Testimony of Coleman Bazelon before the U.S. House of Representatives, Committee on Energy and Commerce, Subcommittee on Communications and Technology

November 16, 2017

I would like to thank the Committee for the opportunity to testify today on this important topic. I started my career as an analyst at the Congressional Budget Office just as the second generation cellular services were beginning to be deployed. The developments of third and fourth generation technologies have helped fulfill the promise of wireless. The same will be true with 5G, which will bring unprecedented speeds and low latency to wireless networks, supporting new applications and the development of an Internet of Things. And as with those earlier developments, additional spectrum is needed to fulfill the 5G promise.

Unlike the previous technological advancements, 5G combines new technologies with a new architectural model of how spectrum is deployed. The architecture of a robust 5G network will require spectrum in a variety of bands: "low-band" spectrum below 1 gigahertz for wide-area and long-range communications; "mid-band" spectrum between 1 and 6 gigahertz for applications that would benefit from a combination of coverage and capacity; and "high-band" spectrum for short range communications requiring fast data rates and low latency. To effectively use these spectrum bands, a 5G network will require the deployment of millions of small cells along with a growing number of macro cells. All three pieces of this "spectrum trifecta" will be crucial for the successful deployment of 5G networks.

The Principle of Spectrum Reallocation states that when the value of a band of spectrum in a new use exceeds its value in an existing use, plus the cost of transitioning the frequencies, it should be reallocated. This simple principle—that benefits should exceed costs—can face many obstacles in practice. Incumbent users, whether TV broadcasters or government agencies, tend to be reluctant to relinquish spectrum assignments. Consequently, mechanisms where incumbents are compensated are beneficial because they help overcome resistance. In fact, anything that can be done to smooth the transfer of spectrum is helpful. For example, the recently introduced Spectrum Auctions Deposit Act—which overcomes impediments identified by Chairman Pai to holding spectrum auctions—will facilitate future auctions and the Spectrum Reallocation Fund should help provide frequencies for those auctions.

These new 5G deployments will have profound implications for spectrum value. On the one hand, being able to integrate massive amounts of high-band spectrum into commercial mobile networks will flood the market with spectrum capacity, at least in denser, more populous areas and for applications that can utilize the higher frequency spectrum. On the other hand, these new networks will enable new wireless services and increase consumer expectations about throughput and reliability. The net impact of these two offsetting effects is uncertain and overall spectrum values could go up or down.

But, within the overall net impact on spectrum values, there are clear implications for different types of spectrum from increased user expectations for throughput, mobility and latency that will be fostered by the new 5G deployments. The value of mid-band spectrum used for capacity outside of the areas served by high-band 5G deployments should increase because demand for network capacity—reset to a user experience based on a higher level of throughput in the urban areas—will be greater in those non-urban areas.

The Principle of Spectrum Reallocation is applicable to all bands that make up the 5G spectrum trifecta, but I will focus on mid-band spectrum, the connective tissue of 5G deployments. In my accompanying paper submitted to the Committee that CTIA released yesterday, I examine the value of making an additional 100 MHz of mid-band spectrum available in the 1,300–1,350 MHz and 1,780–1,830 MHz bands. After accounting for a moderation in spectrum value compared to recent highs, I find that a 50 + 50 MHz paired band would be expected to raise $63 billion in auction receipts. Making those frequencies available are expected to cost up to an estimated $8 billion to relocate existing users, providing them with at least equivalent and, in many cases, improved wireless infrastructure. Consequently, this band would be expected to raise $55 billion in net receipts. Admittedly, there is some amount of uncertainty when forecasting future auction receipts. Frankly, it is not for the faint of heart. But so long as an auction of this 100 MHz of mid-band spectrum raises more than $8 billion—a paltry amount for so much spectrum that can be used for mobile broadband—reallocating the federal users and auctioning the reclaimed spectrum will create value.

The application of the Principle of Spectrum Reallocation does not end here. For example, all or part of the 3.7 to 4.2 GHz band could be valuably deployed in support of 5G networks. I have investigated this band and found that even with conservative assumptions about value of both existing C-band services and potential new deployments, reallocating some or all of the band would likely create value. A voluntary mechanism that ensures incumbents benefit from any transition will help facilitate making additional needed frequencies available for new 5G networks.

Thank you.