdoors across the entire 6 GHz band

at very low power and allowing indoor unlicensed devices to operate at higher power levels than those adopted without AFC.

- High-Band (millimeter wave) Spectrum
 - Spectrum Frontiers (above 24 GHz and below 95 GHz)
 - The FCC adopted [rules](#) making available various spectrum bands above 24 GHz for 5G wireless services and auctioning the spectrum to commercial entities. It completed auctions for spectrum in the 27.5-28.35 GHz (“[28 GHz](#)”) band and 24.25-24.45 GHz and 24.75-25.25 GHz (“[24 GHz](#)”) band in 2020. It also [completed](#) an auction of spectrum in the 37.6-38.6 GHz (“Upper 37 GHz”), 38.6-40 GHz (“39 GHz”), and 47.2-48.2 GHz (“47 GHz”) bands. The FCC has an open proceeding to consider additional commercial use of the 25.25-27.5 GHz (“26 GHz”), 37-37.6 GHz (“Lower 37 GHz”), and 42-42.5 (“42 GHz”) bands, which currently include a mix of federal and non-federal allocations.

Other Efforts to Support 5G

5G Networks

- Open RAN:
 - On March 17, 2021, the FCC adopted a [Notice of Inquiry](#) (“NOI”) that seeks input on the current status and deployment of Open Radio Access Networks (“Open RAN”), which some parties assert are a potential path to drive 5G innovation, and virtualized network environments, domestically and internationally. Comments were due April 28, 2021, and reply comments are due May 28, 2021.
- Supply Chain Security:
 - Pursuant to the [Secure and Trusted Communications Networks Act of 2019](#) and the [FY 2019 National Defense Authorization Act](#), the FCC adopted [rules](#) requiring certain providers to remove and replace equipment and services that pose a national security threat from their networks. It also established a Reimbursement Program to assist smaller providers, that are either required or voluntarily agree to remove and replace, with the costs of removal and replacement. On March 12, 2021, the FCC [announced](#) the publication of its “Covered List” of equipment and services that are deemed to pose an unacceptable risk to the national security of the United States, which includes certain equipment or services produced by the following entities, as well as their subsidiaries and affiliates: (1) Huawei Technologies Company, (2) ZTE Corporation, (3) Hytera Communications Corporation, (4) Hangzhou Hikvision Digital Technology Company, and (5) Dahua Technology Company. The FCC has an [open proceeding](#) that proposes to raise the cap on customers for purposes of eligibility to seek reimbursement (raising it from 2 million to 10 million customers) as well as to allow reimbursement for all covered equipment and services obtained before June 30, 2020.

- The FCC has also [issued](#) final designations [prohibiting](#) Universal Service Fund support from being used to purchase or obtain equipment or services produced by [Huawei Technologies Company](#) and [ZTE Corporation](#).

5G Infrastructure

- Unlike 4G, which utilizes a small number of large (typically 200-foot) towers that are geographically dispersed, 5G will rely on small cells placed in close proximity. And the FCC has taken several actions to streamline the deployment of wireless facilities and infrastructure.
 - The FCC adopted an [Order](#) in March 2018 to streamline the wireless infrastructure deployment process by excluding small wireless facilities from the National Historic Preservation Act (“NHPA”) and National Environmental Policy Act of 1969 (“NEPA”) reviews that were designed for larger towers.
 - In September 2018, the FCC issued a [Declaratory Ruling and Order](#) that: (1) limits certain fees charged by state and local governments for small cell installations; (2) establishes two new shot clocks for small wireless facilities – 60 days for collocation on preexisting structures and 90 days for new builds; (3) codifies the existing 90- and 150-day shot clocks that were established in 2009 for wireless facility deployments that do not qualify as small cells; (4) concludes that all state and local government authorizations necessary for the deployment of personal wireless service infrastructure are subject to those shot clocks; and (5) adopts a new remedy for missed shot clocks by finding that a failure to act constitutes a presumptive prohibition – any locality that misses the deadline is expected to issue any necessary permits or authorizations without further delay – rather than adopt a “deemed granted” remedy.
 - On June 9, 2020, the FCC adopted a [Declaratory Ruling and Notice of Proposed Rulemaking](#), also known as the 5G Infrastructure Order, which focuses on clarifying Section 6409(a) of the Spectrum Act. That provision streamlined local approval processes for certain eligible collocations and modifications to existing wireless structures. In doing so, the FCC provided important clarification of its initial rules implementing Section 6409. Notably, the FCC clarified issues where local governments had sought to thwart the pro-deployment intent of Section 6409, such as when a modification or collocation would conflict with preexisting “concealment” measures.
 - On October 27, 2020, the FCC adopted an [Order](#), also known as the Section 6409 Infrastructure Order, revising its rules implementing Section 6409(a) of the Spectrum Act of 2012, 47 U.S.C. § 1455, which provides that state and local governments may not deny certain requests to modify existing wireless structures that do not substantially change the physical dimensions of the structures. The Order is intended to streamline the process of upgrading existing wireless infrastructure for 5G by further clarifying the parameters of what will “substantially change” the dimensions of an existing facility.
 - In a [Declaratory Ruling](#) released January 19, 2021, the FCC clarified that under its pole attachment rules, requesting attachers cannot be required to pay the entire cost of pole replacements if the pole replacement is not necessitated *solely* by that new attachment. Thus, when a new attachment – including for example a small

wireless facility – is proposed on an existing pole that already requires replacement (whether because it is on the utility’s replacement schedule already, or has existing safety or construction non-compliance issues), the new attacher cannot be required to pay the full cost of replacement.

5G Funding

- On October 27, 2020, the FCC adopted an [Order](#) establishing the 5G Fund for Rural America, which will make available up to \$9 billion in federal subsidies over 10 years to bring voice and 5G broadband services to unserved rural areas. The funds will be made available in two phases, with Phase I making available up to \$8 billion nationwide to all eligible rural areas that lack unsubsidized 4G LTE and 5G broadband service, and Phase II making available at least \$1 billion (plus any funds left over from Phase I) to specifically target the deployment of technologically innovative 5G networks that facilitate precision agriculture.
- On January 19, 2021, the FCC [announced](#) that it adopted additional rules and reporting requirements for its Digital Opportunity Data Collection. Among other things, the [Order](#) creates standards for collecting broadband deployment data, establishes a process for challenging coverage map data, and sets standards for enforcing data collection requirements. The additional rules and requirements are intended to ensure that the FCC collects precise and accurate broadband deployment data as it continues its efforts to close the digital divide.