Insight

Reallocating the 5.9 GHz Band: Roadblock for Transportation Innovation or Roadmap to 5G Innovation?

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Executive Summary

- The 5.9 GHz spectrum band, originally reserved for autonomous vehicles, is set to transition this summer from a limited specific use by the Department of Transportation to unlicensed spectrum available more broadly.
- This move will provide particularly important spectrum for 5G and next-generation Wi-Fi, technologies that will assist in providing the bandwidth for many next-generation connected technologies, including those in the transportation industry, and expanding internet access.
- While some policymakers and scholars have expressed concerns that the shift could impact transportation safety or innovation by causing interference or undoing innovations and projects currently relying on dedicated short-range communications (DSRC) technology, the band was not commonly used by innovators and projects in that way.

Introduction

On May 3, 2021, the Federal Communications Commission (FCC) issued its final rule to split the 5.9 GHz band between unlicensed use and its previously specified use for intelligent transportation systems. Previously the Department of Transportation (DoT) controlled all of this spectrum, as it was reserved for communication between autonomous vehicles and other potential transportation safety-related uses, but the spectrum was largely going unused. While some lawmakers have continued to support the DoT's control of this spectrum, the final rule would allow the transition of portions of the 5.9 GHz band to unlicensed spectrum to begin in July 2021. This transition will provide particularly critical spectrum for growing Wi-Fi demands and next-generation communications. Some have questioned whether this transition will undermine transportation safety or next-generation vehicle technology, but the transition will help provide a strong backbone for the connectivity that fuels many innovations, including in the transportation sector.

The History of the 5.9 GHz Band

The 75 MHz of spectrum between 5.850 GHz and 5.925 GHz, commonly referred to as the 5.9 GHz band, was originally allocated in 1999 by the FCC to the DoT for use related to dedicated short-range communications (DSRC) for vehicle-to-vehicle communication. Policymakers intended this allocation to support the development of safety features and innovations related to autonomous vehicles. As technologies have developed, however, most vehicle manufacturers have not used DSRC. At the same time, the increasing number of connected devices, including potential transportation safety and automation developments, is leading to increased saturation in existing bands assigned to Wi-Fi and 5G. Mid-band spectrum such as the 5.9 GHz band

and the C-Band are particularly critical to the continued development of this technology.

In November 2020, the FCC voted unanimously to transition the 5.9 GHz band to a spectrum-sharing model. Under the new model, FCC reallocated 45 MHz of this spectrum to unlicensed usage, making it available for Wi-Fi and other purposes, while the DoT retains 30 MHz of spectrum for DSRC and other transportation-related uses. The final rule was published in May 2021 and is set to take effect in July, but the policy conversations about the band's under-utilization have been ongoing with support from commissioners appointed by both political parties since at least 2015. As with other spectrum decisions, this move followed significant due diligence and analysis by the FCC to determine the impact and risks such a transition could have while also examining the benefits to further connectivity and innovation.

Critics continue to argue that a spectrum-sharing arrangement would undermine transportation safety and could limit certain technological innovations in the transportation field such as the development of autonomous vehicles and "platooning," where multiple trucks are linked using connected technology and some degree of automation. As recently as March, Transportation Secretary Pete Buttegieg expressed concern in a congressional hearing about the proposed transition, arguing that DoT needs the full spectrum to meet the safety goals and support DSRC technology.

A Critical Step for Next Generation Communication

The transition of the 5.9 GHz band plays a critical role in the growing demand for connectivity and would likely accelerate next-generation telecommunications technologies by serving as a backbone for innovative connected devices in a range of industries, including transportation. The spectrum available in the 5.9 GHz band is uniquely valuable as it has less interference and a higher bandwidth than many lower frequencies and is adjacent to those bands already used for Wi-Fi and telecommunications purposes. It is a particularly useful band for these technologies that are facing increasing crowding at lower levels. In this way, the transition of the 5.9 GHz band supports the further development of next-generation Wi-Fi and 5G technologies.

As such a transition will provide opportunities to improve connectivity and support a growing range of innovative and connected devices, it will have a positive impact on economic growth as well. A RAND analysis suggests that transitioning the 5.9 GHz band to unlicensed spectrum could boost the economy by as much as $106.3 billion based only on 2018 household smartphone, laptop, and tablet usage. As the analysis notes, this value increases when taking into account the growing number of other data-using and connected devices, from gaming consoles to smart-home connected devices. In the last year, Wi-Fi traffic has increased, and so it is likely that the economic impact will be even higher now as the band prepares to transition.

Reallocating a large portion of the 5.9 GHz band will not only meet existing demands but will further improve America's internet infrastructure capabilities. The COVID-19 pandemic has highlighted the importance of strong internet infrastructure to withstand growing demands, but also the need for further development and continued maximization of spectrum utilization to help expand internet access. The transition of the 5.9 GHz band is key to the deployment of 5G and next-generation Wi-Fi. Without this range of spectrum, the growing demands on existing bands could lead to a roadblock in rolling out these new technologies. As New American's Open Technology Institute describes, "The 5.9 GHz band is increasingly a key part of the potential solution to the ''spectrum crunch' in unlicensed bands, and as a means of accelerating both the availability and affordability of 5G-capable connectivity to all Americans. Because mobile carrier 5G networks will be built out first in mostly urban, high-traffic and high-return areas, next-generation Wi-Fi will be essential to heading off a new 5G digital divide if rural, small-town, exurban, and even lower-income urban neighborhoods lack mobile carrier 5G."

A stronger internet infrastructure remains important for numerous industries, from agriculture to education, that are increasingly using connected technologies and the internet in new ways. It is also critical to meet the growing demands of connected devices in the home: According to a Deloitte study, the average American household has 11 internet-connected devices, and that number continues to increase. Transitioning the 5.9 GHz spectrum band plays an important role in meeting that demand.

Is There an Impact on Transportation Innovation and Safety?

The transportation industry continues to undergo many exciting and innovative changes that will transform the way people and goods move. Like in many other industries, these changes include significant automation, artificial intelligence, and internet connectivity. The DoT and FCC are right to consider the potential safety impacts and what if any standards are needed; the 5.9 GHz band, however, was underutilized and there are many other ways to continue to promote both innovation and safety.

While some have advocated for DoT's continued control of the 5.9 GHz band for safety or innovation purposes, the band was being generally underutilized in both these regards. For example, while General Motors is using DSRC and the 5.9 GHz band for connected vehicle-to-vehicle communication, many other innovators and auto companies including Ford and Toyota are using other forms of connected communication. Thus, partially reallocating the band will not delay the current progress on autonomous vehicles and other connected technologies, nor will it undermine the advanced safety features that are being developed. While most of the band will be repurposed for unlicensed usage, some portions will still be available for those innovators who have been using the band.

The limited use of DSRC and the 5.9 GHz band outside of these innovations was also not closely tied with safety innovations. Only a few projects using the band ever came to fruition, and most of those were small or unrelated to safety. For example, in Tampa, Florida, local officials used DSRC for congestion control and tolling. Even those projects that were designed to use the 5.9 GHz band for its original purpose rarely came to full fruition. In New York City, where a program was expected to use the spectrum and accompanying technology at intersections in Manhattan and Brooklyn, only one intersection was ever fully equipped.

The growth of 5G associated with transitioning the 5.9 GHz band could also be important for the future of connected automotive technology. As noted earlier, many innovators are already planning to use other communications technologies in their connected transportation technology that will benefit from further access to 5G and advanced Wi-Fi. Like the stationary connected devices in our homes, this technology also requires a strong and advanced internet infrastructure that can meet growing bandwidth demands.

Conclusion

Spectrum is a limited resource and as such, maximizing its use can have a significant economic impact. As technologies and demands evolve, it will be necessary at times for the FCC to consider if underutilized spectrum can be repurposed. In the case of the 5.9 GHz band, the upcoming transition provides important opportunities for continuing to develop a strong internet infrastructure to support a variety of technologies including transportation safety innovations.