

**Before the
NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION
Washington, D.C. 20230**

In the Matter of)	
)	
Development of a National Spectrum Strategy)	Docket No. 230308-0068
)	

COMMENTS OF THE DIGITAL PROGRESS INSTITUTE

I. Introduction

“America is increasingly dependent on secure and reliable access to radio frequency spectrum.”¹ Thus begins NTIA’s request for comment on a National Spectrum Strategy. And the Digital Progress Institute heartily agrees: The work of NTIA and the FCC in reforming and refarming radiofrequency spectrum has created the modern Internet economy, transformed entertainment, transportation, education, healthcare, and numerous other industries, created trillions in consumer surplus, and raised hundreds of billions of dollars for the federal coffers. If America is going to beat China and win the race to 5G and beyond, it must continue that important work.

In producing a National Spectrum Strategy, NTIA should start by learning from what has worked and what has not worked in the past. For example, NTIA should look to our previous national spectrum strategy to Facilitate America’s Superiority in 5G Technology, known as the 5G FAST Plan.² That plan resulted in the refarming of spectrum in the 600 MHz, 800 MHz, and 900 MHz bands, historic auctions in the 2.5 GHz, 3.45 GHz, 3.55 GHz, and 3.7 GHz bands (including the nation’s first Rural Tribal Priority Window and record-breaking C-band auction), the opening of almost 5 gigahertz of millimeter-wave spectrum for commercial use (including through the nation’s second incentive auction), and vast new opportunities for Wi-Fi and other unlicensed technologies in the 5.9 GHz and 6 GHz bands.

One key to the 5G FAST Plan’s success was the identification of specific, actionable bands of spectrum that were underused at the time but highly valuable if reformed. Given the global marketplace for spectrum-based equipment, that meant looking at what spectrum was being targeted by other nations for flexible use licensing and unlicensed use—after all, spectrum with no equipment is of little value. Another key to success was allowing sound economics and engineering to drive the government’s decision-making. For example, the FCC did not initially set a target for how much spectrum to repurpose in the C-band but instead made its decision after engineering studies showed that existing services could be repacked in as little as 200 megahertz with a 20 megahertz guard band. Similarly, the Commission gave users in the 39 GHz band flexibility to join the incentive auction or not depending on their own estimates of the value of their current uses of that spectrum.

¹ NTIA, Development of a National Spectrum Strategy: Request for Comment, 88 Fed. Reg. 16244 (Mar. 16, 2023).

² FCC, The FCC’s 5G FAST Plan, <https://docs.fcc.gov/public/attachments/DOC-354326A1.pdf>.

Accordingly, the Digital Progress Institute strongly encourages NTIA to be concrete and incremental in writing that National Spectrum Strategy. It's better to identify the bands for study and pursue reform where the economics and engineering make sense than set an artificial target for reform that can quickly become not a floor, but a ceiling on what should be done. It's better to follow and enforce existing processes to manage federal users and account for long-term planning than to start with a *tabula rasa*. And it's better to actually deploy technologies that we know can improve spectrum management now rather than await a some new baublesque technology that promises to solve all problems.

Finally, NTIA must recognize that to lead necessarily means some will oppose its work—a leader cannot be everything to everyone. The Digital Progress Institute has faith that Secretary Alan Davidson and the rest of NTIA's leadership will recognize the role granted them by the President and Congress and bring about real reform.

II. A Spectrum Pipeline to Ensure U.S. Leadership in Spectrum-Based Technologies

To start, the Digital Progress Institute wholly agrees that a “spectrum pipeline is essential to continue our nation’s economic growth” and “to improve our global competitiveness.”³ Such a pipeline is also important for giving federal uses—and the commercial contractors that design and create the equipment used by those users—a clear view on what's to come. A spectrum pipeline is all the more necessary given the imbalance of spectrum resources available in the mid-band between federal users and non-federal users; with about 3,300 megahertz of legacy spectrum in federal hands, a pipeline to reform and refarm that spectrum would put American on track to lead.

As such, the Digital Progress Institute strongly recommends that NTIA adopt a spectrum pipeline that identifies several bands for near-term action, without placing an artificial cap on the total amount of spectrum to be reformed.

Notably, some aspects of that pipeline are already in place, although execution has been lacking. For example, NTIA and the FCC identified the 1300-1350 MHz band for clearing back in 2015—and yet there has been little movement on this front. Similarly, federal agencies began collecting information about their operations in the 7.125-8.4 GHz band back in 2018—five years later, it appears they are still gathering information. Moving forward on each of these bands should be a priority.

Other aspects of the pipeline are well known. For example, the federal government has long made light use of the 3 GHz band, and the FCC and NTIA have worked over the past six years to reform and refarm that spectrum. Moving forward on the last piece of that band, the 3.1-3.45 GHz band, should be a priority. Similarly, many countries are starting to license the 4.4-4.99 GHz band for 5G and beyond. Transparently examining the federal operations in this band and whether they need to be conducted using this spectrum could aid in freeing up 500 megahertz for commercial use.

Similarly, unlicensed operations have long thrived in the 5 GHz band, but federal operations have severely restricted the bands most intensive use to the high end of the band.

³ NTIA, Development of a National Spectrum Strategy: Request for Comment, 88 Fed. Reg. at 16245. Given NTIA's role in overseeing the federal use of spectrum, the Digital Progress Institute will generally confine its comments to spectrum bands that are either exclusively federal use or shared between federal and non-federal use.

NTIA should work with the FCC to reduce limits on unlicensed operations in the band, especially in the U-NII-2C band (5.47-5.725 GHz) as suggested by Commissioner Brendan Carr.

Finally, NTIA should complete its work with the FCC to authorize more effective and intensive use of point-to-point and point-to-multipoint communications in shared spectrum bands such as the 70/80/90 GHz bands. By creating new service opportunities at lower regulatory costs, these bands can play a role in offloading both commercial and federal users from microwave point-to-point systems in lower bands.

III. Long-Term Spectrum Planning

The Digital Progress Institute applauds the work that NTIA and the FCC have conducted in developing and implementing the Spectrum Coordination Initiative. What is more, the Digital Progress Institute lauds the work of the FCC's Technical Advisory Committee and NTIA's Commerce Spectrum Management Advisory Committee, both of who play keep roles in ensuring good spectrum management.

The Digital Progress Institute respectfully submits that traditional long-term planning by NTIA and the FCC have largely been successful, with two caveats. As explained in the attached white paper in Exhibit A,⁴ the Digital Progress Institute and Public Knowledge explain that NTIA must reassert itself as the lead executive branch agency on spectrum matter and remind federal agencies that they should leverage the interagency process by submitting all federal spectrum concerns to NTIA as opposed to airing their complaints with the FCC or the public. What is more, NTIA should reiterate to federal agencies that, as the congressionally designated independent expert on spectrum matters, those agencies should respect the role and expertise of the FCC. Doing otherwise will only thwart any further efforts to roll out 5G, next-gen Wi-Fi, and other services to the American public.

IV. Unprecedented Spectrum Access and Management Through Technology Development

While new technologies can present amazing new opportunities, sometimes a focus on such technologies distracts from more obvious solutions at hand. And over the past two decades, it's clear that the largest and most contentious fights over spectrum policy often are tied to one of the most basic technologies: receivers.

Consider, for example, the hubbub that arose in 2021 with the launch of service in the lower C-band (3.7-3.8 GHz). Despite a 400-megahertz guard band between that service and aircraft receivers, the Federal Aviation Administration nonetheless grew concerned of possible potential interference and ultimately ordered a subset of aircraft to replace their receivers. Had the Federal Aviation Administration imposed tighter receiver standards on aircraft so that radiofrequencies outside of their band (i.e., below 4.2 GHz) quickly sloughed off, there would have been no controversy at all. And the cost to the industry would have been nominal (even the cost to uninstall and replace existing receivers was paltry)—this was a failure of spectrum management plain and simple.

⁴ See also https://digitalprogress.tech/wp-content/uploads/2022/03/InteragencyProcess_DPI_PK.pdf.

The FCC itself has recognized the importance of improving receivers as a matter of good spectrum policy, and this month is voting on a policy statement should would set forth several principles to guide receivers. At a high level, these principles state that receiver manufacturers must recognize the radiofrequency environment “is highly variable” and “increasingly noisy,” that they should plan to take into account that environment as well as nearby operations in designing services, that “receivers should be designed to mitigate interference from emissions outside of their service’s assigned frequencies,” and that “radio systems should use good engineering practices to mitigate degradation from interference.”⁵

NTIA should adopt and incorporate these same principles for receivers into its National Spectrum Strategy and, more importantly, require federal users and the contractors that work for federal users to start implementing these principles quickly. Indeed, good receiver design may mitigate much of the need for new spectrum-sharing technologies as whole new bands of spectrum, previously avoided due to interference concerns, suddenly become usable.

* * *

Consumer demand for mobile data is at an all-time high and only continues to surge as demand grows for lightning-fast and responsive 5G products and services. With the recent introduction of an additional 1,200 megahertz of unlicensed spectrum in the 6 GHz band, new generations of Wi-Fi and other unlicensed uses are at an inflection point. What is more, we have all but run out of usable commercial spectrum to license out to accommodate today’s market demands. It is clear we need to reform more spectrum for commercial use to ensure America’s leadership position in 5G and beyond.

The National Spectrum Strategy is an opportunity for NTIA to reassert its authority and develop a workable spectrum pipeline that reduces the federal footprint and empowers American industry. The Digital Progress Institute believes that NTIA, and its partner the FCC, are well positioned to take that lead and deliver real reform.

Respectfully submitted,

/s/ Joel Thayer
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April 17, 2023

⁵ FCC, Fact Sheet: Principles for Promoting Efficient Use of Spectrum and Opportunities for New Services, FCC-CIRC2304-01 (vote scheduled for Apr. 20, 2023).

EXHIBIT A



Digital Progress Institute

Public Knowledge

The Interagency Process and Its Importance in Securing the Future of 5G

Joel Thayer and Greg Guice

March 2022

Introduction

5G will revolutionize how we engage with our mobile devices. The term “device” in the 5G context is not limited to mobile phones or tablets but will also include heart monitors, electric grids, and even cars as they use these networks to operate. Although we have not fully realized the innovations from 5G, we know that we will need more spectrum to power the 27.5 billion devices on our networks within the next few years. For the uninitiated, spectrum is the invisible real estate enabling wireless connectivity. The Federal Communications Commission (FCC) is responsible for allocating spectrum for commercial uses, like 5G. The National Telecommunications Information Administration (NTIA) is responsible for managing federal spectrum use, which accounts for as much as 60 percent of usable spectrum. In order to ensure efficient use and to prevent harmful interference between commercial and federal users, the two agencies have established an interagency process to coordinate on proposed actions related to spectrum usage.

As spectrum usage has intensified since the 1990s, the need to put more spectrum to use for commercial purposes has grown as well. Federal spectrum has often been a source of spectrum that can be converted to commercial use. However, some agencies have demonstrated that they are not too keen on vacating or sharing spectrum with commercial players. This reality creates a lot of complexity for the FCC in rolling out 5G as it serves as a considerable barrier in allowing wireless carriers to build out their networks and technology companies to develop products that utilize unlicensed or shared spectrum. The Federal Aviation Administration (FAA) is the most recent example in a string of agencies that voiced last-minute concerns related to the FCC opening up more spectrum for 5G. The interagency process is meant to address these concerns, but, unfortunately, agencies’ latest actions all too often undermine that process.

We write this paper as a tool to: 1) outline why the FCC is the appropriate authority to resolve commercial spectrum disputes; 2) outline how the interagency process works and the role the NTIA plays in resolving issues with government spectrum incumbents; and 3) demonstrate the importance of coordination by reviewing a few recent examples of government agencies circumventing this interagency process and the problems that has created.

I. Why Congress Gave the FCC the Authority to Resolve Spectrum 5G Disputes

Before getting into the various disputes, it is essential to understand why the FCC exists in the first place and where it gets its authority to manage commercial spectrum. Therefore, this section outlines the underlying principles that define why Congress gave the FCC the final word in commercial spectrum disputes.

A. Why We Need an Agency to Resolve Spectrum Disputes

When creating an independent agency to allocate and manage commercial spectrum, Congress was trying to solve a problem: the tragedy of the commons. The tragedy of commons is an economic issue in which every person has an incentive to consume the same resource without a way to control any person’s consumption of that resource. For example, let’s say a farmer owns a field where his cows, goats, and horses graze. If the farmer does not allot specific plots to each of his chattel, then each of those constituencies will deplete the field—most likely in an inequitable

manner. Alternatively, suppose the farmer parsed out each animal's area based on their individual need. In that case, there's a likely chance that the animals will get their fill and a less likely chance the animals will deplete the field or, better yet, give the farmer a chance to use other areas of the field for other things, like growing crops.

In our case, the FCC is the farmer, and the field is spectrum. Thus, the cows, goats, and horses represent users of that spectrum. Theoretically, the FCC ensures through the act of allocating spectrum licenses that there is enough spectrum to go around, and licensees don't interfere with the other. In general, that's the FCC's role in spectrum allocation.

B. Why Congress Chose an Independent Agency to Ensure Commercial Players and Government Entities Can Both Use Spectrum

Congress realized early on that giving an executive agency—like the Department of Commerce—the authority to regulate spectrum would create a massive conflict of interest in resolving spectrum disputes. The reason is that the Executive Branch is a significant user of spectrum, and it would be difficult for a cabinet Secretary to be impartial when deciding either to grant a license to a commercial carrier or another executive agency.

To further the point, it's important to understand the history of spectrum policy. Initially, Congress delegated the duty of allocating spectrum to the Department of Commerce in 1912.¹ However, the use of radio waves to transmit communications was in its infancy, and the Department's role was simply to issue licenses to prevent interference with other government uses (e.g., interference with police radios systems or military uses).² However, as the use of spectrum changed, so too did the need for an expert and independent (meaning apolitical) agency to handle these complex transactions. So, in 1927, Congress removed the duty of distributing commercial spectrum licenses from the Department of Commerce and created the Federal Radio Commission to limit the amount of influence any administration could have over spectrum allocations.³

The reason becomes clearer when leveraging our farm analogy. If Congress were to allow the Department of Commerce to make all spectrum decisions, then this delegation would be akin to having the horse wrangler determine how large a plot the goats and cows receive. The chances are that this bodes well for the horse but not for the other animals because the wrangler's expertise may not extend to those other animals, which, in turn, can promote his allotment bias toward the horse. Hence, having the impartial farmer take in the input from the wrangler and all the other constituencies, there is a better chance the field distribution would be equitable.

A key reason Congress created the FCC rests on the fear that letting the executive branch issue radio licenses would result in too much government control over broadcast content, as seen in Europe at the time. Moreover, Congress felt, left up to an agency under the President's direct authority—like the Department of Commerce—there would be a solid incentive to hoard more

¹ Thomas Hazlett, *Assigning Property Rights to Radio Spectrum Users: Why Did FCC License Auctions take 67 Years?*, 41J.L. & Econ. 529 (1998).

² *See id.*

³ Federal Radio Act of 1927, P.L. 69-632, https://en.wikipedia.org/wiki/Radio_Act_of_1927. This was subsequently incorporated into the Communications Act of 1934.

spectrum for itself, leaving little, if any, for commercial uses. In other words, Congress did not want to have the parochial actors, such as the horse wrangler, to decide for the other animals. Instead, Congress created an impartial agency (i.e., the FCC) to settle these disputes while the NTIA serves as a central mechanism to keep individual agencies from seizing spectrum. Hence, in 1993, after Congress authorized the FCC to start auctioning spectrum, Congress created the division of labor between the NTIA to address federal use of spectrum and FCC to handle non-federal use.⁴

The concern over the President usurping more authority over agencies only grew after the creation of the FCC,⁵ and still grows today. For example, the Department of Defense (DoD) sits on a significant amount of C-Band, which is a valuable spectrum band for 5G.⁶ Instead of parsing out spectrum the DoD is not using, it intends to force carriers—in this case, Verizon—into sharing arrangements with it to maintain its control.⁷ Thankfully, the DoD does not control the entire band, and much of it the FCC auctioned off for commercial 5G services.⁸ Because of the FCC’s independence from the Executive Branch, the DoD can hold its spectrum, while the FCC can auction off other non-federal parts of the band to commercial users.

The important takeaway here is that the FCC is the premiere authority on non-federal use spectrum. The FCC doesn't regulate the federal government’s use, but Congress requires the NTIA to work with the FCC when the FCC decides to open up new bands for non-federal use. Federal operations are limited to what the federal government is doing, and needs sign-off from the President (delegated to the NTIA through the Department of Commerce). The individual agencies don't get to just do what they want.

II. What is the NTIA and the Importance of the Interagency Process in Facilitating Sound Spectrum Policy

A. Origin of the NTIA

While the FCC has clear authority over commercial (and public safety) spectrum for purposes of allocating spectrum, setting the rules for use of such spectrum, and controlling the license terms of spectrum, there is another agency charged with managing federal spectrum use and coordinating the commercialization of federal spectrum for a variety of uses. That agency is the National Telecommunications and Information Administration (NTIA), which is part of the

⁴ See 47 U.S.C. §§ 923-26.

⁵ Paul Verkuil, *The Purposes and Limits of Independent Agencies*, 1988 Duke L. J. 257 (1988) (writing “President Roosevelt was being advised by the Brownlow Committee to place the independent agencies under executive departments in order to manage administrative policymaking.”).

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<https://www.defense.gov/News/Speeches/Speech/Article/2307288/department-of-defense-statement-on-mid-band-spectrum/>.

⁷ <https://www.fiercewireless.com/operators/dod-picks-verizon-to-install-5g-c-band-at-7-air-force-bases>.

⁸ *In the Matter of Expanding Flexible Use in the 3.7-4.2 GHz Band*, GN Docket No. 18-122, Report and Order, Order Proposing Modification, 35 FCC Rcd 2343 (3) (2020) (C Band Order).

Department of Commerce.⁹ Prior to its establishment by Congress in 1992, the NTIA had existed under Executive Order since 1978 (and in various other iterations even prior to that time).¹⁰ The NTIA plays a critical role in ensuring the spectrum needs of federal agencies through coordination of those needs with regards to federal spectrum, and coordinates commercialization of spectrum as the representative of those agencies with the FCC.¹¹

Thus, under the farm analogy, the NTIA manages a portion of the farm's field (i.e., spectrum)—think horse wrangler—that has been set aside to ensure that the various farm animals and crops in that portion (federal agencies) have their needs met, but also to ensure that the overall health of the farm itself is sustainable and serves the needs of the larger economy. In order to achieve that objective, the farm hands managing the NTIA portion of the farm have to coordinate with the FCC farm hands to balance complementary and sometimes competing interests involved in bringing spectrum to market.¹²

For purposes of this paper, we will focus on two aspects to the interagency process, namely meeting the spectrum needs of federal users and representing those agencies in negotiations with the FCC on commercializing spectrum.

A. Federal Spectrum Users

The NTIA allocates and assigns spectrum to federal users and is responsible for overall management of federal spectrum use. To ensure it has the technical expertise, the NTIA employs a team of engineers and manages its independent labs to assess spectrum concerns that may be raised by other agencies. In addition to the technical support, the NTIA utilizes an advisory committee, the Interdepartmental Radio Advisory Committee (IRAC), which the NTIA chairs, that has representatives from 19 federal agencies.¹³ The IRAC advises on a range of issues, including federal user assignments, spectrum use planning for agencies, technical standards, and coordination. Advice from the IRAC is developed through a subcommittee structure that specializes in particular objectives related to the NTIA's authority.¹⁴ While the FCC is not a member of the IRAC, it does have a designated liaison representing it on each of the subcommittees.

The goal of the assignment process is to ensure that federal users have the spectrum they need and can operate in a manner that does not cause harmful interference to other users in the band

⁹ The NTIA has a much broader mission that goes beyond spectrum management and coordination. Additional details are available in the *Manual of Regulations and Procedures for Federal Radio Frequency Management (Redbook)*, available [here](#) at Chap. 1.1, Sec. 6 (hereinafter “Redbook”).

¹⁰ See *A Short History of NTIA* available [here](#).

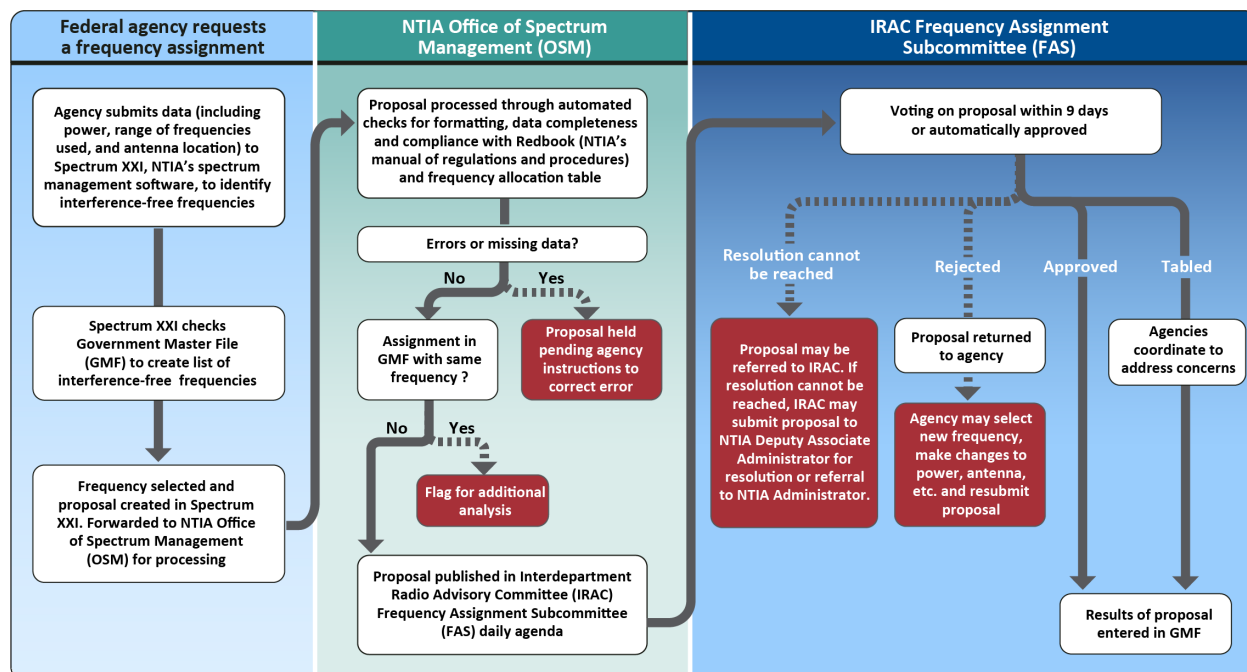
¹¹ *Id.* at Sec. 6(j).

¹² NTIA is statutorily mandated to meet with FCC twice a year to facilitate planning future federal and nonfederal spectrum needs and the reallocations necessary to meet them. 47 U.S.C. § 922; see also, 47 U.S.C. § 902(b)(2)(L)(i).

¹³ Details on federal agency participation in the IRAC is available [here](#).

¹⁴ The Subcommittees are: Emergency Planning Subcommittee (EPS), Frequency Assignment Subcommittee (FAS), the Radio Conference Subcommittee (RCS), the Space Systems Subcommittee (SSS), the Spectrum Planning Subcommittee (SPS), the Technical Subcommittee (TSC), and the Secretariat. More on their particular functions can be found in the [Redbook, Sec. 1.3.2](#).

where they intend to operate. As for the assignment process, once an evaluation by an agency is conducted and a proposal for use is received, the frequency assignment can take place in as little as nine days from the date of filing, assuming it clears for completeness and is an available frequency.



Source: GAO analysis of National Telecommunications and Information Administration (NTIA) information. | GAO-22-104537

Following the approval, the NTIA requires federal agencies to conduct 5- or 10-year reviews of their assignments to ensure that assigned spectrum data are still accurate.¹⁵ As part of the proposal process, the NTIA has directions that apply generally and specific requirements for specific bands that federal agencies must comply with in order to seek an assignment. Applications are reviewed by the Frequency Assignment Subcommittee of the IRAC for approval.

Where a dispute arises between federal agencies or a Frequency Assignment Subcommittee (FAS) member agency finds an issue with an application, the FAS will first seek to resolve the issue or correct the application so it can be approved.¹⁶ However, if the FAS and the applicant are unable to resolve the dispute, applications can be referred to the IRAC for consideration.¹⁷ Where the dispute cannot be resolved with the IRAC, the matter is referred to the Deputy Associate Administrator of the Office of Spectrum Management at the NTIA, who resolves them or refers them to the NTIA Administrator for a decision. Federal frequency assignment decisions made by the NTIA Administrator may be appealed to the Director of the Office of Management and Budget.

¹⁵ *Spectrum Management: NTIA Should Improve Spectrum Reallocation Planning and Assess Its Workforce*, GAO-22-104537, available at <https://www.gao.gov/assets/720/718710.pdf>, n. 25.

¹⁶ *Redbook*, Sec. 8.1.1

¹⁷ *Id.*

B. Coordinating on Spectrum Commercialization

The second mission of the NTIA, for purposes of this paper, is to work with federal agencies in determining whether commercial use of certain federal spectrum bands can occur and to then coordinate with the FCC at both the staff and senior levels of the agencies to bring spectrum to market. The terms of this relationship are outlined in the 2003 Memorandum of Understanding (MOU) between the two agencies and included in the *Redbook*—the NTIA’s general rulebook for government spectrum management.¹⁸ The two agencies use this coordination to develop a comprehensive long-range spectrum management plan and to work closely on executing planned actions that lead to the commercial use of federal spectrum.

As a practical matter, the MOU creates a framework for staff in both agencies to find the balance between finding new or efficient uses of spectrum to enhance the economic opportunities, while ensuring that federal spectrum users’ needs are accounted for. It is through such coordination (and sometimes at the direction of Congress) that for the last three decades there has been an earnest effort to repurpose spectrum to meet current and future federal and commercial needs.

The interagency process has also fostered the incorporation of innovations to spectrum use that allows federal agencies to better meet their spectrum needs while still freeing up spectrum for commercial use. In particular, the FCC and the NTIA have worked over the last decade to incorporate more opportunities for spectrum sharing, which is “a framework that expressly accommodates multiple, overlapping types of spectrum use authorizations in a single frequency band and geography.”¹⁹ It was first proposed by the President’s Council of Advisors on Science and Technology (PCAST) in 2012,²⁰ and by 2013 the Obama Administration had issued an Executive Order calling on federal agencies to pursue sharing opportunities in recognition of the opportunity sharing presented for promoting efficient use and expediting commercial access to spectrum.²¹

That shift in policy was successfully tested in 2014 when the FCC adopted new rules for spectrum being made available in the Advanced Wireless Services (AWS) bands.²² That auction and sharing arrangement netted \$40 billion in proceeds, while also bringing an additional 40 MHz of spectrum to commercial use through sharing.

Between 2015 and 2018, the FCC adopted rules for the Citizens Broadband Radio Service (CBRS) in response to the NTIA’s 2010 decision to make the 3550-3650 MHz band available for

¹⁸ [Memorandum of Understanding Between the Federal Communications Commission and the National Telecommunications and Information Administration](#), Jan. 3, 2003. Prior to the signing of this MOU, the two agencies were operating under an MOU from the 1940s.

¹⁹ Leibovitz, John and Milkman, Ruth, [Taking Stock of Spectrum Sharing](#) at 9 (Sept. 3, 2021).

²⁰ President’s Council of Advisors on Science and Technology, [Report to the President: Realizing the Full Potential of Government-Held Spectrum to Spur Economic Growth](#) (2012) (PCAST Report).

²¹ Memorandum for the Heads of Executive Departments and Agencies, Expanding America’s Leadership in Wireless Innovation, 78 Fed. Reg. 37431 (Jun. 20, 2013).

²² The Federal Communications Commission And The National Telecommunications And Information Administration: Coordination Procedures In The 1695-1710 MHz and 1755-1780 MHz Bands, Public Notice, 29 FCC Red. 8527 (2014).

commercial sharing with shipborne and other radars operated by the DoD. The three-tier sharing arrangement adopted by the Commission allows DoD priority over all other operations in the band, with the middle tier prohibited from causing harmful interference to DoD's operations and bottom tier prohibited from interfering with either of the other two tiers.²³

Other instances of sharing have also taken place in the years since and sharing has become a valuable tool for increasing the efficient use of spectrum.²⁴ Sharing, however, underscores the importance of the interagency coordination process. In order for it to be successful, staff and senior leadership in both the FCC and NTIA, and participants in the various agencies, must align around the goal of sharing spectrum and even then technical coordination is critical at every stage of bringing the targeted spectrum to market. In the two above examples, much went right because of committed leadership in the agencies and from the White House, which is an important take-away about coordination: every aspect of the federal government must buy in and assist to bring the benefit to market.

A sign that the heads of the FCC and the NTIA know those lessons came during the drafting of this paper. On February 15, 2022, the FCC and the NTIA announced the establishment of a new spectrum coordination initiative. That initiative acknowledges what many who follow spectrum policy have witnessed: over the past few years we've seen the cost of not having a whole-of-government approach to spectrum policy.²⁵ The steps outlined in the release commit the agencies to re-establishing high-level meetings, renewed efforts to develop a national spectrum policy, an update of the MOU, a recommitment to an evidence-based spectrum compatibility analysis, and a commitment to technical collaboration. This is a promising sign that there is a recommitment to the interagency process at the highest levels of the agencies.

To help inform those efforts at revamping the interagency process it is worth reviewing what has gone wrong over the last few year so that there is a clear understanding of the forces that have driven efforts that have resulted in a destabilization of the benefit of coordination and the commitment needed to efficiently and expeditiously facilitate spectrum for commercial use.

III. Congress Gave the FCC Broad Authority to Regulate Non-Federal Spectrum

In Section 1 of the Communications Act, Congress created the FCC “[f]or the purpose of regulating interstate and foreign commerce in communication by wire and radio.” The FCC’s general delegation is to “execute and enforce the provisions of th[e Communications Act].” Statutes mainly found in Title III and other assorted provisions of and amendments to the Communications Act of 1934 (Act) provide the FCC with its authority over spectrum specifically.

²³ [3.5 GHz Band Overview](#).

²⁴ See generally, Leibovitz, John and Milkman, Ruth, [Taking Stock of Spectrum Sharing](#) (Sept. 3, 2021) (providing an overview of sharing as a regulatory policy).

²⁵ [FCC, NTIA Establish Spectrum Coordination Initiative: New Actions by Chairwoman and Assistant Secretary Advance U.S. Spectrum Policymaking through Updated Procedures, Closer Coordination, and Information Sharing](#), News Release (Feb. 15, 2022).

A. Congress via the Communications Act Intended to Make the FCC, Not the NTIA, the Final Say on Interference Disputes

Congress gave the FCC a lot of tools to manage spectrum, as compared to the NTIA or any other agency for that matter. First, Congress gave almost exclusive jurisdiction to the FCC to determine how commercial operators can use spectrum. Once the FCC has made its decision, the regulatory remedies available to aggrieved parties—including government entities—are limited to either petitioning for reconsideration at the FCC or filing in federal court.

Congress had many opportunities to provide the NTIA with more spectrum allocation authority, but it did not. Instead, Congress made several amendments to Title III to position the FCC further as the primary spectrum regulator. For instance, Section 301 of the Communications Act gives the FCC the authority to issue licenses for all intrastate and interstate spectrum uses.²⁶ Moreover, Title III of the Communications Act provides the FCC with significant discretion to define the contours of spectrum rights.²⁷

Congress also gave the FCC complete discretion to whom to grant a license.²⁸ The Act also permits the FCC to modify existing licenses to provide new and innovative technologies, such as the internet of things or 5G innovations.²⁹

As part of its licensing authority, the Act tasks the FCC with quelling interference concerns. For instance, Section 302 empowers the FCC “to regulate the interference potential of radio transmitters.”³⁰ Whereas Section 303 directly delegates the FCC the authority “to adopt such regulations as it deems necessary to prevent interference between radio stations and to encourage more effective use of radio spectrum in the public interest.”³¹ Moreover, Section 303(r) give the FCC authority to make rules to implement “any international radio or wire communications treaty or convention, or regulations annexed thereto, including any treaty or convention insofar as it relates to the use of radio, to which the United States is or may hereafter become a party.”³²

Further, Section 303 of the Act provides the FCC with the authority to: 1) determine the nature of services a licensee can render;³³ 2) determine licensees’ power levels;³⁴ 3) opening up bands for experimental licenses; and 4) study new uses for spectrum.³⁵ Additionally, the Omnibus Reconciliation Act of 1993 gives the FCC the explicit authority “to allocate electromagnetic

²⁶ 47 U.S.C. § 301.

²⁷ *E.g.*, 47 U.S.C. §§ 3(42); 303(b); 307(b); & 309(j)(6)(F).

²⁸ 47 U.S.C. § 309.

²⁹ *In the Matter of LightSquared Technical Working Group, et al.*, IB Docket No. 11-109, Order, 36 FCC Rcd 1262 (2) (2021) (denying National Telecommunications and Information Administration's Petition to Stay the Commission's April 2020 Ligado Order and Authorization to modify Ligado Network's license to provide 5G-IoT services).

³⁰ 47 U.S.C. § 302.

³¹ 47 U.S.C. § 303(f).

³² *Id.* § 303(r).

³³ *Id.* § 303(b).

³⁴ *Id.*(c).

³⁵ *Id.*

spectrum to provide flexibility of use.”³⁶ The FCC can even unilaterally modify existing spectrum licenses if, in the FCC’s estimation, it is in the public’s interest, “convenience, or necessity” under Section 316 of the Act.³⁷ However, the FCC must give the licensee or licensees at least 30-day notice before doing so.³⁸

It is worth noting that no other federal agency, including the NTIA, has rulemaking power relating to the use of spectrum by non-federal users. To the contrary, Congress expressly required in the 1993 Omnibus Budget Reconciliation Act that:

"no person or entity (other than an agency or instrumentality of the United States) shall be permitted...to operate a radio station utilizing a frequency that is authorized for the use of government stations pursuant to section 902(b)(2)(A) of this title for any non-government application unless such person or entity has submitted to the NTIA proof, in a form prescribed by such manual, that such person or entity has obtained a license from the Commission; and "no person or entity (other than an agency or instrumentality of the United States) shall be permitted, after 1 year after August 10, 1993, to utilize a radio station belonging to the United States for any non-government application unless such person or entity has submitted to the NTIA proof, in a form prescribed by such manual, that such person or entity has obtained a license from the Commission."³⁹

These statutes further solidify the FCC’s station as our primary spectrum regulator. Read as a whole, Congress unequivocally provides the FCC the requisite authority to find new uses for spectrum as it is our expert agency on that front, not any other agency.

B. The FCC’s Authority to Hold Auctions

Congress provides the FCC with narrow-auction authority over a specific group of frequencies for a particular purpose via a slew of different laws.⁴⁰ The FCC could not always auction spectrum and previously resorted to a cumbersome lottery system to distribute licenses. The FCC’s authority to auction off spectrum requires a specific Congressional delegation. FCC

³⁶ *FCC Spectrum Policy Task Force: Findings and Recommendations*, ET Docket No. 12-135, Report at p.8 (2002). Found here:

<https://www.fcc.gov/document/fcc-spectrum-policy-task-force-findings-and-recommendations>.

³⁷ 47 U.S.C. § 316(a)(1).

³⁸ *Id.*

³⁹ 47 U.S.C. § 903(e)(1)(3).

⁴⁰ *E.g.*, The Middle Class Tax Relief and Job Creation Act of 2012, P.L. 112-96, signed February 22, 2012 (mandating mandates spectrum license auctions for frequencies at 1915-1920 MHz; 1995-2000 MHz; 2155-2180 MHz; an additional 15 MHz to be identified by the FCC; and 15 MHz of spectrum between 1675 and 1710 MHz for commercial advanced wireless services); MOBILE NOW Act, 114th Congress, S. 2555, signed Mar 23, 2018 (requiring that the FCC and NTIA identify 255 Mhz of spectrum for fixed and mobile wireless broadband use by 2022 and at least 100 MHz for unlicensed use and at least 100 MHz for licensed use.);

Chairman Mark Fowler first petitioned Congress to use an auction to license spectrum in 1985; a request Congress denied.⁴¹

It was not until the Omnibus Reconciliation Act of 1993 that Congress first gave the FCC the requisite statutory authority to conduct auctions and held its first in 1994.⁴² Since then, the FCC has held over 100 auctions, bringing billions of dollars into the U.S. Treasury.⁴³ The FCC even has the authority to conduct a reverse auction. In a reverse auction, the FCC can encourage licensees to voluntarily relinquish their spectrum licenses to put into a pool where the FCC can redistribute spectrum rights for new uses, such as wireless broadband.⁴⁴ Congress has entrusted the FCC to make the calls necessary to hold auctions and determine the scope of those auctions.

In 2018, Congress passed the Making Opportunities for Broadband Investment and Limiting Excessive and Needless Obstacles to Wireless Act (MOBILE NOW Act) that required the FCC to find and auction off a significant amount of C-Band.⁴⁵ The MOBILE NOW Act is the primary statutory basis the FCC used to hold its recent C-Band 5G auction.⁴⁶

C. FCC Procedure to Promulgate Spectrum Policy

The point of this section is to demonstrate how the FCC takes in a myriad of advice and guidance from not just its own qualified engineers, but also from industry and other government agencies. Hence, there are no fly-by-night proceedings when it comes to spectrum allocation.

The FCC cannot act in a vacuum. Before it can institute a rule or licensing change that affects spectrum use, the FCC is required to consult the NTIA to establish whether any new use that results from an auction will affect government operations even before it initiates a proceeding. Moreover, Congress conditioned the FCC's initial spectrum authority on prior coordination with the NTIA.⁴⁷ In other words, the Communications Act (along with a Memorandum of Understanding signed by both agencies) requires the FCC to work with the NTIA when identifying new spectrum uses.⁴⁸ Moreover, under section 309(j), an auction involving federal users must make at least 110% of clearing cost to federal agencies to move federal users.

Once the FCC has taken the NTIA's initial concerns into account and feels prepared to address them, the FCC initiates a proceeding to open up a band, which is true in the case of an auction or an amendment to a license or group of licenses in a particular band.

⁴¹ Timothy C. Salmon, *Spectrum Auctions by the United States Federal Communications Commission*, Found here: <http://faculty.smu.edu/tsalmon/fccchapter.pdf>.

⁴² Salmon, *Spectrum Auctions by the United States Federal Communications Commission*, *supra* note 18.

⁴³ <https://www.fcc.gov/auctions-summary>.

⁴⁴ 47 U.S.C. § 309(j)(8)(G)(i).

⁴⁵ MOBILE NOW Act § 605(b).

⁴⁶ *In the Matter of Expanding Flexible Use in the 3.7-4.2 GHz Band*, GN Docket No. 18-122, Report and Order, Order Proposing Modification, 35 FCC Red 2343 at para. 6 (2020).

⁴⁷ 47 U.S.C. § 309(j)(10).

⁴⁸ Memorandum of Understanding Between the Federal Communications Commission and the National Telecommunications and Information Administration, at 1 (Jan. 31, 2003), <https://docs.fcc.gov/public/attachments/DOC-230835A2.pdf> (FCC-NTIA MOU).

The FCC's procedures for spectrum are extensive, and it is how Congress intended it to be via the Communications Act, specific laws (e.g., the Spectrum Act or the MOBILE NOW Act), and the Administrative Procedure Act (APA). The APA requires the FCC to articulate a rational connection between the facts found in its record and decisions it made in a particular proceeding.⁴⁹ One way for the agency to start the process of creating a record is for the FCC to put out a Notice of Inquiry to get early public input—this includes government agencies—to decide what procedure would best suit the public's interest (assuming Congress has not mandated a particular proceeding). This portion is true for an auction or even license renewals.

In the event the FCC decides that a rulemaking is necessary either by public input or Congressional mandate, then it requires an arduous procedure, which includes at least a few steps before we get final rules with the effect of law. The rulemaking process from NOI to auction takes years. For instance, the C-Band Order took about five years. The Spectrum Frontiers conversation technically started in 2007, but began in earnest in 2016 and was auctioned in March of 2019.⁵⁰

To promulgate rules for spectrum policy generally, the FCC puts out a notice of a proposed rulemaking (NPRM) after its NOI. The NPRM stage asks the public to comment on draft rules the FCC has proposed to see if they are suitable. Once the FCC publishes the NPRM in the Federal Register, the commenters—which can include government agencies—usually have 20 to 30 days to respond to the FCC. Once the initial comment period ends, the FCC rules allot another 10 to 15 days for commenters to file replies to the initial comments.

Once both initial comment and reply comment periods have concluded, the FCC starts its internal review process. However, members of the public and federal agencies can still voice their concerns via ex parte meetings. An ex parte meeting is an official meeting with the agency where the FCC hears concerns from individuals outside of the comment periods. The FCC requires each person or entity requesting an ex parte meeting to file a description of the meeting and with whom in the agency they met so that the public has notice of such participation and so the FCC can include the ex parte as part of the official record.

Commenters can also file letters to the FCC voicing their concerns or support of a particular action after the comment period has closed. For instance, the NTIA included several letters into the FCC well after the comment term expired in the FCC's 5.9 GHz WiFi proceeding.⁵¹ The reason the FCC allows this level of flexibility is to increase transparency into its process and ensure that its rule or rules are based on a thorough record. Once the FCC determines it has enough data, it either moves forward to a full order or puts out a limited order on the issues on which it feels have been fully fleshed out.

It can be even more difficult to change the parameters of an existing spectrum license. For example, it took the FCC nearly 20 years to modify Ligado Networks' license so that it could

⁴⁹ 5 U.S.C. § 706(2).

⁵⁰ <https://www.fcc.gov/auction/102/factsheet>.

⁵¹ See letter from Charles Cooper, Associate Administrator, Office of Spectrum Management, NTIA, to Mr. Ronald Repasi, Chief, Office of Engineering and Technology, FCC, dated Sept. 8, 2020.

deploy a low-power terrestrial nationwide network in the L-Band.⁵² Moreover, the FCC did not hand Ligado the reins to ensure it would not interfere with existing users—mostly for GPS capabilities, but, instead, put a slew of restrictions on the company’s new use of the spectrum based on a series of negotiations with the NTIA.⁵³

IV. Courts Have Consistently Deferred to the FCC Regarding Spectrum Disputes with Incumbents

Recently, industry players challenged the FCC’s authority to promulgate spectrum rules. However, before getting into those individual disputes, we examine the deference courts give the FCC generally.

A. How Courts Determine Whether an FCC Action is Valid

Understanding whether the FCC has authority to perform a particular action involves analyzing that action under the Supreme Court case *Chevron, U.S.A. v. Natural Res. Def. Council*.⁵⁴ The actual fact-pattern from the case is not relevant to our discussion, but its test is critical to understand. *Chevron* provides courts with a two-step test when evaluating any federal agency’s action or interpretation of its authority. The first question courts ask is whether “Congress has directly spoken to the precise question at issue.”⁵⁵ If the court determines that Congress has spoken to the issue, that usually means it’s game over for the agency’s decision, because the court will conclude that the agency’s rule is contradictory to the statute.

However, if a court determines that the statute in question is “silent or ambiguous” concerning the issue at bar, then the court must determine “whether the agency’s answer is based on a permissible construction of the statute.”⁵⁶ If the answer to the second question is “yes,” then the agency’s action is lawful and the court must defer to the agency’s interpretation. However, if the court finds that the agency acted arbitrarily, capriciously, or “manifestly contrary to the statute,” then the court can invalidate the agency’s interpretation or rule.⁵⁷ Hence, if the statute doesn’t say it or it cannot be reasonably interpreted as saying it, the agency action doesn’t fly.

In short, courts must ask itself:

1. Is the statute within the agency’s jurisdiction clear?
2. If not, was the agency’s interpretation reasonable or was it “arbitrary or capricious”?

The second prong of the *Chevron* test is usually the source of the litigation. Generally, courts question whether the FCC’s final order, interpretation, or action is directly reflected in the record or “logical outgrowth” of its NOI or NPRM. However, courts give a considerable amount of deference to the FCC when the agency interprets the Communications Act. The seminal cases

⁵² *In the Matter of LightSquared Technical Working Group Report, et al.*, IB Docket No. 11-109, Order and Authorization, 35 FCC Rcd 3772 (5) (2020) (Ligado Order).

⁵³ Ligado Order at paras 47, 48, 52, 54, 55, 67, 101, 103, 105, 145, & 146.

⁵⁴ 467 U.S. 837 (1984).

⁵⁵ *Chevron*, 467 U.S. at 843-44.

⁵⁶ *Id.*

⁵⁷ *Id.* at 844.

that explains how *Chevron* deference works in telecom law *Nat'l Cable & Telecom'n Ass'n v. Brand X Internet Services*⁵⁸ and *City of Arlington v. FCC*.⁵⁹

In *Brand X*, the Supreme Court refused to reverse the FCC's decision to define "broadband services" as an "information service"—a less regulated service—over a "telecommunications service"—a highly regulated service.⁶⁰ What this ruling, in effect, translates to is courts will almost certainly uphold the FCC's interpretation of statutes within its jurisdiction (e.g., the Communications Act, Telecommunications Act of 1996, or MOBILE NOW Act) if it's well-reasoned, which is established in its record that we discussed earlier.

The *City of Arlington* case took it one step further by applying *Chevron* deference to FCC decisions that don't require records. In that case, two cities in Texas (*i.e.*, Arlington and San Antonio) challenged an FCC declaratory ruling—a proceeding where the FCC clarifies its rules or statute—that clarified what "a reasonable time period" for state and localities to act on wireless facility siting applications under Section 332(c)(7)(B)(ii) of the Act.⁶¹ The declaratory ruling defined the phrase within a "reasonable period of time" to mean "90 days to process an application to place a new antenna on an existing tower and 150 days to process all other applications."⁶² The cities disagreed with the FCC that it did not have the authority to set that timeframe under Section 332 of the Act, and appealed the decision that went all the way up to the U.S. Supreme Court.

Ultimately, the Supreme Court held that courts must defer under *Chevron* to the FCC when it interprets an ambiguous statute within its jurisdiction, which includes upholding declaratory rulings.⁶³ Hence, the courts give the FCC a lot of room to define terms within its statutes of jurisdiction and its actions based on the FCC's interpretation of those statutes.

B. The Courts Strongly Defer to the FCC on Spectrum-Allocation Issues

Given the incredible amount of statutory authority Congress gave to the FCC over spectrum disputes, courts have a penchant for deferring to the FCC's expertise when it resolves spectrum disputes. Below is a list of cases in which the courts have articulated and upheld the FCC's jurisdiction to regulate spectrum.

<u>Case</u>	<u>Holding</u>
<i>AT&T Services, Inc. v. FCC</i> ⁶⁴	The D.C. Circuit upheld the FCC's authority under Section 301 of the Act and the APA to open up the 6 GHz band for unlicensed WiFi use.

⁵⁸ 545 U.S. 967 (2005).

⁵⁹ 569 U.S. 290 (2013).

⁶⁰ *Id.* at 986.

⁶¹ *City of Arlington*, 569 U.S. at 290.

⁶² *Id.*

⁶³ *Id.* at 307.

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[https://www.cadc.uscourts.gov/internet/opinions.nsf/7658F4CE919568A7852587B900589344/\\$file/20-1190-1928330.pdf](https://www.cadc.uscourts.gov/internet/opinions.nsf/7658F4CE919568A7852587B900589344/$file/20-1190-1928330.pdf).

<i>PSSI Global Services, LLC v. FCC</i> ⁶⁵	The D.C. Circuit upheld the FCC’s C-Band Order both under the APA and Section 303 of the Act. The Court also upheld the FCC’s authority to modify satellite operators’ market-access grants under Section 316(a)(1) of the Act by narrowing frequency in the C-Band to those operators use.
<i>M2Z Networks, Inc. v. FCC</i> ⁶⁶	The D.C. Circuit upheld the FCC’s determination that granting M2Z Network’s request to modify its license to provide broadband services was not in the public interest.
<i>Globalstar, Inc. v. FCC</i> ⁶⁷	The D.C. Circuit upheld the FCC’s authority under Section 303 and 301 of the Act to reassign a block of spectrum to Iridium instead of sharing the block with Globalstar.
<i>Mobile Relay Associates v. FCC</i> ⁶⁸	The D.C. Circuit acknowledging that the FCC “‘foster[s] innovative methods of exploiting the spectrum,’ it ‘functions as a policymaker’ and is ‘accorded the greatest deference by a reviewing court.’”
<i>Northpoint Tech., Ltd. V. FCC</i> ⁶⁹	The D.C. Circuit upheld the FCC’s interpretation of it being able to auction portions of 12 GHz for domestic, non-satellite-based video distribution and data services that are not “used for the provision of international or global satellite communications service” under the ORBIT Act.

Now that we have reviewed the role the FCC plays in commercial spectrum regulation, we next provide an understanding of the role the NTIA plays in managing spectrum for federal users and the coordination (interagency process) between the two agencies.

V. Recent Examples of Government Agencies Circumventing the Interagency Process

⁶⁵ 983 F.3d 1 (D.C. Cir. 2020).

⁶⁶ 558 F.3d 554 (D.C. Cir. 2009).

⁶⁷ 564 F.3d 476 (D.C. Cir. 2009).

⁶⁸ 457 F.3d 1 (D.C. Cir. 2006).

⁶⁹ 414 F.3d 61 (D.C. Cir. 2005).

5G is going to require a slew of different wireless infrastructure schemes and wide swaths of radio and microwave spectrum to accomplish these stated goals. To its credit, the FCC developed its 5G FAST Plan to further U.S. leadership in the wireless space, but now, some unexpected regulators have appeared to disrupt 5G's path forward.⁷⁰

When agencies circumvent the interagency process, things become very disjointed and unnecessarily cumbersome. We saw how the absurd (bordering on parody) things can become when federal agencies decide to circumvent the NTIA. Federal agencies appeared to have a playbook when disagreeing with the FCC: 1) NTIA circumvention; and 2) make last-minute, foregone interference claims to undercut the FCC's credibility.

Frankly, when agencies employ this strategy, a rogue agency can slow, stunt, or undo 5G by attacking decisions in which it has no authority. We discuss the evolution of this playbook by examining the latest attempts from agencies to discredit the FCC's authority:

A. 5G vs. the Weather

As part of the FCC's 5G FAST Plan, the FCC decided to auction a portion of the 24 GHz band.⁷¹ This band allows carriers to provide last-mile wireless coverage to ensure that your experience on apps and other mobile services remain uninterrupted when bouncing from place to place. The 24 GHz band will be particularly helpful to enhance apps that require a high-range spectrum (e.g., virtual reality, 3-D video, and streaming applications), especially in places where large swaths of spectrum in traditional bands are unavailable.⁷²

However, three days before the FCC held its auction, the National Oceanic and Atmospheric Administration (NOAA) and National Aeronautics and Space Administration (NASA) lodged two primary concerns: 1) the potential for harmful interference in adjacent bands (i.e., 23.6-24 GHz spectrum band) when collecting weather data using microwave sensors measuring atmospheric levels of water vapors; and 2) the alleged procedural breakdown between them and the FCC on its auctioning off blocks of the 24 GHz spectrum band.

As for the former concern, it was clear to all experts at the FCC that commercial wireless services would not cause interference to NOAA's weather systems. Moreover, NTIA and other relevant agencies helped develop the United States government's position on 5G to which all factions agreed that this block of spectrum was essential to its overall 5G strategy.⁷³ Even the Department of State weighed in and sided with the FCC.

⁷⁰ <https://www.fcc.gov/document/fccs-5g-fast-plan>.

⁷¹ <https://www.fcc.gov/auction/102>.

⁷² <https://www.brookings.edu/wp-content/uploads/2016/07/How-5G-tech-enables-health-iot-west.pdf>.

⁷³

https://www.ntia.doc.gov/files/ntia/publications/ntia-osm_letterencl_to_fcc-oet_re_spectrum_frontiers_07-12-2016.pdf.

NOAA and NASA's latter concern distilled down to an "unfair surprise" by the FCC onto these other agencies, which was and still is an odd argument given that the FCC started planning to auction off this spectrum circa 2007.⁷⁴ Additionally, nothing about the FCC's auction seems out of step from the original plans, and it was unclear why these agencies were raising these concerns on procedural grounds. What's more, NTIA found no interference issues for incumbent government users (including NASA and NOAA's National Weather Service) with the concurrent use of commercial wireless services in its two-year long investigation.

NOAA and NASA's interference after-the-fact claims were even harder to assess because certain claims relied almost entirely on hearsay in which they claimed the FCC ignored their concerns early on. Although neither NOAA nor NASA could proffer any definitive proof of these conversations with the FCC occurring or provide any other engineering evidence of actual harmful interference for that matter, the issue became highly politicized where Congress decided to hold hearings on the issue.⁷⁵ Thankfully, the FCC still moved forward with its auction and there has been no documented interference from NOAA or NASA's ability to track weather patterns.

However, government agencies learned a strategy: 1) circumvent NTIA; and 2) publicly undercut the FCC's credibility by proffering last-minute interference concerns.

B. 5G vs. GPS

The executive agency disruption playbook was in full effect when the FCC unanimously approved Ligado's application to modify its spectrum license.⁷⁶ Ligado's modification allows the company to deploy a low-power terrestrial network for 5G and IoT by leveraging its licensed frequencies within the L-Band. The general complaints came from two factions—the DoD and GPS users. Both claimed in the eleventh hour that Ligado's use would interfere with their GPS operations.

The Ligado proceeding stretches out at least a decade. But, although Ligado first filed its application in 2010, this proceeding commenced closer to 2003. The FCC's Order is the culmination of an extensive record that articulates every stakeholder's concern (including the DoD's). Ligado also modified its application several times to address these concerns. The Ligado

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<https://www.washingtonpost.com/weather/2019/03/13/fcc-auction-off-wireless-spectrum-that-could-interfere-with-ital-weather-data-rejecting-requests-us-house-science-agencies/>.

⁷⁵

<https://www.cantwell.senate.gov/news/press-releases/cantwell-warns-5g-auction-could-damage-us-weather-forecasting-data-collection>.

⁷⁶ *LightSquared Technical Working Group Report; LightSquared License Modification Application, IBFS File Nos. SAT-MOD-20120928-00160-00161, SES-MOD-20121001-00872; New LightSquared License Modification Application, IBFS File Nos. SES-MOD-20151231-00981, SAT-MOD-20151231-00090, and SAT-MOD-20131231-0091; Ligado Amendment to License Modification Application IBFS File Nos. SES-MOD-20151231-00981, SAT-MOD-20151231-0090, and SAT-Mod-20151231-00091, IB Docket Nos. 11-109; 12-340-11-109; 12-340; 11-109, Order & Authorization, FCC 20-48 (2020). Available at <https://docs.fcc.gov/public/attachments/FCC-20-48A1.pdf>(Ligado Order).*

Order builds off these decade-long negotiations and clearly incorporated all these concerns. This is evident from the fact that the NTIA, the DoD, the Department of Transportation (DoT), and the Federal Aviation Administration submitted no complaints to the FCC's inquiry regarding Ligado's application circa 2017. The FCC has followed every conceivable government procedure for the matter.

Moreover, the FCC, in consultation with the NTIA, evaluated an extensive review on how to prevent Ligado's operations from interfering with DoD's GPS operations. The FCC's Order reviewed three tests that examined potential interference concerns relating to Ligado's proposed terrestrial operations and GPS (The Roberson and Associates Reports (RAA Reports), the National Advanced Spectrum and Communications Test Network Report (NASCTN Report), the DoT Adjacent Band Compatibility Assessment Final Report (DoT ABC Report)). Moreover, the DoD had requested Ligado to coordinate testing with NASCTN, a federal lab administered by the Pentagon, the Department of Commerce's National Institute of Standards and Technology, and the NTIA to provide "accurate, reliable, rigorously scientific, and unbiased measurements and analyses" in technical spectrum matters. The NASCTN then conducted thousands of hours of comprehensive testing which showed GPS devices can coexist with the parameters of the network Ligado proposed in 2015 without posing a risk to national security.

To prevent such interference, the FCC and its expert engineers placed these onerous restrictions on Ligado's use to protect GPS:

- **Creation of Guard Band for GPS:** Ligado must not conduct terrestrial operations in the spectrum directly adjacent to the RNSS band and must create a 23 MHz guard band to protect GPS.⁷⁷
- **Repair and Replace:** Ligado must cooperate directly with any U.S. government agency that anticipates that its GPS devices may be affected by Ligado's ATC operations by: (1) providing base station location information and technical operating parameters to federal agencies prior to commencing operations in the 1526-1536 MHz band; (2) working with the affected agency to identify the devices that could be affected; (3) working with the affected agency to evaluate whether there would be harmful interference from Ligado's operations; and (4) developing a program to repair or replace any such devices that is consistent with that agency's programmatic needs, as well as applicable statutes and regulations relating to the ability of those agencies to accept this type of support.⁷⁸
- **Military Installations:** In the event that it is determined that Ligado's operations will cause harmful interference to a specific, identified GPS receiver operating on a military installation, the FCC expects Ligado and the affected government agency to negotiate an acceptable received power level over the military installation or to establish limited exclusion zones.⁷⁹
- **Stop Buzzer Capability:** Ligado's approval is conditioned on Ligado maintaining a 24/7 operations center to continuously monitor transmit power for each base station and have

⁷⁷ Ligado Order, para.

⁷⁸ *Id.* at para. 101.

⁷⁹ *Id.* at para. 103.

the capability to “cease transmission” of base station transmitters within 15 minutes if needed.^{80,81}

To put this in perspective, if Ligado were to have a party, then the FCC would only allow it to host a book club in the next town over from a GPS neighborhood.

Like NOAA and NASA, the DoD got Congress’s ear where, you guessed it, the DoD: 1) circumvented NTIA; and 2) publicly undercut the FCC’s credibility by proffering last-minute interference concerns. Even with all the listed protections, the DoD flooded Congress with fears of GPS breaking down, military operations being compromised, and, yes, planes falling out of the sky. What was the basis of these interference claims? A fringe and extremely unreliable standard to determine interferences with GPS from communications systems.⁸²

Even though the FCC goes into an almost exhaustive account as to why it did not use the DoD’s engineering standard in its Ligado Order and in written testimony to Congress, the DoD was able to inspire the Senate Armed Service Committee—a committee that does not have jurisdiction over the FCC or its spectrum authority—to get engaged. The Senate Armed Service Committee placed an extra (albeit slight) hurdle in the 2021 National Defense Authorization Act (2021 NDAA). The 2021 NDAA allowed the FCC to move forward but empowered the DoD to conduct a concurrent study to measure interference and prohibits DoD funds (extending to companies with DoD contracts) to comply with the FCC’s Ligado Order.⁸³

Although it appears the DoD took a modest victory, the damage this caused is far worse. These agencies found their playbook to be effective by challenging the FCC’s engineers’ expertise and overwhelming authority over spectrum issues as we articulated above.

C. DOT and 5.9 GHz

Fallow spectrum being put to higher use is an important aspect of the FCC’s spectrum management. That was the objective the FCC was seeking to achieve when it began the process of repurposing the 5.9 GHz band. This band was first set aside by the FCC in 1999 for DSRC (dedicated short-range communications), a technology that automakers promised would save lives and that was ready for market. It never really came to be and other than a few deployments, DSRC spectrum lay mostly fallow over the subsequent decades.

When adopting licensing and service rules for automotive operations in the 5.9 GHz band in 2003, the Commission selected a single technology, DSRC, despite its more usual practice of leaving the selection of technologies to licensees and the marketplace to sort out. In this instance,

⁸⁰ *Id.* at paras.105, 146.

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<https://joellthayer.medium.com/the-armed-services-committee-further-weighs-in-on-the-fccs-grant-of-ligado-s-application-a6375a456287>.

⁸² Ligado Order, at para. 48.

⁸³ National Defense Authorization Act for Fiscal Year 2021, Report, S. Rept. 116-236, available at <https://www.congress.gov/congressional-report/116th-congress/senate-report/236> (June 24, 2020).

the Commission hoped that by selecting a specific technology it could advance the opportunities for interoperability between vehicles and infrastructure and vehicle-to-vehicle communications more quickly.⁸⁴

Ten years later, this had not come to pass, but the needs for wireless broadband service were exploding. So, the Commission began a proceeding in 2013 to examine whether unlicensed devices could share the 5.9 GHz band with DSRC operations.⁸⁵ In 2016, the Commission developed a three-phase plan to test prototype unlicensed devices' ability to share the 5.9 GHz band with DSRC.⁸⁶ This was done in conjunction with the Department of Transportation, the automotive industry, and technology companies. In October 2018, the Commission released and solicited comments on its Phase I test (FCC laboratory testing) report and commenters suggested a range of next steps, including continuing to protect the band for the exclusive use of DSRC, allowing unlicensed operations in the band, and promoting the use of a new vehicular standard C-V2X, which was an emerging standard that used cellular systems to provide the connection for a range of safety and other features important to realizing the opportunity of connected cars.⁸⁷ Throughout this period, the FCC continued to work with the NTIA, the Department of Transportation, and the automotive and communications industries.

In 2020, the FCC decided that it was time to reallocate the 5.9 GHz spectrum for unlicensed use, while still reserving a portion of it for DSRC. As the FCC stated at the time, “increasing the amount of spectrum available for unlicensed operations is critical for meeting our nation’s connectivity needs. Today, Wi-Fi carries more than half of the Internet’s traffic...[keeping] America’s cellular networks from being overwhelmed and will continue to do so in the future.” The FCC allowed a continuing use of 30 MHz of the band for Intelligent Transportation System (ITS) services and adopted the technology standard C-V2X for safety-related transportation and vehicular communications, an amount of spectrum more in line with the needs of the automotive

⁸⁴ *Amendment of the Commission’s Rules Regarding Dedicated Short Range Communications Services in the 5.850-5.925 GHz Band (5.9 Band); Amendment of Parts 2 and 90 of the Commission’s Rules to Allocate the 5.850-5.925 GHz Band to the Mobile Service for Dedicated Short Range Communications of Intelligent Transportation Services*, ET Docket No. 98-95, Report and Order, 19 FCC Rcd 2458, 2466-68, paras. 13-16 (2003) (*DSRC Service Rules Order*). See also 47 CFR §§ 90.379 and 95.3159 (incorporating by reference the American Society for Testing and Materials (ASTM) E2213-03 DSRC standard (the ASTM-DSRC Standard)). In 2010, IEEE adopted a new standard, 802.11p, for wireless access in vehicular environments. See https://standards.ieee.org/standard/802_11p-2010.html.

⁸⁵ See *U-NII 5 GHz NPRM*, 28 FCC Rcd at 1796-1800, paras. 88-101 (seeking comment on making an additional 195 megahertz of spectrum in the 5 GHz band available for unlicensed use, labeled U-NII-2B (the 5.4 GHz band from 5.350-5.470 GHz) and U-NII-4 (the 5.9 GHz band from 5.850-5.925 GHz)).

⁸⁶ *The Commission Seeks to Update and Refresh the Record in the “Unlicensed National Information Infrastructure (U-NII) Devices in the 5 GHz Band” Proceeding*, ET Docket No. 13-49, Public Notice, 31 FCC Rcd 6130, 6130-31 and 6138-39 (2016). The test plan was devised to examine sharing between DSRC and unlicensed devices in the following phases: Phase I (FCC laboratory testing); Phase II (basic field tests with a few vehicles at a Department of Transportation facility); and Phase III (additional field tests with many vehicles, more test devices, and real-world scenarios). *Id.* at 6139.

⁸⁷ *Office of Engineering and Technology Requests Comment on Phase I Testing of Prototype U-NII-4 Devices*, ET Docket No. 13-49, Public Notice, 33 FCC Rcd 10766 (OET 2018). The test results showed that prototype unlicensed devices were able to detect a co-channel DSRC signal and implement post-detection steps designed to avoid interference from unlicensed devices to DSRC under laboratory conditions. *Id.* at 10767.

industry in promoting safety of life systems.

Of course, it was not the end of the matter for the Department of Transportation or the automotive industry. Taking a page from the now well-worn playbook, the Department of Transportation took its case to Capitol Hill, and not to the committee with jurisdiction over spectrum policy, but instead to the House Committee on Transportation and Infrastructure. The Chairman of that Committee put the FCC on notice, sending a letter to “express [his] continued strong opposition to the Federal Communications Commission’s (FCC) decision to share the 5.9 GHz radio frequency band (or Safety Band) with unlicensed Wi-Fi.”⁸⁸ The letter included a familiar framing, that “the FCC appears more concerned with faster Wi-Fi than transportation safety.” The letter went on to claim the FCC had ignored safety concerns as well as the views of lawmakers and the automotive industry. The Committee also held a hearing on the matter to make a public demonstration of their concerns.

Proceeding along a path that was fact-based, evidence-based, and studied, the record demonstrated that the FCC was not in fact more concerned about faster Wi-Fi than transportation safety, but instead it was trying to utilize spectrum that had largely sat fallow for almost three decades. If these life-saving systems were so important to the automotive industry, why had they not bothered to put them into autos or into infrastructure beyond a smattering of projects? Also, the FCC had accommodated DSRC (and C-V2X) opportunities in the band. But, since the automotive industry did not get exactly what it wanted, it decided to take advantage of an NTIA that was without leadership and circumvent the interagency coordination process to see what it could get by appealing to the Department of Transportation. And based on the letters and public hearing, it appears the Department of Transportation was willing to step outside the interagency process and help the automotive industry make the case.

In this instance, unlike in the Ligado instance discussed above, the playbook did not result in any procedural hurdles being put in place to stop or slow the FCC’s decision from taking effect, but that does not mean there was no harm caused. This example illustrates that industries can use the federal agencies that oversee them to help challenge the FCC’s decisions on spectrum. When those agencies are willing participants in undermining the interagency process, that does damage to the whole framework that Congress developed and has been in place for decades. And it is doing so at a time when the demands on spectrum are extremely high and growing and when there is a premium for moving to create the more efficient use of spectrum.

There is pending litigation involving the FCC’s 5.9 GHz band decision, so the ultimate outcome is still to be determined, though it is expected that given the record the FCC’s decision will be upheld.

D. FAA and C-Band

⁸⁸ Letter from Rep. Peter A DeFazio, Chairman of the House Committee on Transportation and Infrastructure to Hon. Jessica Rosenworcel, Acting Chairwoman, FCC, available at <https://transportation.house.gov/imo/media/doc/2021-03-18%20FCC%205.9%20Letter.pdf> (Mar. 18, 2021).

As the old saying goes, nothing succeeds like success, and while the federal agencies in the above examples had varying levels of success, one thing was made clear to them: agencies should feel empowered to step out of the interagency process because the playbook helps bring about their desired result (even if it is to delay the inevitable) with little or no effect on them. We saw this play out again at the end of 2021, when the Federal Aviation Administration (FAA) and the aviation industry began claiming that planes would fall from the sky if the spectrum known as the C-Band was turned on to support the 5G services provided by some wireless providers. So how did we get here? Did the FAA (and the aviation industry) have an opportunity to raise concerns during the FCC's rulemaking process? Did the FCC listen to the FAA and seek to address the concerns it raised? While the answer to both of those questions is yes, the FCC in October 2021 found itself once again being publicly challenged for its decision.

By way of background, in 2017 the FCC initiated a proceeding in which it began the consideration of the potential for sharing spectrum in the C-Band. As the Commission stated in the opening of that inquiry, it was aware that there were “significant and important federal operations” in the band and that it worked closely with the NTIA to evaluate the potential operational impacts, costs, benefits, and resource considerations to ensure the continued operation of those important missions.⁸⁹

In 2018, the Commission moved from the inquiry stage in its process to the rulemaking stage, releasing a Notice of Proposed Rulemaking seeking comment on a more specific plan for utilizing the band for mobile and fixed wireless service. The Commission also adopted an Order at that time that required the collection of additional information from incumbent users of the band to better understand the implications of potential mobile use of the band and the appropriate transition methodology because, the Commission noted, “it is important that we obtain a clear understanding of the operations of current users in the band.”⁹⁰ The Commission further explained that such information was critical to its “consideration of how much spectrum could be made available, how incumbent operators could be protected, accommodated, or relocated, and the overall structure of the band going forward.”⁹¹ Additionally, the Commission rightly sought comment on adjacent band operations that were raised in the Notice of Inquiry concerning the aeronautical navigation operating in 4.2-4.4 GHz portion of the band related to aircraft radio altimeters and wireless avionics intra-communications (WAIC) systems.⁹² The Commission noted that these systems increase aircraft safety by providing important redundancies in communications links between aircraft systems.⁹³ It specifically asked stakeholders that use these systems to comment on what were the needed out-of-band emission limits necessary to “protect the aeronautical radionavigation service in the 4.2-4.4 GHz band.”⁹⁴

⁸⁹ In a footnote to the Notice of Inquiry, the Commission acknowledged the coordination work it was generally undertaking with NTIA and the resources such coordination demand of the agencies. *Expanding Flexible Use in Mid-Band Spectrum Between 3.7 and 24 GHz*, GN Docket No. 17-183, Notice of Inquiry, 32 FCC Rcd. 6373, n.2 (2017).

⁹⁰ See *Expanding Flexible Use of the 3.7 to 4.2 GHz Band*, GN Docket No. 18-122, Order and Notice of Proposed Rulemaking, 33 FCC Rcd. 6915, 6923 para. 16 (2018) (C-Band Order and NPRM).

⁹¹ *Id.*

⁹² *Id.* at 6957, para. 125.

⁹³ *Id.*

⁹⁴ *Id.*

In comments filed in the proceeding, Boeing, Aviation Spectrum Resources (ASR), Aeronautics Industry Association, and other aviation interests urged the Commission to protect their operations in the adjacent band. As Boeing explained, “radio altimeters are already ‘properly engineered’ to resist spurious emissions from external sources. The band pass filters that are incorporated into radio altimeters, however, have limited ability to reject transmissions close to the edges of the 4.2-4.4 GHz band. As a result, relatively powerful mobile communications in the adjacent band could overload the radio altimeter receivers on aircrafts, inhibiting their accurate operation.”⁹⁵ ASR supported the assessment from Boeing, providing information on preliminary test data that was being conducted by the Aerospace Vehicle System Institute that indicated that “interim results have indicated that the adjacent 100 MHz (4.1-4.2 and 4.4-4.5 GHz) is of most concern to the demonstrated radio altimeter receivers.”⁹⁶ The final test results were filed with the Commission in 2019.⁹⁷

To boil this down, the aviation industry is telling the FCC that their equipment is really good at staying within their approved bands for operation (4.2-4.4) but they could use some additional protection (100 MHz guard band) because they may not be as good at rejecting signals from other transmitters if they are too close. Setting aside whether that means the “radio altimeters are properly engineered” (FYI, this is the real issue here and they are not), what it meant to the FCC is that given the realities on the ground and based on these reports, it should consider a guard band to afford additional protections for the aviation equipment.

In 2020, the Commission adopted its Order putting in place new rules for use of the C-Band for mobile services.⁹⁸ To address the concerns raised by the aviation industry, the Commission adopted a guard band of 220 MHz, double the amount suggested by Boeing and ASR in their comments. In its review of competing studies that were placed in the record, the Commission concluded that the 220 MHz guard band in combination with the power and emission limits provided all due protection to the altimeters and WAIC systems operating in the 4.2-4.4 GHz band.⁹⁹ In recognition of a request by the AVSI for additional study and analysis, the Commission encouraged the parties to engage in a multi-stakeholder group to further analyze “why there may even be a potential for some interference given that well-designed equipment should not ordinarily receive any significant interference (let alone harmful interference)” with such a large guard band.¹⁰⁰

⁹⁵ Boeing Reply Comments, GN Docket 18-122 at 6 (filed Dec. 11, 2018); *see also* Aviation Spectrum Resource, Inc. Comments, GN Docket No. 18-122 at 5-6 (filed Oct. 30, 2018).

⁹⁶ Aviation Spectrum Resource, Inc. Comments at 6. That testing data was anticipated to be completed by the end of 2018 and Aviation Spectrum Resource committed to updating the record with the testing data once it was complete. Aviation Spectrum Resource, Inc. Reply Comments at 5.

⁹⁷ “Behavior of Radio Altimeters Subject to Out-Of-Band Interference,” attachment to Letter of Dr. David Redman, Aerospace Vehicle Systems Institute, to Marlene H. Dortch, Secretary, Federal Communications Commission, Docket No. 18-122 (filed Oct. 22, 2019).

⁹⁸ Expanding Flexible Use of the 3.7 to 4.2 GHz Band, GN Docket No. 18-122, Report and Order and Order of Proposed Modification, 35 FCC Red 2343 (2020) (“C-Band Order”).

⁹⁹ C-Band Order at 2485, para. 395.

¹⁰⁰ *Id.*

Over the course of the year after the Commission released its Order, the aviation industry did form a multi-stakeholder working group to further study the issue and on October 8, 2020 filed a report outlining its findings. That report indicated that the 220 MHz guard band was insufficient to prevent harmful interference to altimeters. It also found that the power levels or use in operations in the 3.7-3.98 GHz band would also cause harmful interference to the “properly engineered” altimeters.¹⁰¹

By October 2021, it became clear that an impasse had been reached and the playbook went into force. It started with a well-timed article in the Wall Street Journal and the vague warning from the FAA that planes may need to be grounded.¹⁰² On November 2, the FAA issued a Special Airworthiness Information Bulletin, in which it warned of “potential adverse effects on radio altimeters,” and provided information to manufacturers and airlines on what they should do to prepare for the 5G launch that was then scheduled for December 2, 2021. Interestingly, the bulletin revealed an important point for this debate, particularly given the RCTA study. The FAA stated in the bulletin “[t]here have not yet been proven reports of harmful interference due to wireless broadband operations internationally, although this issue is continuing to be studied. In the United States, there has been wireless broadband deployment in the 3.65-3.7 GHz band since 2007. The FCC started a proceeding to authorize mobile broadband service in the 3.55-3.7 GHz band in December 2012 and adopted final rules in April 2015 and October 2018. Commercial deployment started in September 2019, with no known issues for altimeters to date.”¹⁰³ On November 4, the licensees of the spectrum, the aviation industry, the FAA, and the FCC hashed out an agreement that would alleviate some of the aviation industry and FAA’s concerns by either not turning on the new 5G systems that were close to 50 airports and reducing power levels at other locations.¹⁰⁴ Additional concessions from the wireless licensees followed¹⁰⁵ and as those concessions were being given, the FAA guidance to airlines modified as approvals for altimeters expanded.¹⁰⁶ The situation on deployment of 5G networks and their ability to operate continues to evolve. With the resignation of FAA Administrator Steve Dickson in early February, the progress that has been made to address the aviation concerns will hopefully continue apace so we can realize the full benefit of these 5G networks.¹⁰⁷

As with the other examples, the FCC’s process was undermined and the agency (or more importantly the industry players that did not get the result they wanted) leveraged the playbook to achieve a different result than what the record developed by the FCC demanded. Here, it appears that the issue was not with the spectrum rules, but the operation of the “properly

¹⁰¹ Letter from Terry McVenes and David Redman, RTCA, to Marlene H. Dortch, Secretary, Federal Communications Commission, GN Docket No. 18-122, Nov. 19, 2020.

¹⁰² [FAA Plans Warning to Pilots, Airlines over 5G Rollout](#), Andrew Tangle and Ryan Tracey, Wall Street Journal (Oct. 29, 2021).

¹⁰³ [Risk of Potential Adverse Effects on Radio Altimeters](#), Special Airworthiness Information Bulletin, AIR-21-18 (Nov. 2, 2021).

¹⁰⁴ [AT&T, Verizon to Delay Rollout Over FAA’s Airplane Safety Concerns](#), Andrew Tangel and Drew Fitzgerald, Wall Street Journal (Nov. 4, 2021).

¹⁰⁵ [The FAA Announces Progress in Expanding 5G Service at Airports](#), Niraj Chokshi, New York Times (Jan. 28, 2022).

¹⁰⁶ [FAA Statements on 5G](#).

¹⁰⁷ [FAA Administrator Steve Dickson Resigns, Will Leave at the end of March](#) (Feb. 17, 2022).

engineered radio altimeters.” As the story continues to unfold, that portion of the story may yet reveal additional policy challenges we will need to confront, such as more rigorous receiver standards and certification regimes.

VI. General Policy Considerations

As articulated above, circumventing the long-established interagency process has real-world impacts. We find that there are ways to prevent unnecessary roadblocks to 5G and beyond.

In the immediate term, it is essential that federal agencies:

- respect the role and expertise of the FCC to thwart any further incumbrances to rolling out 5G expeditiously; and
- leverage the traditional interagency process by submitting all federal spectrum concerns to the NTIA as opposed to forging individual complaints.

In the long term, Congress should consider whether to:

- update the Communications Act to codify the interagency process into statute akin to versions of the FCC-NITA MOU;
- reauthorize the FCC’s spectrum authority for ten more years; and
- provide more funding to the FCC and NTIA to hire more engineering resources, including funding for more engineering labs.

VII. Conclusion

As we noted at the beginning of this paper, our underlying intent in putting this information together is to help raise awareness of the structure Congress has put in place to promote the efficient management of our nation’s spectrum. The interagency process, when it works well, provides an opportunity for all stakeholders to come forward in a data-driven process to assist the FCC and the NTIA in building a record of evidence to support efficient spectrum usage by helping these agencies understand what the possibilities and concerns are and which of the various access regimes (licensed, unlicensed, sharing) can facilitate more efficient usage. Critical to the interagency process working is not only full engagement by stakeholders, but a willingness to accept the result. Accepting the result provides those bidding in auctions certainty that they will receive the value of what they are bidding for. Certainty in the results also provides technology innovators who rely on unlicensed and sharing opportunities what they need in order to pursue their product developments. When certainty is continually undermined, as our examples demonstrate, we hinder that certainty, undermining future opportunities to fully realize the potential spectrum presents for advancement. Finally, it is important that leaders on Congressional committees not undermine the process. Congress has laid out the process in statute and Congress needs to respect it as well. The success of the playbook we identified in the paper to disrupt meaningful spectrum policy at the FCC relies on the willing participation of Congressional committees that lack jurisdiction over spectrum, the FCC, or NTIA. The leaders of these committees and agencies should make clear to the constituencies within their jurisdiction that the interagency process is how spectrum disputes are to be resolved.