5G Wireless Deployment

Streamlining Rules Can Help Keep State an Innovation Leader

Background

What is small cell 5G? The next generation of wireless communication standards is referred to as "5G" for fifth generation. It is an emerging standard that is in the trial phase now and will be finalized by the International Telecommunications Union in 2020. Current generation 4G uses high-powered antennas on tall towers, while 5G will use an array of lower-power transmitters closer to the ground referred to as "small cells." These small cells use higher frequencies, which enable much faster network speeds.

Small cells use the millimeter wave high frequency band between 30 gigahertz (GHz) to 300 GHz, which have a wavelength of 1 centimeter to 1 millimeter (the higher the frequency, the shorter the wavelength). This millimeter wave technology allows a literal exponential increase over existing 4G Long Term Evolution (LTE) speeds. Current 4G LTE caps around 100 megabyte/second (Mb/s) and next generation 5G will enable in excess of 1 gigabyte/second (GB/s) speed. In trials, companies have shown 5G speeds from 10 GB/s to 20 GB/s. In real world terms, this means downloading a 4K ultra high-definition 3-D movie in seconds versus minutes. However, the implications far exceed smooth video streaming. In addition to blazing speed, 5G networks will have the capacity to connect the devices of the future and do it in real time.

The higher frequency of 5G small cells allows much faster speeds, but has a much shorter transmission range than conventional 4G towers. However, 5G networks require 10 to 100 times more small cell antennas than a 4G network. While 4G antennas are the size of a small building, 5G small cell antennas, sending the small millimeter waves, range from the size of a shoe box to a pizza box. The most natural location for these small cells often are power poles, street lights, and traffic signals.

What Will 5G Small Cells Enable?

A 5G network will help reach the potential of the internet of things (IoT), which is the interconnection of everyday devices to the internet. There will be close to 30 billion connected IoT devices in use by the time 5G could roll out in 2021. For consumers, these devices include fitness trackers, cameras, door locks, thermostats, and vehicles. However, this also includes connectivity of infrastructure unlike ever before.

The next generation of connected devices at the community level includes real-time monitoring of traffic lights, smart parking, and bridges. This has the potential to revolutionize the way cities provide transportation and public safety while enabling a new level of day-to-day convenience for the public. Instead of being a piece of hardware, a connected device can be a solution by gathering data, transmitting it, and allowing for the data to be analyzed. However, the quality of the connection is the lynchpin to make it work.

5G networks will have the capacity to serve these public goals while providing traditional internet service to consumers. Along with the speed and capacity, 5G promises a tenfold improvement in the latency (network response time) of the connection. Latency is an important component of functional network speeds. The ultra-low latency provided by 5G will allow applications in their infancy to become reliable on a mainstream level. This allowance includes an entire frontier of augmented reality and virtual reality applications.

On top of the new applications that 5G networks will enable, the transition from 4G to 5G will directly create jobs in the deployment phase and significantly more through increased competiveness. California is expected to gain 11,000 network deployment jobs and 375,000 jobs though increased opportunities created by 5G. Nationwide projections for the 5G transition estimate $275 billion in investment over the next seven years, 3 million new jobs, and $500 billion in gross domestic product (GDP) growth. Importantly, city-by-city and county-by-county breakdowns show that these economic benefits flow proportionally to small, medium, and large communities.

What Are the Policy Issues?

There still are engineering hurdles to clear and technological advancements to be made, but just as daunting are the public policies regarding 5G small cell deployment. Because small cells will need to be deployed in public rights of way, there is a balancing act between short-term local government control and income from fees, and long-term benefits from job creation, updated infrastructure and economic growth.

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Local governments see the fees obtained by leasing the space for small cells as a significant revenue generator in the immediate future and have said that efforts to cap these fees could lead to a cutback of community services. Currently, the fees for small cells in some jurisdictions mirror fees for the 4G macro-sized cell towers and can range from $3,000 to more than $10,000 per small cell.

The permitting and approval process also has proven to be a hurdle to small cell deployment. In some jurisdictions, the approval process is the same as for a large "macro" cell tower, a process that can take well over a year. This is challenging when 100 times more small cells are needed in the same area that one macro tower covers. Also, for the technology to work, an entire cluster of small cells needs to be approved in bulk. Approving some, but not all of a cluster would hamper the efficacy of the deployment. The telecommunications and technology companies looking to deploy small cell are hoping that public policies will adapt for the transition to 5G.

Federal Activity

In March 2017, the Federal Communications Commission (FCC) issued a Notice of Proposed Rulemaking and a Notice of Inquiry for a "review of the regulatory barriers to wireless network infrastructure investment and deployment," and to examine how the FCC acts "to remove or reduce these barriers consistent with the law and the public interest." The commission accepted comments over the summer. It is unclear to what extent any FCC regulations would pre-empt state or local government authority on the subject.

In October 2017, Commissioner Brendan Carr stated: "[T]he current regime is not tailored to support this type of massive, new deployment. It costs too much and it takes too long." He went further and said that the FCC would begin taking action to streamline the small cell deployment process by the end of 2017. The FCC will likely continue working on the issue through 2018.

California Legislative Activity

• SB 649 (Hueso; D-San Diego) would have streamlined some of the process involved in small cell approvals and fixed the fee local governments could charge at $250 per small cell. The bill was vetoed by Governor Edmund G. Brown Jr. in 2017.

CalChamber Position

In order for California to remain a leader in broadband deployment, speed and quality, California lawmakers should continue to support innovation and growth by encouraging greater investment in modern infrastructure, and supporting policies that modernize regulations and promote competition going forward. Preserving this commitment to the streamlined regulations that have encouraged businesses to enhance the California economy and empower California consumers is necessary to ensure that the internet remains a vibrant driver of jobs, growth and innovation.

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