

TESTIMONY: United States Senate Commerce Committee Hearing:
“America Offline? How Spectrum Auction Delays Give China the Edge and Cost Us Jobs.”
Russell Senate Office Building, Room 253 (Feb. 19, 2025, 10:15 AM)

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Thank you for your invitation to participate in today’s discussion of radio spectrum allocation. I am an economist who has studied this and related issues, publishing numerous research articles and books on the topic,¹ formerly serving as Chief Economist of the Federal Communications Commission, and currently serving as a co-principal investigator of SpectrumX, an NSF Spectrum Innovation Center.

Radio spectrum is a vital component of the modern economy. The airwaves through which communications flow – enabling mobile networks, connections to Internet services, satellite links, and a host of other stunningly useful applications – is limited in supply. But regulatory restrictions have made it even more restricted than nature and economic demand alone. Artificial scarcity has been imposed by public policies that prevent entrepreneurs from moving under-utilized spectrum resources into their highest valued uses.

Such impediments have long been a problem of traditional spectrum allocation. Dating to the 1927 Radio Act, a statute still dictating the basic structure of regulation, many facets of law require *Mother May I?* The term of art describes the slow process wherein idle bandwidth is discovered, defined in scope, and then transitioned into productive employments. Needless permissions and red tape too often limit markets and impede America’s economic growth. Bands have been reserved for maritime communications in Utah. The Forestry Service has enjoyed exclusive frequency rights in New York City. And today, some 35 channels from the TV Allocation Table of 1952 are still reserved for terrestrial, over-the-air broadcasting. *I Love Lucy* might have benefited from this arrangement back in the day, but we now have more efficient means to deliver video using cables, satellites, and broadband Internet.

But too often such opportunities are greeted with a spectrum strategy of “hurry up and wait.” The famous scientist Edwin Howard Armstrong could, in the 1930s, invent FM radio, a hi-fidelity technology superior to the old AM, only for FCC machinations to prevent its eventual blossoming until the 1960s. The World War II invention of cellular radio ran into a licensing roadblock that delayed wireless telephone networks until the 1980s. Spectrum wars in bureaucratic trenches pit industries against each other, with the upshot that vast bands – and better networks – may go idle for a lifetime.

These long lags continue to plague entrepreneurial ventures, reduce competition, and frustrate wireless consumers desiring more bandwidth for enhanced communications. Yet, the

¹ See, e.g., Thomas Winslow Hazlett, *THE POLITICAL SPECTRUM: THE TUMULTUOUS LIBERATION OF WIRELESS TECHNOLOGIES, FROM HERBERT HOOVER TO THE SMARTPHONE* (Yale University Press, 2017).

good news is that U.S. policy has not been static. American regulators have occasionally taken corrective actions to promote liberalization. In particular, market-oriented policies have relaxed mandates for how spectrum must be utilized. In granting users and licensees wider discretion via “flexible-use spectrum rights,” enormously valuable new competitive forms have been unleashed. Today, over ten times as much bandwidth is available for mobile wireless use than in the mid-1990s. In addition, competitive bidding – auctions -- assigns such rights, replacing arbitrary distributions prior to 1994. The trick, however, is that in the underlying allocation process itself, administrative designations are still largely used to define the nature, location, and rules governing what technologies, services, and business models are to be made available for deployments.

Recent decades have brought experiments with new methods, and even the once hidebound FCC has innovated.² In 1994, the introduction of what became known as second generation cellular, or 2G wireless, was held up for some years by protests registered by holders of micro-wave allotments. The incumbents claimed catastrophe would result from any change in band access rights.

As is (was) often the case, such claims were overwrought. The situation was put into clearer focus, and resolved, by a clever FCC policy, an “overlay.” This approach granted emerging 2G networks the rights to utilize vacant frequencies in the micro-wave band under “flexible use” rules. Further, the overlays granted the new licensee secondary rights over spectrum occupied by the micro-wave transmissions. This protected incumbents but gave life to entrants by defining the spectrum access rights needed for bargains to be struck. Investors in 2G networks were able to pay incumbents to move aside – using alternative technologies or other frequencies – so as to free up bandwidth for higher valued services. The hold-up ended, airwaves became available, and the U.S. – then lagging E.U. countries in digital wireless -- began to innovate and forge global leadership in emerging network services.

The overlay policy has since been used in numerous contexts by U.S. regulators.³ The 2016-2017 “Incentive Auction” moved 70 MHz allotted to TV broadcasts to flexible use spectrum rights won at auction by mobile carriers; broadcasters were paid to economize on airwave usage with funds bid by the new licensees. Incentive payments to incumbents were also paid from auction revenues in Auctions 101 (2019) and 103 (2020). Overlays were then modified in Auction 107 held in 2020-2021, restructuring the Satellite C-Band. The 500 MHz allocated there had appeared crowded, congested, and unavailable to entrants. In fact, with payments to incumbents, some 280 MHz of prime mid-band spectrum became available for reallocation to entrants. Winning bidders paid \$94 billion for the licenses. Of that total, some \$13 billion was passed through to the incumbent users of the band, satellite operators. The transfer enabled the companies to upgrade their systems while reducing their spectrum footprint – “relocation costs and incentives” in FCC parlance. This capacious tranche of new flexible-use

² Former FCC Member (and Chair) Jessica Rosenworcel summarized the new spirit of change this way: “When it comes to wireless policy, we have a history of embracing the ideas that are cool, kooky, and new before anyone else. After all, it was more than two decades ago that we took the academic ideas of Ronald Coase and ushered in a whole new era of spectrum auctions. We also pioneered the use of unlicensed spectrum—the airwaves we now know and use every day as Wi-Fi. More recently, we blazed a trail for two-sided incentive auctions.” Statement of Commissioner Jessica Rosenworcel, FCC 19-96 (Rel. Sept. 27, 2019), p. 34.

³ Hazlett, *THE POLITICAL SPECTRUM*, 276-287.

spectrum was the largest ever released by the FCC for auction in one proceeding, and it energized U.S. 5G build-out. The rapid manner in which the policy was crafted and executed was also notable. From a Notice of Inquiry in July 2017 to the conclusion of bidding in Feb. 2021, a relatively short timetable departed from the long delays that the FCC has too often witnessed.⁴

Such mechanisms have improved incentives for cooperation in the process of radio spectrum reallocation. They lubricate transitions that enable the adoption of advanced methods of spectrum sharing, a term that is too often narrowly seen as top-down administrative rules. Most significantly, they help identify where consumers most value airwaves, revealing opportunities for new models and increasingly useful technologies. With attention to economic incentives, demonstrated in both encouraging and disappointing results exhibited in spectrum policy experiments, pro-consumer strategies have been discovered. Many more targets of opportunity for efficient reforms in radio spectrum await.

⁴ Even a generous accounting led the FCC to estimate standard delays as 6-11 years. See: FCC, *National Broadband Plan* (March 2010), p. 79.