

**Before the  
NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION  
UNITED STATES DEPARTMENT OF COMMERCE  
Washington, D.C. 20230**

In the Matter of	)	
	)	NTIA Docket No. 230308-0068
Development of a National Spectrum Strategy	)	
	)	Docket NTIA-2023-0003
	)	

**COMMENTS OF  
COMPETITIVE CARRIERS ASSOCIATION**

Competitive Carriers Association (“CCA”)<sup>1</sup> respectfully submits these comments in response to the National Telecommunications and Information Administration’s (“NTIA”) Request for Comments (“RFC”) seeking input on the development and implementation of a National Spectrum Strategy.<sup>2</sup> CCA strongly supports NTIA’s efforts to develop a long-term national strategy to ensure that America’s spectrum resources are efficiently and effectively deployed. Without a strong and stable spectrum pipeline from the planning phase, through the distribution phase, to the deployment phase, the United States risks losing its role as a world leader in spectrum policy and technological innovation. To maintain its global leadership and further promote innovation and competitiveness, it is crucial that the United States establishes a strong and stable long-term spectrum pipeline that contains significant mid-band spectrum available for licensed use.

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<sup>1</sup> CCA is the leading association for competitive wireless providers and stakeholders across the United States. CCA’s members range from small, rural carriers serving fewer than 5,000 customers to regional and nationwide providers serving millions of customers, as well as vendors and suppliers that provide products and services throughout the wireless communications ecosystem.

<sup>2</sup> Development of a National Spectrum Strategy, 88 Fed. Reg. 16,244 (Mar. 16, 2023) (“RFC”).

The National Spectrum Strategy should recognize and reaffirm the economic and consumer welfare benefits that licensed spectrum has produced for the United States and the world. Unlicensed spectrum and spectrum sharing models are important for certain use cases, and often complement exclusive-use licensed services. Ultimately, however, services employing exclusive-use spectrum are the foundation of America’s robust wireless ecosystem, and more of this spectrum is needed to meet insatiable consumer demand. Moreover, mobile service enabled by licensed spectrum has proven especially important to ensuring connectivity in rural areas, where—as the RFC rightly recognized—closing the digital divide represents both a challenge and an opportunity to unlock economic growth.<sup>3</sup>

The RFC also discusses long-term spectrum planning and promoting unprecedented spectrum access and management through technology improvements.<sup>4</sup> CCA supports these efforts as important parts of a strong National Spectrum Strategy. CCA encourages increased engagement with smaller and rural wireless carrier stakeholders, given their unique needs, the significant opportunities new wireless use cases can bring to rural areas, and the significant negative impacts lack of clarity or unexpected spectrum usage issues can have on small and rural carrier business models. With respect to the implementation of new spectrum sharing tools, techniques, and approaches, CCA supports development of solutions such as the Incumbent Informing Capability (“IIC”) but urges real-world testing and significant stakeholder engagement to ensure that any solution meets the need for high-power use with reliable access to spectrum before adoption of novel spectrum-sharing models at scale.

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<sup>3</sup> *Id.* at 16,246-47.

<sup>4</sup> *Id.*

## **I. THE SPECTRUM PIPELINE SHOULD PRIORITIZE MID-BAND SPECTRUM**

### **a. Licensed Spectrum Remains Critical for 5G Innovation and Rural Coverage**

5G mobile data service, like its predecessor 4G, is unlocking innovative new uses and use cases and, in the near future, 6G will continue that trend.<sup>5</sup> The development of these use cases creates an ongoing need for additional licensed, full-power spectrum to realize the benefits enabled by technological progress. For example, the full potential of metaverse, virtual and augmented reality, and holographic applications will require high-bandwidth mobile data transmission; while Wi-Fi and similar indoor solutions will offload some of this traffic, the new applications would be seriously and unnecessarily limited “if only enabled at home.”<sup>6</sup> Other use cases also of particular importance to rural areas such as unmanned aerial vehicles, autonomous vehicles, automation, and precision agriculture will have the best opportunity to thrive under a licensed spectrum framework. Accordingly, and contrary to certain other comments in the record,<sup>7</sup> there continues to be a critical need for additional licensed spectrum.

As the tremendous growth in the nation’s wireless ecosystem has demonstrated, the licensed spectrum model encourages significant investment that drives wireless network deployment and innovation. The licensing model provides certainty and confidence to licensees and other stakeholders. Without the assurance of exclusive control afforded by licensing,

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<sup>5</sup> See, e.g., Qualcomm, *Vision, Market Drivers, and Research Directions on the Path to 6G* 6, 15-16 (Dec. 2022), <https://www.qualcomm.com/content/dam/qcomm-martech/dm-assets/documents/Qualcomm-Whitepaper-Vision-market-drivers-and-research-directions-on-the-path-to-6G.pdf>.

<sup>6</sup> Eliane Semaan et al., *Ericsson, 6G Spectrum - Enabling the Future Mobile Life Beyond 2030*, 6 (Ericsson White Paper GFTL-23:000243 Mar. 2023), <https://www.ericsson.com/en/reports-and-papers/white-papers/6g-spectrum-enabling-the-future-mobile-life-beyond-2030>.

<sup>7</sup> See Comments of Christian Fjeld, Wi-Fi Alliance, *National Spectrum Strategy Listening Session*, NTIA (Mar. 30, 2023), <https://ntia.gov/issues/national-spectrum-strategy/listening-session/march-30> (claiming that full-power, licensed uses are inefficient because “spectrum based applications rarely require continuous access”).

operators would struggle to rationalize long-term business models and to evaluate the potential return from an investment in spectrum access or service infrastructure. Such certainty also promotes U.S. global competitiveness by facilitating research and development and investment in new technologies and use cases.

A licensed spectrum model is particularly important for certain mobile use cases because, under that model, the licensee itself largely controls the interference environment. This certainty and stability are highly depended upon by consumers that increasingly rely on mobile services to meet critical communications needs. By contrast, any user who satisfies device operating requirements can transmit in unlicensed spectrum, which substantially increases interference. For spectrum bands that support Time Division Duplexing (“TDD”), the exclusive-use licensing associated with a full-power model helps to ensure that operators can work together to minimize the potential for interference, including through synchronization of operations, so that bands do not experience unmanageable interference. TDD would not be practical in an environment suffused by unlicensed and unsynchronized use of spectrum. As a result, permitting unlicensed use of these bands would result in inefficient use or underutilization of the spectrum.

Moreover, because licensed spectrum holders have the ability to manage interference, they are able to guarantee that they will transmit particularly valuable or important traffic over low-latency and highly reliable connections. Full-power licensees are also better able to share spectrum with incumbent federal agencies and can create a stable, predictable, and controlled sharing environment that is not possible with unlicensed spectrum. These abilities are critical for many of the public purposes that underpin the National Spectrum Strategy, including emergency response, public safety, and national security uses.<sup>8</sup>

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<sup>8</sup> *RFC*, 88 Fed. Reg. at 16,245.

Licensed mid-band spectrum is especially important to ensure network coverage in rural areas which would otherwise remain underserved, hindering economic growth. Mid-band spectrum has the propagation characteristics currently most suitable for rural deployments given its balanced coverage and capacity characteristics. Furthermore, this spectrum can best accommodate the geographic challenges and population density issues faced in many rural areas, while also potentially limiting network deployment costs more often associated with small cell deployments required with higher band spectrum. Licensed mid-band spectrum can also support the deployment and expansion of Fixed Wireless Access services, complementing its use for mobile connectivity. This added benefit is increasing access to fixed services in otherwise underserved or unserved areas and creating new competitive benefits in markets previously served by a monopoly incumbent carrier. When licensed mid-band spectrum is made available to smaller and rural carriers at maximal power levels and in competitively accessible license sizes, the potential for bridging the digital divide and promoting rural development is maximized.

**b. New Spectrum Sharing Models Must Prioritize Clarity for Spectrum Users and Retain Flexibility to Learn from Experience**

Licensed spectrum offers an easier model for federal incumbent sharing than unlicensed operations would offer, because a license holder can manage the radiofrequency environment and negotiate sharing agreements with other entities, including federal incumbents. A single license holder can work with the relevant regulatory authorities to establish the terms and conditions for sharing spectrum with federal incumbents, and can adapt both network infrastructure and device deployments to changing commercial and government requirements. By contrast, unlicensed spectrum sharing models have so far proven challenging to implement.

For example, the Federal Communications Commission (“FCC”) adopted an innovative sharing scheme for the Citizens Broadband Radio Service (“CBRS”) band,<sup>9</sup> but that sharing model has demonstrated certain weaknesses. CCA members have noted differences in the quality among the Spectrum Access Systems (“SASs”) that automatically coordinate sharing in the band. For example, some SASs do not update information in a timely manner, which can idle spectrum that operators could have put into service and generates other inefficiencies that diminish the capacity and coverage available to consumers.<sup>10</sup> Also, in CCA members’ experience, the power levels authorized may not be maximally efficient, particularly in rural areas, which results in potentially inefficient use of the spectrum and missed opportunities. Further, the FCC has imposed potentially burdensome evidentiary and procedural requirements on responsible CBRS operators to prove others’ non-compliance with the CBRS rules. This potentially raises deployment costs and reduces consumer quality of service.

In the 6 GHz band, the Automatic Frequency Coordination (“AFC”) systems that manage spectrum access<sup>11</sup> have also presented difficulties for spectrum users. Different models used by the various AFC systems seeking to facilitate unlicensed Wi-Fi cause inconsistent results and “pop-up” interference from a wide variety of Wi-Fi connected devices tend to increasingly put incumbent licensed services at risk that is extremely difficult to anticipate or mitigate. Some incumbent microwave service operators, fearing that the AFCs may not be able to effectively protect their services from interference, have chosen to depart from the band. It is important that

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<sup>9</sup> See *Wireless Telecommunications Bureau and Office of Engineering and Technology Conditionally Approve Three Spectrum Access System Administrators for the 3.5 GHz Band*, Public Notice, 36 FCC Rcd 8255 (WTB, OET 2021).

<sup>10</sup> See *infra* at 8.

<sup>11</sup> See generally *Unlicensed Use of the 6 GHz Band*, Report and Order and Further Notice of Proposed Rulemaking, 35 FCC Rcd 3852 (2020), review granted in part, cause remanded by *AT&T Servs., Inc. v. FCC*, 21 F.4th 841 (D.C. Cir. 2021).

the administration and the wireless industry retain flexibility to learn from and improve upon innovative sharing models like these as lessons are learned and sharing scenarios evolve.

A National Spectrum Strategy that seeks to improve upon existing spectrum sharing models could increase efficiency and yield significant benefits. Additional and improved spectrum sharing models that leverage real-time knowledge of incumbent usage, such as the Incumbent Informing Capability, may also prove to be valuable methods of more completely deploying the United States' spectrum resources.<sup>12</sup> But under any sharing model, it is critical that operators have sufficient ability to use the spectrum and sufficient clarity on the impacts of sharing to be able to build a business plan.

**c. Mid-Band Spectrum Should Be Prioritized for Review Through the Spectrum Pipeline**

Maintaining a full spectrum pipeline that includes a mix of low-band, mid-band, and high-band spectrum will allow wireless operators to deliver capacity in urban, suburban, and rural areas and support the full range of use cases that advanced broadband services can deliver now and well into the future. At this time, however, the mobile wireless industry's most pressing need is for additional licensed mid-band radiofrequency spectrum for use in full-power applications. Making more licensed mid-band spectrum available would best position the United States competitively and ensure that innovative services delivered over mobile networks are fully realized for the public's benefit. It would also ensure that rural areas are not left behind, capturing the positive network effects promised by 5G and its future successors.

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<sup>12</sup> Michael DiFrancisco et al., NTIA, *Incumbent Informing Capability (IIC) for Time-Based Spectrum Sharing* (Dec. 14, 2020), [https://www.ntia.gov/sites/default/files/publications/iic\\_for\\_time-based\\_spectrum\\_sharing\\_0.pdf](https://www.ntia.gov/sites/default/files/publications/iic_for_time-based_spectrum_sharing_0.pdf).

In the short term, the 3.1-3.45 GHz band is an ideal candidate for the pipeline and for opening to licensed full-power use. This important mid-band frequency range is adjacent to existing mobile spectrum allocations,<sup>13</sup> “which would help drive lower costs for device manufacturers” when implementing mobile wireless services using these frequencies.<sup>14</sup> It comprises a substantial part of the available mid-band spectrum that is “widely considered necessary to help ensure U.S. leadership in 5G.”<sup>15</sup> Congress has already directed federal agencies, including NTIA, to study this band for potential opening to licensed mobile use.<sup>16</sup>

In the medium term, the National Spectrum Strategy should prioritize bands such as the 3.98-4.2 GHz band and the 7.125-8.5 GHz band. Also, low-band spectrum in the 450 MHz range presents a potentially valuable deployment opportunity that might be useful to some CCA members: its propagation qualities make it ideal for wide-area, narrowband rural and Internet of Things applications.

For the longer term, frequency ranges extending up to 16 GHz would be appropriate for spectrum pipeline consideration, especially as technology evolves to make the upper limits of the mid-band more suitable for rural use. The FCC has recently acknowledged this need by taking important steps toward opening certain upper mid-band spectrum above 7.125 GHz, such as

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<sup>13</sup> 47 C.F.R. § 2.106.

<sup>14</sup> ACCENTURE, SPECTRUM ALLOCATION IN THE UNITED STATES 4 (Sept. 28, 2022), <https://www.ctia.org/news/spectrum-allocation-in-the-united-states>.

<sup>15</sup> National Telecommunications and Information Administration, *Feasibility of Commercial Wireless Services Sharing with Federal Operations in the 3100-3550 MHz Band 1* (July 2020), [https://www.ntia.doc.gov/files/ntia/publications/ntia\\_3100-3550\\_mhz\\_mobile\\_now\\_report\\_to\\_congress.pdf](https://www.ntia.doc.gov/files/ntia/publications/ntia_3100-3550_mhz_mobile_now_report_to_congress.pdf).

<sup>16</sup> See, e.g., MOBILE NOW Act, Division P, Title VI of the Consolidated Appropriations Act of 2018, Pub. L. No. 115-141, 132 Stat. 348, 1100 (Mar. 23, 2018), Infrastructure Investment and Jobs Act, Pub. L. No. 117-58, 135 Stat. 429, 1349 (Nov. 15, 2021); see also Jill C. Gallagher, Congressional Research Service, *Repurposing 3.1-3.55 GHz Spectrum: Issues for Congress* (Mar. 16, 2023).

considering expanding use in the 12 GHz band.<sup>17</sup> Exploring actions such as this should be encouraged as part of the National Spectrum Strategy. In the long term, of course, NTIA, the FCC, and other agencies will need to work together with stakeholders to identify other bands that may be suitable for limited sharing and for full-power licensed use.

## **II. LONG-TERM SPECTRUM PLANNING SHOULD EMPHASIZE THE IMPORTANCE OF STAKEHOLDER ENGAGEMENT**

When developing long-term spectrum plans, it is critical that policymakers work closely with the multitude of stakeholders from both the public and private sectors. The spectrum planning process should allocate sufficient time for all stakeholders to work through the anticipated use cases, appropriate allocation and licensing mechanisms, possible sharing regimes, deployment challenges, and other issues that could affect efficient use of the spectrum by future users and licensees. When a band under consideration includes incumbent or potential governmental users, NTIA and FCC leadership will be vital to ensure cooperation between all agencies and stakeholders. Both nationwide carriers and smaller rural and regional carriers have important perspectives to contribute in these discussions.

Transparency and clarity regarding agreements and decisions made concerning spectrum planning, including clarity regarding future spectrum allocations, is also essential for mobile service providers. Given the magnitude of funds that operators must pay to license spectrum at auction, mobile wireless providers and other licensees need to understand clearly how that spectrum fits into their business plans to evaluate whether to place bids. They also need to be able to rely on the policy frameworks developed and on the spectrum they use and obtain. This

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<sup>17</sup> *Expanding Use of the 12.7-13.25 GHz Band for Mobile Broadband or Other Expanded Use*, Notice of Inquiry and Order, GN Dkt. No. 22-352, FCC 22-80 (rel. Oct. 28, 2022); *In re Expanding Flexible Use of the 12.2-12.7 GHz Band*, Notice of Proposed Rulemaking, 36 FCC Rcd 606 (2021).

is particularly true for smaller and rural carriers with fewer resources and higher dependence on their more limited spectrum holdings. Lack of sufficient clarity and reliability of spectrum assets could leave smaller operators stranded outside of larger national or global communications product ecosystems, which can raise capital and operating expenses, impair or impede interoperability, diminish resiliency, and ultimately frustrate the goal of a competitive wireless broadband market.

In addition to long-term planning to support new competition, it is important to help those already in the wireless ecosystem to flourish and advance their innovation and growth. Smaller and rural wireless service providers, in particular, play a unique and important role in the ecosystem: because they are nimble and highly motivated to reach unconnected areas, they can, and often do, provide wireless coverage in places that others do not. These companies rely on licensed spectrum, but have different needs from nationwide wireless operators. Even fractional bandwidth in discrete geographic areas can contribute meaningfully to robust wireless deployment. Focusing too closely on a nationwide view of the wireless broadband industry or promoting satellite-based services to the exclusion of smaller and regional terrestrial wireless operators might result in overlooking valuable resources that wireless operators could enlist for full-power wireless broadband use to efficiently and effectively serve consumers. Policies facilitating deployment of services using spectrum, such as through deployment and permitting streamlining, could also be a valuable aspect of a National Spectrum Strategy.

Finally, CCA encourages international coordination and harmonization on spectrum allocations wherever possible. Spectrum harmonization can advance U.S. competitiveness and innovative strategic objectives. For mobile wireless stakeholders, international coordination unlocks economies of scale and scope for devices and equipment, and thereby expands choices

and reduces the cost of mobile services to carriers and consumers. A broader universe of equipment and products is particularly beneficial to smaller and rural carriers that typically cannot shape supply chains to meet their unique needs and provides competitive options that might not exist otherwise.

### **III. LIVE TEST BEDS SHOULD BE ENCOURAGED TO PROVE THE ABILITY OF NEW TECHNOLOGIES TO FACILITATE SHARING AND IMPROVE SPECTRAL EFFICIENCY**

As the RFC suggests, technology development can improve both spectrum access and spectrum management.<sup>18</sup> However, policymakers should proceed with caution when imposing novel spectrum management technologies until they have been proven workable in practice in the field. Especially for smaller carriers, inaccurate or misguided assumptions about the effectiveness of spectrum access technologies can lead to significant and costly problems once regulatory requirements are imposed.

For example, in 2015, the FCC created the CBRS spectrum management system to permit spectrum sharing in the 3.5 GHz band by both government and private-sector users.<sup>19</sup> In practice, the CBRS framework has experienced challenges that potentially reduce its widespread use and efficiency. A study suggests that the complexity of CBRS spectrum sharing, and the ability of federal users to claim priority over commercial uses, have discouraged adoption of CBRS spectrum and made unfeasible commercial applications that require consistent availability of bandwidth.<sup>20</sup> The 6 GHz AFC framework demonstrates deep process flaws, including a lack of transparency and a reliance on simulations (unsupported by real-world testing), to conclude

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<sup>18</sup> RFC, 88 Fed. Reg. at 16,247.

<sup>19</sup> *Amendment of the Commission's Rules with Regard to Commercial Operations in the 3550-3650 MHz Band*, Report and Order and Second Further Notice of Proposed Rulemaking, 30 FCC Rcd 3959 (2015).

<sup>20</sup> Recon Analytics LLC, *CBRS: An Unproven Spectrum Sharing Framework* 1 (Nov. 14, 2022), <https://www.ctia.org/news/cbrs-an-unproven-spectrum-sharing-framework>.

that sharing in the band would not result in harmful interference to incumbents. Given the flaws, the eventual operation of AFCs does not offer reliable assurances to incumbents that interference problems will be resolved despite successful modelling.

Real-world testing and experience can help policymakers and the industry avoid these problems when implementing future spectrum sharing models and better ensure efficient use of spectrum. Live test beds can be an important tool for increasing the accuracy of predictions about spectrum sharing, and for mitigating the issues that can result when regulators and industry overestimate the technical capabilities of new sharing methods and tools. As a complement to high-quality modelling, building test beds to see the technical work in action will allow stakeholders to troubleshoot issues before they arise in the marketplace. Test beds should be built in rural areas in particular to accurately assess opportunities in those markets. Similarly, the administration could bolster its National Spectrum Strategy and any new spectrum sharing regimes by seeking out ways to increase the number of experienced spectrum engineers and related workers in the field. This could be particularly helpful in rural areas where such expertise is in high demand. While computer models are valuable, there simply is no substitute for real-world experience when bringing new and untested technologies online to solve a spectrum sharing issue.

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CCA thanks NTIA for its engagement and efforts to develop a comprehensive and meaningful National Spectrum Strategy. A strong, comprehensive National Spectrum Strategy that focuses on licensed mid-band spectrum will position the United States for long-term wireless leadership, encourage innovation and economic development, and meet the evolving

needs of U.S. businesses and consumers. CCA looks forward to continuing to work with the administration and industry stakeholders to develop this strategy.

Respectfully submitted,

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