Insight

The C-Band Auction: Market-based Approaches to Spectrum in Advancing 5G

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Executive Summary

- The Federal Communications Commission is auctioning portions of the C-band spectrum that are critical to the development of 5G.
- 5G development and deployment will both improve the connectivity and experience of those who rely on mobile devices as well as **s**upport other emerging technologies and the growing number of connected devices.
- The C-band auction illustrates how a market-based approach can provide the appropriate incentives to optimize spectrum utilization and benefit current spectrum holders, innovators, and consumers.

Introduction

The Federal Communications Commission (FCC) is set to hold a public auction of portions of the C-band radio frequency on December 8, 2020. More specifically, the FCC will auction frequencies between 3.7 and 3.98 gigahertz (GHz) within the C-band. This auction is critical to developing 5G because the frequency is exceptionally well suited for supporting internet over a broad area with low latency. Many other countries including China are also making rapid progress towards this next generation telecommunication infrastructure. The race to developing more 5G capacity—and to reap the rewards of lower operating costs across various industries, higher speeds, and increased bandwidth—has engendered substantial bipartisan support for the FCC decision to auction off C-band spectrum. Tapping the full power of 5G has been hailed as a second Industrial Revolution because it provides enough broadband capacity for a growing number of connected devices, from refrigerators to tractors to surgical equipment, to harness the power of the internet.

Currently, there are concerns that China may be slightly ahead of the United States in the development and deployment of 5G infrastructure and devices, but the United States has the ability to quickly catch up if it embraces the appropriate policy solutions to promote private innovation and deployment. The forthcoming auction is one such policy, as it is seeking to reallocate underutilized spectrum expeditiously. This timely and market-based approach can serve as a model for future spectrum transitions and auctions for companies that would like to sell their underutilized spectrum. The C-band auction thus provides one example of how market-based principles can be incorporated into policy solutions that encourage innovation and investment in infrastructure.

The Advantages of 5G: Increasing Demand and Bridging the Digital Divide

During the COVID-19 pandemic, internet infrastructure has faced unprecedented demands as more Americans find themselves reliant on broadband for work, school, and social activities. The United States' historically light-

touch approach to regulating internet infrastructure encouraged a system of private investment that built a robust infrastructure. This infrastructure was better able to handle increased demand for broadband than its European counterparts, where internet service providers were forced to downgrade certain services such as Netflix and YouTube. 5G will play a key role in meeting the growing demands of internet traffic beyond the pandemic, and mid-band spectrum such as the C-band is critical to the deployment and development of 5G technology.

Beyond the pandemic, internet infrastructure will continue to see increased usage as a growing number of emerging technologies and connected devices become common. The average American household in 2019 had 11 connected devices. This number is only expected to grow as smart home technologies, wearable devices such as FitBits, and other technologies such as autonomous vehicles become more common.

5G can also improve service for those who depend on smartphones as their sole source of connectivity. As the Brookings Institute's Nicol Turner-Lee explains, compared to 4G, the high-capacity, high-speed connection of 5G service will improve the viability of data-intensive apps such as those used for telemedicine, video conferencing, and virtual schools. Additionally, these networks are able to withstand higher traffic from an increased number of devices—which is particularly important for increased speed and reliability in densely populated urban areas.

The Case for the C-Band Auction: Market-Based Solutions to Spectrum Allocation Provide Incentives and Benefits

For individuals and companies to experience these benefits, spectrum will be needed to develop and deploy 5G technology. As spectrum is a limited resource, it is important to examine whether there are opportunities for the market to provide a more efficient utilization. The C-band auction demonstrates that the FCC recognizes the market might be able to find service providers who can better utilize spectrum that is currently dormant or underutilized.

Radio frequency spectrum, or simply spectrum, is a truly unique natural resource. It is similar to renewable resources in that it is not a finite commodity in certain respects, but also bears similarities with non-renewable resources such as fossil fuels. This is because while we do not run out of radio frequencies (i.e., a new operator can use the frequency as soon as another operator ceases to utilize it), only a single operator can use a frequency at a given time.

While spectrum is a commodity, it is not the case that all ranges of spectrum are equally valuable. For instance, the FCC's December 8, 2020, C-band auction will open up access to the 3.7-3.98 GHz frequencies that are ideal for expanding 5G because they are able to couple high coverage range with high speeds. Because spectrum has characteristics similar to limited resources, it is imperative that it be utilized efficiently.

The FCC licenses spectrum to those who use it, and so it has to approve any transfer of the licenses. It can reallocate spectrum through a variety of means—lotteries (which are random), petitions (which are more centrally governed), and auctions, for example—but an auction has a number of benefits. The auction approach can provide incentives both to those who are currently not using spectrum as well as to those who need it to develop 5G. An auction-based approach therefore is more likely to encourage those who are holding a valuable section of spectrum to sell by ensuring they obtain a fair market value for their resource. An auction is also more responsive to market demands and more likely to benefit consumers by encouraging the maximally

valuable utilization.

The C-band is being underutilized by satellite companies that beam cable and broadcast programming. Advances in technology have resulted in these satellite companies using the upper portions of the C-band, making room for wireless service and other companies to develop 5G in the lower portions of the C-band. Further, these companies are in a financially precarious position, and so they are looking for a way to recoup some value from their unused spectrum. The best system for such allocating such resources has historically been market based, where the entity who can be expected to make the most productive use of the resource purchases control of it.

The key benefit of a private auction—one conducted solely by the companies themselves—is that it would facilitate the transfer of spectrum from the satellite companies to cellular companies quickly. Originally, it was expected that a public auction—one facilitated by the government—would not complete a transfer until 2021 or 2022, and the estimated lost consumer surplus of this delay was estimated at $18 billion. A public auction, however, is able to provide guardrails ensuring a smooth transition and ensure appropriate value is obtained for both the government (which owns the spectrum) and the current licensees of the spectrum. At the same time, a public auction could easily have been delayed by bureaucratic processes, thus harming all parties if not conducted in a timely fashion.

The FCC, under Chairman Ajit Pai, was able to break with agency precedent and cut the time it takes to administer a spectrum auction. Doing so has resulted in a public auction that has many of the timely benefits of a private auction, with the additional element that some of the proceeds from the sale of spectrum go to the U.S. Treasury. Nevertheless, a private auction would have reallocated the spectrum even more quickly, allowing the economy to reap the benefits of 5G sooner. The C-band auction has approximated the effect of a private auction in many ways. Ideally, the FCC will embrace such an approach and be able to offer future auctions in a timely manner as well. The ability to develop 5G in other spectrum ranges should not depend on the priorities of certain government officials, however. A culture and policy shift that would embrace private auctions for those who would like to sell their spectrum holdings would create greater incentives for licensees to transfer their under-utilized spectrum to those for whom it holds greater value. Additionally, legislation that requires the valuation of spectrum could also make both private and public spectrum holders more aware of its potential value. Nevertheless, the FCC's decision to quickly move forward with a public auction will achieve many similar benefits.

Conclusion

The upcoming C-band auction illustrates that the FCC is willing to quickly conduct an auction that creates appropriate incentives for both current spectrum holders and those that might be able to better utilize it. The C-band auction should serve as a signal to other spectrum holders that there may be an economic reason to engage in an auction for spectrum they are no longer using to its highest value. While a private auction would be better in certain respects, an expeditious public auction achieves many of the same benefits.

Ensuring the rapid development and deployment of 5G should remain a bipartisan priority. The C-band auction is another step toward expanding this next-generation telecommunications technology that will serve as critical infrastructure for emerging technologies and connected devices. As policymakers work to encourage 5G development, they should consider how the C-band auction serves as a useful model. Policies that employ market-based incentives encourage fast deployment and maximal innovation—both of which are essential as the United States races to deploy 5G.