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RIVALROUS REGULATORS: HISTORICAL ANALYSIS OF THE DUAL AGENCY APPROACH TO SPECTRUM MANAGEMENT

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INTRODUCTION

As we move into the 5G world, access to radio frequencies has become an ever-present challenge for operators. Services need the legal certainty that their networks can function without the fear of harmful interference degrading their operations.¹ Unfortunately, almost every frequency band or channel has an existing legal right to operate. Therefore, federal regulators must carefully examine allocations to ensure that they best support the public interest. Recently, regulators have made significant strides to do just that.

For example, regulators transformed the 3.5 GHz band into a 3-tiered access system, which allows federal operations to continue, while also allowing the inclusion of licensed

1. Jean Pierre De Vries and Jeffrey Westling, "Not a Scarce Natural Resource: Alternatives to Spectrum-Think," *SSRN*, (Oct. 7, 2017). https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2943502.

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and unlicensed operations when available.² In the 3.7 – 4.2 GHz “C-band,” regulators worked with satellite providers to resolve difficult technical challenges and make a large portion of the band available for flexible use.³ Past administrations expanded use in the “spectrum frontiers,” which are high-band frequencies suitable for sending substantial amounts of data over shorter distances.⁴

However, with an ever-present threat of harmful interference, regulators often face difficult trade-offs between the costs and benefits of assigning more users to smaller frequency bands. At the same time, speed and certainty is critical as private operators deploy networks.⁵ The longer it takes regulators to complete a proceeding, the lower the value of associated legal rights.⁶

In the United States, two separate regulators govern radio operations: the National Telecommunication and Information Administration (NTIA) for federal users and the Federal Communications Commission (FCC) for non-federal users. In recent years, cracks have begun to show as more federal agencies go beyond NTIA’s Interdepartment Radio Advisory Committee and take their grievances outside of the coopera-

2. “Citizens Band Radio Service,” Federal Communications Commission, last visited July 6, 2021. <https://www.fcc.gov/wireless/bureau-divisions/mobility-division/citizens-band-radio-service-cbrs>.

3. “Expanding Flexible Use of the 3.7 to 4.2 GHz Band, Report and Order,” Federal Communications Commission, GN Docket No. 18-122, March 3, 2020. <https://www.fcc.gov/document/fcc-expands-flexible-use-c-band-5g-0>.

4. “Use of Spectrum Bands Above 24 GHz for Mobile Radio Service, et al.,” Federal Communications Commission, July 14, 2016. <https://www.fcc.gov/document/spectrum-frontiers-ro-and-fnprm>.

5. Tom Struble et al., “The Importance of Quick C-Band Auction to America’s 5G Future,” Federal Communications Commission, Feb. 4, 2020. <https://www.rstreet.org/2020/02/06/the-importance-of-quick-c-band-auction-to-americas-5g-future>.

6. Joe Kane, “Comments of the R Street Institute, Expanding Flexible Use of the 3.7 to 4.2 GHz Band,” WT Docket No. 18-122, Oct. 29, 2018. <https://www.rstreet.org/2018/10/29/comments-of-r-street-institute-in-the-matter-of-expanding-flexible-use-of-the-3-7-to-4-2-ghz-band>.

tive structure.⁷ These cracks will only continue to grow and therefore revising and improving this model must be a top priority for Congress.

EXISTING MANAGEMENT STRUCTURE

Two separate agencies oversee radio operations in the United States, yet have very different mandates and driving goals. These differing approaches can cause tension between the agencies, as the competing policy objectives may not always align. Therefore, it is important to first examine how and why the agencies approach spectrum management.

Federal Communications Commission

The Federal Communications Commission (FCC or Commission) regulates all non-federal radio operators within the United States. The agency grew out of the Federal Radio Commission, which Congress created to address the general lack of authority over radio operations and the resulting instances of harmful interference. During the early 20th century, operators simply registered with the department of commerce, and as more operators began broadcasting, it quickly became clear that the country needed an authority to allocate frequencies for specific uses, assign licenses to prevent harmful interference among operators and define the service rules for those operations.

One of the main challenges for this early agency was determining what stations best served the public interest, the standard Congress established for granting licenses. One Commissioner went as far as to say it was a “rather appalling responsibility.”⁸

The law tells us that we shall have no right of censorship over radio programs, but the physical facts of radio transmission compel what is, in effect, a censorship of the most extraordinary kind. A broadcasting station is in many ways akin to a newspaper, but with this fundamental difference there is no arbitrary limit to the number of different newspapers which may be published, whereas there is a definite limit, and a very low one, to the number of broadcasting stations which can operate simultaneously within the entire length and breadth of our country. This limit has not only been reached, it has been far overpassed; the demand from every section of the country is to cut down the number of broadcasting stations in the interests of the listening public.⁹

This “appalling responsibility” of defining the public interest drives almost every decision before the Commission, which

7. See, e.g., Joan Engbreton, “Despite DOT Objections, FCC Votes to Free Up 5.9 GHz Band for Unlicensed Wi-Fi,” *Telecompetitor*, Nov. 18, 2020. <https://www.telecompetitor.com/despite-dot-objections-fcc-votes-to-free-up-5-9-ghz-band-for-unlicensed-wi-fi/>; Kendra Chamberlain, “NOAA chief warns 24 GHz 5G would hamper weather forecasting,” *Fierce Wireless*, May 20, 2019. <https://www.fiercewireless.com/5g/noaa-chief-warns-24-ghz-5g-would-hamper-weather-forecasts/>.

8. “Statement of Commissioner Bellows before the League of Women Voters,” *1st Annual Report of the Federal Radio Commission to Congress*, July 1, 1927, p. 6. <https://www.fcc.gov/document/1st-annual-report-federal-radio-commission-congress-1927>.

9. *Ibid.*

incorporated the FRC’s structure and many of the same mandates when Congress created the FCC in 1934.¹⁰

During the early years of this new Federal Communications Commission, licenses continued to be allocated by so called “beauty contests” in which the Commission would make determinations regarding the relative value of different services.¹¹ Despite the best efforts of the Commission, regulators frequently made decisions that, in hindsight, led to a sub-optimal use allocation and assignment of frequencies.¹² Potentially worse, the FCC was among the most politicized agencies and was often corrupted to the point that those in power could leverage relationships with the Commission to enrich themselves. For example, Lyndon B. Johnson made a fortune by acquiring licenses from the Commission at low costs and operated with almost no red tape or limitations.¹³

Over time, it became clear that this top-down approach to spectrum management failed to properly assign rights in an optimal way, and new avenues for assigning operating rights emerged. For example, lotteries saw the Commission awarding licenses at random, which removed some of the elements of corruption and misguided value judgments out of the equation.¹⁴ Over time, the common understanding of radio licenses began to shift towards a view of the spectrum as a scarce natural resource which individual entities would obtain a property interest in.¹⁵ While a mischaracterization of the nature of radio licenses, viewing a license as a pseudo-property right gave licensees the flexibility to negotiate and trade these rights.

In 1993, the Commission began exclusively licensing through auctions: those parties that value the rights the most would bid on those rights, allowing the market to make determinations as to what the public wanted.¹⁶ For instance, an entity that provided a service that relied heavily on a certain frequency band may derive more value from obtaining those rights and therefore bid more than an entity that the additional rights may only supplement existing licenses or oth-

10. *Ibid.*

11. Jonathan E. Nuechterlein and Phillip J. Weiser, *Digital Crossroads: American Telecommunications Policy in the Internet Age*, (MIT Press, 2013).

12. See, e.g., Jeffrey Westling, “Unleashing Unlicensed Innovation,” *InsideSources*, Nov. 21, 2019. <https://insidesources.com/unleashing-unlicensed-innovation>.

13. Jack Shafer, “The Honest Graft of Lady Bird Johnson,” *Slate*, July 16, 2007. <https://slate.com/news-and-politics/2007/07/how-lady-bird-and-lyndon-baines-johnson-came-by-their-millions.html>.

14. Nuechterlein and Weiser.

15. De Vries and Westling. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2943502.

16. Ivy Planning Group “Whose Spectrum Is It Anyway? Historical Study of Market Entry Barriers, Discrimination and Changes in Broadcast and Wireless Licensing,” Federal Communications Commission, December, 2000. https://transition.fcc.gov/opportunity/meb_study/historical_study.pdf.

erwise provide that entity with less value.¹⁷ With secondary market transactions to build the back-end, this approach allows for the market to better account for the public interest, easing the appalling responsibility that troubled the early years of the Commission. This approach, paired with unlicensed use that act as an open commons, has led to significant innovation and generated billions in economic development.¹⁸

However, the Commission still faces significant challenges today. For example, the Commission cannot make every frequency band available for flexible use, as radios interact in complex and often unforeseen ways, and some operators need strict interference protections to ensure they can continue to provide service.¹⁹ Further, there is no greenfield spectrum left. This means that if the Commission makes additional bandwidth available for flexible use, they are limited by the fact that difficult decisions about incumbent services will need to be made.²⁰

National Telecommunications and Information Administration

While the Commission regulates all non-federal radio operations, federal agencies are beyond the reach of the FCC. Because early regulation of radios under the Radio Act of 1912 provided the Department of Commerce with limited authority, radio operators lacked any formalized coordinator to prevent harmful interference.²¹ In practice, this meant that operators needed to coordinate and resolve harmful interference among themselves. While Congress eventually stepped in for the non-federal parties, federal agencies proactively cooperated to mitigate harms long before the FRC was created.

Then called the Interdepartment Advisory Committee on Governmental Radio Broadcast, Federal agencies created a committee initially as a purely advisory body for the

department of commerce. However, it quickly widened its scope to encompass a wide array of functions:²²

Measures to prevent interference; the assignment of frequencies within allotted wave bands; determination of the character of broadcast material; and other radio matters of common interest to all departments, not having an international aspect, shall be determined through the permanent interdepartmental organization.²³

While this role was one of central coordination, the Interdepartment Radio Advisory Committee (IRAC) tended to take a hands-off approach and allow the agencies to resolve disputes among themselves whenever possible.²⁴

Over the years, the administrative structure of spectrum management at the federal level changed significantly, but the IRAC maintained its role as the central coordination point for federal operations. Today, IRAC is part of the National Telecommunications and Information Administration (NTIA), which itself is the Department of Commerce.²⁵ The Assistant Secretary of NTIA serves as the chief advisor to the President on telecommunications and technology, and the Deputy Associate Administrator of the Office of Spectrum Management Chairs the IRAC. While the NTIA has authority to manage federal spectrum, the IRAC continues to play a significant advisory role for the agency.²⁶

EXPANDING TENSION DUE TO DIFFERING FOUNDATIONS

The existing structure represents two distinct mindsets regarding spectrum management. The FCC grew out of a public interest in addressing how regulators could maximize the efficiency of operations to derive the most value out of the relative bandwidth. This led them to allow the market to drive the relative value of a given license. When licensees underutilize assigned frequencies, the Commission will examine different means of freeing up that additional bandwidth to make it available for flexible use or alternative services, and then allow the market to dictate where these rights should lie. The constant pressure on the Commission to free up additional bandwidth for a variety of services ensures that existing allocations are not wastefully underutilized.

NTIA and IRAC have different mandates. IRAC began as a collaborative process and was mainly designed to prevent

17. Joe Kane, "The Role of Markets in Spectrum Policy," *R Street Institute Policy Study* No. 146, June 2018. <https://www.rstreet.org/wp-content/uploads/2018/06/Final-No-146-for-posting.pdf>.

18. See, e.g., David W. Sosa and Greg Rafert, "The economic Impacts of Reallocating Mid-Band Spectrum to 5G in the United States," Analysis Group, Feb. 2019. <https://api.ctia.org/wp-content/uploads/2019/02/The-Economic-Impacts-of-Reallocating-Mid-Band-Spectrum-to-5G-1.pdf>; Sanjay Dhar et al., "Accelerating Future Economic Value From the Wireless Industry," Accenture Strategy, 2018. https://www.accenture.com/_acnmedia/PDF-82/Accenture-Strategy-Accelerating-Future-Economic-Value-2018-POV.pdf#zoom=50.

19. See, e.g., Thomas Gryta, "Sirius, T-Mobile Spat Over Airwave Interference," *The Wall Street Journal*, Sept. 30, 2015. <https://www.wsj.com/articles/sirius-t-mobile-spat-over-airwave-interference-1443649368>.

20. Brent Skorup, "Sweeten the Deal: Transfer of Federal Spectrum Through Overlay Licenses," *The Richmond Journal of Law and Technology* 22:5, (2016). <https://scholarship.richmond.edu/cgi/viewcontent.cgi?article=1425&context=jolt>.

21. "An Act to Regulate Radio Communications," Public No. 264, 62nd Congress, Aug. 13, 1912, last accessed Sept. 21, 2021. <http://earlyradiohistory.us/1912act.htm>.

22. R. H. Coase, "The Interdepartment Radio Advisory Committee," *Journal of Law and Economics* 5 (Oct. 17, 1962). <https://www.journals.uchicago.edu/doi/10.1086/466580>.

23. Ibid.

24. Ibid.

25. "Interdepartment Radio Advisory Committee," National Telecommunications and Information Administration, last accessed July 7, 2021. <https://www.ntia.doc.gov/page/interdepartment-radio-advisory-committee-irac>.

26. Ibid.

harmful interference to federal operations. As a result, the primary underlying goal of IRAC is not maximizing value, but rather to ensure that incumbents can continue operations without having to significantly change operating parameters.

While these differing mandates are not necessarily a bad thing, the tensions they create have artificially placed the agencies at odds with one another. Many of the most underutilized frequency bands are allocated to federal operations because they have, thus far, had no incentive to relinquish those rights.²⁷ When a private operator likewise resists efforts to limit existing operating rights, the Commission can make a final decision that binds the parties, subject to the restrictions in the Communications Act and Administrative Procedure Act. For Federal operators, the Commission lacks the requisite authority to reallocate these operations without buy-in from the agencies. The NTIA, and in-practice the President, can theoretically force the agencies to reallocate operations, but the inherent pressures on the NTIA are different: IRAC always focused on protecting incumbents rather than expanding rights.

Three recent case studies can highlight different challenges of this dichotomy.

3.1-3.55 GHz

The 3.1-3.55 GHz band is allocated to federal government for radiolocation, most notably high-powered defense radar systems on fixed, mobile, shipborne and airborne platforms.²⁸ Due to the propagation characteristics and capacity, many consider the band an ideal candidate for commercial use.²⁹ But, because the Commission lacks the authority to reallocate the federal operations in the band, it must work with the Department of Defense and the NTIA to develop a plan that would serve the interests of all parties involved. However, without instigation from Congress this may have never happened.

The MOBILE NOW Act essentially forced the NTIA and the Department of Defense (DoD) to accept some shared use of the band, but to date only the top 100 MHz has been made

available by the federal government.³⁰ Some called for a much larger portion of the band to be reallocated for commercial use, such as an additional 100 MHz of exclusively licensed operations or shared use in the lower 250 MHz. However, because this would require buy-in from the DoD, the FCC had a relatively limited ability to make additional bandwidth available, even if doing so would serve the public interest.

As it stands, without the mandate from Congress, even the top 100 MHz would likely remain solely allocated for radiolocation service. And perhaps the federal users simply cannot make any additional portion of that band available to commercial users without jeopardizing mission critical applications. However, much like with private incumbents, no incentives exist to drive the DoD to willingly make available capacity accessible. Therefore, there is little recourse for the FCC to fully investigate existing uses and whether additional commercial operations can exist in the band.

24 GHz

The 3.1-3.55 GHz band highlights the challenge of convincing a federal agency to relinquish operating rights, but often the agency in question will not actually relinquish any rights. Rather, the FCC will allocate frequencies adjacent to federal operations that will add additional noise into the environment, causing concern about potential harmful interference.

In 2017, the FCC issued the second order regarding the so called “spectrum frontiers,” which are the millimeter wave high frequency bands above 24 GHz.³¹ In the order, the Commission made the 24 GHz band available for commercial use. Unlike the mid-band spectrum in 3.1-3.55 GHz, 24 GHz travels much shorter distances but has significantly more bandwidth. In other words, these frequencies can carry much more data but only at the tail end of the network.

The NTIA and the FCC both recognized the importance of making these high-frequency bands available, and worked collaboratively to find technical parameters that would maximize the value of the bands while still protecting incumbents. Eventually, the Commission moved forward and began the process to auction licenses in the 24 GHz band.

Despite a lengthy process to review and examine potential issues with the allocation, mere days before the auction was to proceed the National Oceanic and Atmospheric Administration (NOAA) “rolled out a ‘parade of horrors’” regard-

27. Skorup. <https://scholarship.richmond.edu/cgi/viewcontent.cgi?article=1425&context=jolt>.

28. “Facilitating Shared Use in the 3.1-3.55 GHz band,” Notice of Proposed Rulemaking, WT Docket No. 19-348, Dec. 19, 2019. <https://docs.fcc.gov/public/attachments/FCC-19-130A1.pdf>; (“3.1-3.55 GHz NPRM”) 47 C.F.R. § 2.106.

29. Seth L. Cooper, “Fast Action on the Lower 3 GHz Band Will Secure America’s 5G Future,” *Free State Foundation Perspectives* 16:9 (February 2021). <https://freestate-foundation.org/wp-content/uploads/2021/02/Fast-Action-on-the-Lower-3-GHz-Band-Will-Secure-Americas-5G-Future-021821.pdf>.

30. Wilbur Ross, “Feasibility of Commercial Wireless Services Sharing with Federal Operations in the 3100-3550 MHz Band,” Department of Commerce, July 2020. https://www.ntia.gov/files/ntia/publications/ntia_3100-3550_mhz_mobile_now_report_to_congress.pdf.

31. “Use of Spectrum Bands Above 24 GHz for Mobile Radio Service, et al.” Engineering & Technology, International, Wireless Telecommunications, July 14, 2016. <https://www.fcc.gov/document/spectrum-frontiers-ro-and-fnprm>.

ing the impact that the licensing of the 24 GHz band would have the neighboring weather forecasting operations in the 23.8 GHz band.³²

The FCC commonly faces this type of dispute. A party with existing rights in one band worries about the potential for harmful interference in the neighboring band. When these disputes occur, the Commission seeks technical studies to examine the potential for harmful interference in the band, the impact that harmful interference could have on incumbent operations, technical means for mitigation of this risk, and ultimately must determine the best path forward for all parties involved.

While NOAA had objected to the reallocation, the FCC ultimately held authority over the 24 GHz band and NTIA provided little opposition to the decision. Instead, NOAA went outside of the IRAC to bring their issues directly to the American people, and more importantly Congress, to attempt to put pressure on the FCC to reverse course.³³ This added uncertainty puts risk into the auction and into the licenses that commercial carriers eventually obtain by indicating that the issue could be relitigated in the future. A system in which this risk exists in the background potentially limits the value of the licenses and drives down revenue that auctioning the spectrum generates, as well as benefits as new licensees may invest less into the technology that utilizes the band out of a fear that at some point the licenses will be in jeopardy.³⁴

The FCC proceeded with the auction as it ultimately had the authority to do so, and neither NTIA or Congress pressed the issue forward. However, these types of disputes highlight just how difficult the task of reallocating spectrum can be: even when there are no federal incumbents in the band, neighboring operations will undoubtedly face increased noise, or at a minimum an increased risk that their operations may be affected by the new operations in the neighboring band.

No incumbent operator willingly wants to add additional radios into their operating ecosystem that could potentially interfere with the incumbent. The FCC ultimately has the authority to resolve these complaints when only private licensees operate in the bands. When a federal operation is threatened, the jurisdictional bounds get blurry, and despite a process designed to resolve these issues collaboratively, their incentives do not always drive cooperation from the agencies. Nor do these agencies necessarily have recourse for mitigating harms if the FCC ignores legitimate concerns.

32. Joel Thayer, "The Race to 5G Called Due to Inclement Weather," ACT The App Association, March 20, 2019. <https://actonline.org/2019/03/20/the-race-to-5g-called-due-to-inclement-weather>.

33. *Ibid.*

34. Kane. <https://2o9ub0417ch2lq6m43em6psi2i-wpengine.netdna-ssl.com/wp-content/uploads/2018/09/Policy-Study-150.pdf>.

5.9 GHz

Finally, in some cases an allocation can affect an industry an agency regulates, even if that agency lacks any operating rights that would be affected by the allocation. In the 5.9 GHz band, for example, the FCC allocated 75 MHz to intelligent transportation services, specifically dedicated short-range communications.³⁵ At the time of the allocation, the technology was still in its infancy, but proponents promised that the technology would prevent accidents and save lives. After 20 years, little practical progress had been made in commercializing the technology while unlicensed technology has reshaped home Internet as we know it.³⁶ Considering the adjacent unlicensed allocations in the 5 GHz band, the Commission revisited the ITS allocation and allocated 45 MHz of the 5.9 GHz band to unlicensed, paving the way for the next generation of Wi-Fi, as well as 30 MHz to another ITS standard, C-V2X.³⁷

The Department of Transportation has since worked behind the scenes to put pressure on Congress and the FCC to revisit this decision.³⁸ In this case, the NTIA and the Department of Transportation have no real authority regarding the band or allocations for ITS, but they have a strong interest in the proceeding to promote ITS technologies and making transportation safer. The FCC, with a focus on the public interest, made the determination to try to accommodate both.³⁹ Revisiting the item now may limit the value of the allocation, but it is understandable that an agency may feel as though an asset critical to their mission has been degraded or altogether revoked.

PROPOSALS TO IMPROVE COORDINATION BETWEEN AGENCIES

As these case studies indicate, cracks continue to emerge with the dual agency approach, most notably due to the differing incentives between the FCC and the NTIA. Easing these tensions will help resolve management issues before they become more serious disputes. This section will analyze

35. "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," Report & Order, ET Docket No. 98-95, Oct. 21, 1999. <https://docs.fcc.gov/public/attachments/FCC-99-305A1.pdf>.

36. Comments of the R Street Institute, "Use of the 5.850-5.925 GHz Band," ET Docket No. 19-138, March 9, 2020. <https://www.rstreet.org/wp-content/uploads/2020/03/Final-R-Street-5.9-GHz-Comments.pdf>.

37. "Use of the 5.850-5.925," First Report and Order, Further Notice of Proposed Rulemaking, and Order or Proposed Modification, ET Docket No. 19-138, Nov. 20, 2020. <https://www.fcc.gov/document/fcc-modernizes-59-ghz-band-improve-wi-fi-and-automotive-safety-0>.

38. Monica Allevan, "5.9 GHz fight shifts to court challenge," Fierce Wireless, June 3, 2021. <https://www.fiercewireless.com/regulatory/5-9-ghz-fight-shifts-into-higher-gear>.

39. "Use of the 5.850-5.925," First Report and Order, Further Notice of Proposed Rulemaking and Order or Proposed Modification, ET Docket No. 19-138, Nov. 20, 2020. <https://www.fcc.gov/document/fcc-modernizes-59-ghz-band-improve-wi-fi-and-automotive-safety-0>.

different proposals that could improve the spectrum management regime in the United States.

Updating the Memorandum of Understanding

Coordination sits at the core of the dual agency approach to spectrum management and must remain a key priority for both agencies. Even though the agencies have different constituencies and priorities, both agencies exist to manage radio operations in a way that allows for effective and efficient use of the radio spectrum. Over the years, the two agencies agreed to a memorandum of understanding (MOU) that lays out the respective goals and considerations for each agency as they execute their respective missions.⁴⁰

Unfortunately, the MOU between the agencies has become outdated. The explosion of wireless technologies has quickly put more tension on the agencies than existed when the agencies last updated the MOU in 2003. For example, the existing MOU lacks reference to spectrum sharing, a topic that has become a priority as federal and non-federal users continue to try to find technical solutions that would allow for parties to operate concurrently to the extent possible. Further, the existing MOU provides little opportunity for public participation in this process, meaning the agencies may not have a full understanding of the impact of their decisions.

The NTIA's Commerce Spectrum Management Advisory Committee (CSMAC) recently approved a draft MOU that would update the 2003 MOU to explicitly account for these differing considerations.⁴¹ In particular, the MOU would require the NTIA and FCC to hold public workshops that would allow a diverse group of stakeholders to participate in the coordination process, giving the agencies better technical information regarding operations in the field and how regulatory decisions would impact these operations. Similarly, the CSMAC working group also included provisions to expand the goals of spectrum management to include things like promoting scientific research and safety. These goals already exist to some extent, but making them explicit allows for the agencies to fully consider the impact that spectrum management decisions will have.

40. "FCC and NTIA Memorandum of Understanding on Spectrum Coordination," National Telecommunications and Information Administration, Jan. 31, 2003. <https://www.ntia.doc.gov/other-publication/2003/fcc-and-ntia-memorandum-understanding-spectrum-coordination>.

41. See, e.g., "Draft Memorandum of Understanding Between the Federal Communications Commission and the National Telecommunications and Information Administration," Commerce Spectrum Management Advisory Committee, Jan. 21, 2021. https://www.ntia.doc.gov/files/ntia/publications/csmac_subcommittee_1_mou_01142021.pdf; "Governance: Final Report," Commerce Spectrum Management Advisory Committee, July 30, 2020. https://www.ntia.doc.gov/files/ntia/publications/csmac_scl_report_july_2020_rl.pdf.

Federal operators may find less reason to take their grievances to the public if they know both agencies have fully considered the relevant implications. For example, In the 5.9 GHz band the Department of Transportation (DoT) has argued that the FCC hasn't fully weighed the safety implications of the decision. While it is unlikely that an MOU that clearly lays out the priority of protecting safety would change the outcome at the Commission level it may bring some assurances to the agencies that their interests have been fully weighed so they do not take their grievances to the public as the DoT has done.

While the CSMAC acknowledged that the reach of the MOU is relatively limited and Congressional action will likely be needed to continue to improve the process, the MOU remains a step that would improve the coordination between the agencies and better resolve the inherent tensions between two agencies with different priorities.⁴² The FCC and the NTIA should quickly adopt the new MOU and begin the multi-stakeholder process outlined in the draft MOU.

Improvements to Technical Resources

The FCC and the NTIA have some of the best engineers in the world. However, with so many different issues before the two agencies, situations can arise where the Commission would benefit from additional expertise. In 2018, the FCC launched the honors engineering program, which allows young engineers to find placement within the Commission.⁴³ This type of program is a strong first step in improving the resources available to the Commission. By incentivizing the best and brightest young engineers, the quality of technical analysis will continue to improve over time. It is critical for the Commission to continue to support these efforts, and the NTIA should likewise explore options for younger engineers to find placement with the agency to help draw in talent.

However, these steps may not be enough to fully inform the agencies about specific technical issues that they may be facing. At the heart of the 3.1-3.55 GHz and 24 GHz case studies above lies a question of engineering: will incumbent operators face harmful interference due to the addition of private operators. In almost every radio dispute, the incumbent will find technical support to suggest that the addition of more radio operations will interfere with their service, and the potential new entrants will find the opposite. The FCC and NTIA rely on their engineers to analyze the specific claims and make determinations, but the two agencies may not always agree on the engineering. When this happens, coordination may be difficult as the agencies essentially operate with two separate factual backgrounds.

42. *Ibid.*, p. 11.

43. "FCC Seeks Engineers for Honors Program," Federal Communications Commission, Jan. 16, 2020. <https://docs.fcc.gov/public/attachments/DOC-361952A1.pdf>.

Both the FCC and the NTIA should continue to bring additional expertise to the spectrum management process. Radio disputes have a long history of resolution amongst technical experts, which ultimately leads to the best outcomes. While the increased congestion of operations will undoubtedly lead to situations in which engineers cannot resolve issues, promoting sound technical analysis will continue to limit the need for a concrete decision from either the FCC or the NTIA on the merits of two parties unable to resolve their dispute.

Financial Incentive Reforms

Federal agencies pay little, if anything, for their operating rights.⁴⁴ IRAC, as the history showed, has allowed the first in-line to hold on to those rights. While this stems from a desire to protect critical federal operations, it runs directly counter to modern trends in FCC regulation in which license holders must acquire those rights at auction. Therefore, any reform to the spectrum management regime in the United States must consider methods of creating an economic incentive for federal agencies to relinquish those rights. One possible, carrot-based approach would be overlay auctions.⁴⁵

Currently, commercial license holders can negotiate to relinquish portions of those rights to other private operators. If a particular firm holds operating rights and another firm can derive more value from those rights, the other firm will simply purchase those rights on the secondary market.

Unfortunately, federal agencies currently cannot enter into such agreements for financial compensation. This essentially limits any potential secondary market transactions involving federal incumbents. By allowing federal agencies to participate in the secondary market, part of the existing tension between the NTIA and the FCC is diminished: the federal agencies have a reason to relinquish rights.

Yet this will not entirely solve the challenges because federal agencies are not profit maximizing firms. Clearly, agencies have budgets and must operate within financial constraints, so it would make sense for agencies to participate when available. But ultimately the lack of pressure to maximize revenue will lower the relative value of financial compensation, especially considering the mission of the federal agency taking priority.

44. Michael O’Rielly, “How to Free Up Government Held Spectrum in the Face of Increasing Budgetary Pressure,” Federal Communications Commission, Sept. 6, 2017. <https://www.fcc.gov/news-events/blog/2017/09/06/how-free-government-held-spectrum-face-increasing-budgetary-pressure>.

45. Brent Skorup, “American Spectrum Policy Should Allow More Compensation to Agencies for Clearing and More Geographic-based Sharing,” Mercatus Center Public Interest Comment, Jan. 18, 2019. https://www.ntia.doc.gov/files/ntia/publications/skorup_-_pic_-_developing_a_sustainable_spectrum_strategy_for_americas_future_-_v1.pdf.

Alternatively, Congress could require federal agencies to pay “spectrum fees.”⁴⁶ These fees would be assessed on a valuation, conducted by the NTIA, based on an estimate of the value of those operating rights to private operators. This takes a more stick-based approach, taking away the free operating rights that federal agencies have long enjoyed and forcing them to relinquish rights that are unnecessary to achieve their core objectives.

At a minimum, this approach will incentivize Government agencies to more efficiently utilize bandwidth to make the most within the smallest range of frequencies possible. One core issue is that many incumbents will fail to upgrade their hardware due to a lack of financial incentive to do so. For example, even though a newer, more advanced receiver may be able to better filter noise to limit harmful interference, an incumbent may not upgrade if they have no pressure or incentive to do so (i.e. the quality of service with the bad receiver and existing assignment is the same with a better receiver over a smaller range of frequencies). Forcing agencies to pay fees relative to the bandwidth allocated to the agency will incentivize them to upgrade hardware to minimize these costs.

Further, while this approach would essentially require additional federal funding for agencies to purchase spectrum, the economic benefit of freeing additional bandwidth for commercial use would likely far outweigh these costs. In the c-band auction, for example, the FCC found that the economic benefits of proceeding quickly with an auction would cover any relocation costs for incumbent satellite users. Clearly, federal agencies (like all incumbent operators) would dislike a fee on spectrum usage, but such an approach is critical to resolving the competing tensions between the NTIA and the FCC, as economic considerations will now play a role in all radio allocation and assignment decisions.

STRUCTURAL REFORM

The above proposals target the tension between the NTIA and the FCC in an attempt to approve the collaborative process between the two agencies. These solutions will only go so far, and in many cases the two agencies will still disagree as a matter of policy. Considering neither agency has the final say, disagreements have the potential to boil over beyond the bounds of a specific proceeding and further derail the collaborative process.

As an alternative, Congress could place these decision rights into a single agency, merging the functions of the NTIA and

46. Michael O’Rielly, “Enacting More ‘Stick’ Spectrum Fees for Government Users,” Federal Communications Commission, Sept. 8, 2015. <https://www.fcc.gov/news-events/blog/2015/09/08/enacting-more-sticks-spectrum-fees-government-users>.

the FCC.⁴⁷ This approach represents a more extreme restructuring of the spectrum management regime in the United States. This section does not explicitly endorse such a proposal, but seeks to begin the conversation about how structural reforms could impact the management regime in the United States.

Agency Priorities

At the core of the FCC/NTIA dichotomy is the challenge of priorities. The FCC tends to focus more on economic impact, though obviously considerations like public safety and scientific research play a role. The NTIA tends to focus on protecting federal agencies from any encroachment on operations.

When establishing a single agency, Congress will need to clearly define the priorities for the spectrum management regime. The CSMAC draft MOU presents a good baseline: economic considerations, national security, public safety and scientific research should guide all decisions. Theoretically, any approach could leverage these priorities. However, the FCC may lack the national security expertise of the NTIA, and the NTIA lacks the economic expertise of the Commission (especially in the context of designing auctions). If either agency gains ultimate authority over spectrum management, expertise from the other agency should be incorporated into the new one to prevent loss of institutional expertise.⁴⁸

Executive Branch vs. Independent

Looking at the history of spectrum management highlights the potential hazards with politics and corruption in the management process. The market-oriented approach has alleviated many of the concerns about corruption, but a new agency should be insulated from external influences that seek to impact the decision-making process. Ideally, radio allocation and assignment decisions should be technically and economically driven and not be subject to the lobbying power of a firm or agency.

In that regard, either vesting the power with the FCC or a new independent spectrum management agency would best alleviate these potential concerns. The executive branch is highly responsive to demands of those above them in the chain of command. If an agency makes a decision that a non-expert higher up in the chain-of-command dislikes, there is ultimately little recourse for the expert.

As history has shown, FCC Commissioners and staff are not immune from similar pressures. However, the added layer of

insulation that the FCC maintains means it can better rely on the expertise of staff to make informed decisions regarding a specific situation. This will still be a delicate balance; especially considering that pressures from the executive branch could affect nomination decisions before disputes even arise. However, the independent agency approach would still be preferable to an executive agency, where federal agencies would likely be able to exert oversized influence on the management process.

An independent agency approach does present challenges for executive agencies. National security often takes priority over all other considerations, and though the Commission may understand the priority, the agency could make a decision that negatively affects the public interest. In this hypothetical independent agency only approach, the President would be relatively powerless to address a decision that negatively affects the operations of an agency.

It will be critical, therefore, to institutionalize the expertise of the NTIA's Office of Spectrum Management (OSM) and the IRAC into the FCC or new agency's structure. This will provide the FCC with a strong advocate for the federal agencies that may not have the same economic interest in radio operations but that need certainty regarding their operations. Leveraging this knowledge will limit potential scenarios where federal interests are negatively impacted while still giving the independent agency the requisite authority to make binding decisions when the agencies are not fully utilizing their existing allocations and assignments.

When a federal agency disagrees with a decision, they could still go outside of the process at the new agency and bring their grievances to Congress or the public. Independent agencies, after all, are products of Congress and operate within the directive Congress gives them. If an agency does not like a decision Congress could act after the fact to dictate what the agency must do in a given situation. However, even in these situations, a single regulator would provide additional certainty to market participants and agencies that the decision is final because the authority speaks with a single voice: there would be no conflicting messages between the two regulators. Further, if the new agency successfully incorporates expertise from the NTIA and IRAC, as well as leverages the proposals above to acquire additional technical expertise, the decisions will likely have a fuller record of analysis and considerations that justify the decision. While the disgruntled agency can go outside the process, the facts of a given case will ultimately drive the decision-making, meaning it will be more difficult to gain support on the hill.

47. "Draft Memorandum of Understanding Between the Federal Communications Commission and the National Telecommunications and Information Administration," p. 9. https://www.ntia.doc.gov/files/ntia/publications/csmac_subcommittee_1_mou_01142021.pdf.

48. *Ibid.*, p. 10.

FCC vs. New Agency

If Congress decides to vest authority in an independent agency, the question arises as to whether this agency should be the FCC or an entirely new spectrum management authority.

The FCC already houses significant expertise that can allow the Commission to seamlessly incorporate the expertise from the NTIA and IRAC, and has the institutional knowledge to continue auctioning radio licenses in a quick and efficient manner. Further, the Commission's shift away from a command-and-control model to a market driven approach has led to significant economic benefits. Further, many radio applications are inextricably linked to other telecommunications policy issues that the FCC currently has authority over.

Creating a new agency may end up adding additional tensions between the FCC and the new agency. For example, the FCC has recently taken significant steps to reduce the regulatory barriers to deploying 5G mobile networks.⁴⁹ However, these reforms work in tandem with freeing up additional bandwidth: without the frequency allocations, the reforms will have a limited impact.⁵⁰ If the new agency does not work with the FCC on these issues to allocate additional bandwidth to flexible use operations, the tensions we see currently will continue to grow.

A unified FCC will not emerge without challenges. Commissioners and staff will need additional security clearances to manage federal operations. This may take additional resources, and an expanded spectrum management role could limit the time available to the Commission to cover other important topics. Incorporating the expertise from the NTIA into the FCC will help on both accounts, and should limit these harms.

Case Studies

To exemplify how this would work in practice, this section looks back at the recent issues and analyzes how the proceeding may change.

The 3.1-3.55 GHz band represents the best example of a scenario in which a single agency approach could generate significant efficiencies. Rather than waiting for Congress to act, interested parties could petition the FCC directly to explore shared use of the band, or perhaps relocation of the federal incumbent. With additional authority for the DoD to sell these rights as well, additional incentives will exist for

49. See, e.g., "Accelerating Wireless Broadband Deployment by Removing Barriers to Infrastructure Investment and Accelerating Wireline Broadband Deployment by Removing Barriers to Infrastructure Investment, Declaratory Ruling and Third Report and Order," WT Docket No. 17-79 and WC Docket No. 17-84, Sept. 26, 2018. <https://docs.fcc.gov/public/attachments/FCC-18-133A1.pdf>.

50. Federal Communications Commission, "Carr Announces Plan to Extend U.S. Leadership in 5G," Press Release, March 15, 2021. <https://docs.fcc.gov/public/attachments/DOC-370780A1.pdf>.

the DoD to make more efficient use of their allocations and relocate operations where available. Even if the DoD pushed back on a reallocation, the FCC would be able to analyze the detailed technical analysis and decide to relocate operations or allow additional sharing. Further, with the addition in-house expertise from NTIA experts, if the data suggests that only the top 100 MHz could be shared without harmful interference, the FCC would then likely be able to quickly focus on that top 100 MHz without Congress needing to act. In the alternative, the Commission could decide that the public interest benefits of commercializing additional bandwidth outweighs the negative impacts of potential harmful interference.

While the focus has been on the 3.1-3.55 GHz band, similar processes would exist for all existing federal allocations. If the system changed to a single agency approach the 24 GHz band would likely not encounter any late-stage drama that the dual agency approach generated. By incorporating IRAC into the FCC, these potential concerns could be brought directly to Commission staff early in the process and encourage an open dialogue between technical experts. While NOAA may still ultimately disagree with the Commission, the authority of a single agency would likely give bidders more certainty the finality of the decision.

Finally, in the 5.9 GHz band, DoT would interact with FCC directly rather than going through an additional layer of bureaucracy. This would allow them to stay full apprised of Commission decision-making and the thought-process behind it. The FCC would still ultimately make the policy decision that the allocation to a specific vehicle safety standard just hasn't panned out, but with the clarification of priorities, it is possible a more detailed analysis of the public safety considerations would be included in the final order to alleviate concerns.

Clearly, individual agencies may still disagree with FCC decisions, but with a unified voice on spectrum management, these objections would hold less weight and hopefully be resolved earlier in the process. Finding the right balance will be a difficult task for a new Commission, but granting a single manager of radio operations the authority to make these decisions could ultimately drive more efficient use of the radio spectrum.

CONCLUSION

Spectrum management has always been a collaborative process in the United States, and should remain a key priority moving forward. However, as the table of frequency allocations gets more crowded, disagreements will continue to arise between incumbents and new entrants. This presents a significant challenge for the regulator when it has authority over all parties involved. When two separate authorities

exist, conflict and tension threaten efficient management. Congress should consider process reforms to alleviate these concerns, and begin exploring structural changes that can lead to more efficient management of radio operations in the United States.

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