Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
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Promoting Investment in the 3550-3700 MHz Band	)	GN Docket No. 17-258
	)	

COMMENTS OF CTIA

Umair Javed
Senior Vice President and General Counsel

Scott K. Bergmann
Senior Vice President, Regulatory Affairs

Christiaan Segura
Director, Regulatory Affairs

CTIA
1400 Sixteenth Street, NW
Suite 600
Washington, DC 20036
(202) 736-3200
www.ctia.org

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CTIA[1] submits these comments in response to the Notice of Proposed Rulemaking ("NPRM") issued by the Federal Communications Commission ("Commission") seeking comment on potential changes to the framework for the Citizens Broadband Radio Service ("CBRS") in the 3.55-3.7 GHz ("3.5 GHz") band.[2]

I. INTRODUCTION AND SUMMARY.

The 3 GHz band range is an essential tool for enabling 5G and the promise it delivers. Across the globe, networks are deployed throughout the 3 GHz band, covering the 3GPP n77 and n78 segments spanning 3.3-4.2 GHz. And here in the U.S., wireless providers are leveraging the full-power access opportunities in the 3.7-3.98 GHz ("3.7 GHz") and 3.45-3.55 GHz ("3.45 GHz") bands to expand and enhance 5G connectivity. Wedged between these two key U.S. bands is the CBRS band. It is largely used to augment capacity for wide-area deployments and to provide wireless broadband connectivity, but its usage has fallen short due to its low-power,

[1] CTIA – The Wireless Association® ("CTIA") (www.ctia.org) represents the U.S. wireless communications industry and the companies throughout the mobile ecosystem that enable Americans to lead a 21st century connected life. The association's members include wireless providers, device manufacturers, suppliers as well as apps and content companies. CTIA vigorously advocates at all levels of government for policies that foster continued wireless innovation and investment. CTIA represents a broad diversity of stakeholders, and the specific positions outlined in these comments may not reflect the views of all individual members. The association also coordinates the industry's voluntary best practices, hosts educational events that promote the wireless industry and co-produces the industry's leading wireless tradeshow. CTIA was founded in 1984 and is based in Washington, D.C.

[2] *Promoting Investment in the 3550-3700 MHz Band*, Notice of Proposed Rulemaking and Declaratory Ruling, FCC 24-86 (rel. Aug. 16, 2024) ("NPRM").

preemptible sharing framework. Moreover, the CBRS framework has isolated the U.S. in terms of the 3.5 GHz frequencies as compared to the rest of the world, where this spectrum has been identified as central to 5G. For these reasons, investment and deployment in the CBRS band have yet to pan out on the scale envisioned when this "innovation band" was conceived.

CTIA welcomes the NPRM and supports efforts to modify the CBRS framework, foster increased investment, and drive more efficient technology development and deployment.

First, the Commission should move forward with its proposals to adopt changes made to the CBRS coordination and sharing framework as a result of collaboration among federal partners, industry, and multi-stakeholder fora. These changes have helped pare back some of the overly conservative protections that were a result of worst-case assumptions baked into the CBRS modeling and measurements, which contributed to the band's underutilization. And notably, these changes—developed in close collaboration between government and industry stakeholders—were achieved without any increase of interference to federal operations.

Second, the Commission should adopt its proposals to eliminate unnecessary regulations that have been overcome by events—specifically, the out-of-band emissions ("OOBE") requirements for the adjacent 3.7 GHz band and other protective measures that were adopted years ago for Fixed Satellite Service ("FSS") operators and Grandfathered Wireless Broadband Licensees ("GWBL"), both of which have largely been transitioned from the 3 GHz bands.

Third, the Commission should refrain from adopting its proposal to set aside General Authorized Access ("GAA") spectrum for indoor deployments. Wireless providers and vendors are deploying private and indoor wireless use cases today using not just CBRS spectrum, but a wide variety of licensed and unlicensed spectrum bands as well. To the extent the Commission is seeking to enhance opportunities for deploying private networks and indoor use cases, it

should ensure there is effective licensed, full-power spectrum made available to support such solutions in a secure and customizable way.

Finally, as the Commission continues to evaluate the functionality of the CBRS band, it should look for additional ways to make licensed, full-power spectrum available. America's wireless success has been built on the billions of dollars in investments made by service providers and vendors in developing and deploying successive generations of wireless technologies, which in turn have been predicated on the certainty, security, and wide-area capabilities that only full-power, licensed spectrum can support. It would be imprudent for U.S. spectrum policy to focus solely on sharing strategies in lieu of identifying additional full-power, flexible-use allocations to sustain our wireless future.

II. MID-BAND SPECTRUM—IN PARTICULAR, THE 3 GHz RANGE—IS CRITICAL TO MEETING DEMANDS FOR 5G AND BEYOND.

The availability of effective mid-band spectrum has become increasingly important as demands on our wireless networks continue to skyrocket: last year, wireless data usage in the U.S. was nearly double the amount used just two years ago, and the year-over-year increase represented the largest single-year increase in wireless data ever.[3] Indeed, Americans used more wireless data in 2023 than they did from 2010 to 2018 combined.[4] Data growth is expected to continue, with North American mobile data traffic expected to more than triple by 2029.[5] This should not be a surprise, as consumers rely on wireless access for all facets of their lives and enterprises leverage wireless to advance our economy. Further, consumers across the country

[3] *2024 Annual Survey Highlights*, CTIA, at 3, https://api.ctia.org/wp-content/uploads/2024/09/2024-Annual-Survey-Highlights.pdf ("CTIA 2024 Annual Survey Highlights").

[4] *Id*.

[5] *See Ericsson Mobility Report*, ERICSSON, at 39 (June 2024), https://www.ericsson.com/49ed78/assets/local/reports-papers/mobility-report/documents/2024/ericsson-mobility-report-june-2024.pdf.

are turning to fixed wireless access for their home broadband solutions, with 5G home broadband accounting for 95 percent of net new broadband subscribers in the last two years.[6] Meeting this growing mobile and fixed wireless demand, in turn, requires access to more spectrum.

Across the globe, mid-band spectrum—in particular, the 3 GHz band—provides capacity and coverage that is fundamental to supporting 5G and beyond. Dozens of countries support licensed, full-power operations in this spectrum, including countries that rely on the same radars as those used by the U.S. military in this band.[7] In the U.S., the 3 GHz range has become foundational to our nationwide 5G deployments in the full-power licensed spectrum in the 3.7 GHz and 3.45 GHz bands.[8] The Administration is also exploring the potential for making commercial licensed, full-power opportunities available in the lower 3 GHz range, including in the globally standardized segment above 3.3 GHz.[9] As Chairwoman Rosenworcel has stated,

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[6] *See* CTIA 2024 Annual Survey Highlights at 7; Reply Comments of CTIA, WC Docket Nos. 11-10 & 19-195, at 14-15 (filed Mar. 5, 2024); *see also* Julie King, *Cable keeps lagging in customer satisfaction, compared to fiber and FWA*, FIERCE NETWORK (Jan. 31, 2024), https://www.fierce-network.com/broadband/cable-keeps-lagging-customer-satisfaction.

[7] *See Successful Military Radar and 5G Coexistence in the Lower 3 GHz Band: Evidence from Around the World*, CTIA, at 6 (Aug. 15, 2023), https://api.ctia.org/wp-content/uploads/2023/08/Lower-3-GHz-Report.pdf; *see also*, *e.g.*, *The WRC Series – 3.5 GHz in the 5G Era: Preparing for New Services in 3.3-4.2 GHz*, GSMA (Oct. 2021), https://www.gsma.com/spectrum/wp-content/uploads/2021/10/3.5-GHz-for-5G.pdf.

[8] *See*, *e.g.*, Doug Brake, *CBRS Spectrum Is Lightly Used, Whereas C-Band Is Deployed Extensively*, CTIA BLOG (Sept. 25, 2023), https://www.ctia.org/news/cbrs-spectrum-is-lightly-used-whereas-c-band-deployed-extensively ("[R]eal-world evidence reinforces that the C-Band structure—full-power, licensed spectrum—provides a superior model to quickly put spectrum to use to the benefit of American consumers and enterprises."); Mark Giles, *5G in the U.S. – Additional Mid-band Spectrum Driving Performance Gains*, OOKLA (June 24, 2024), https://www.ookla.com/articles/5g-in-the-us-q1-2024 ("[D]ata shows a clear correlation between the release of additional mid-band spectrum, 5G performance, and consumer sentiment for 5G networks.").

[9] *See National Spectrum Strategy Implementation Plan*, NTIA (Mar. 12, 2024), https://www.ntia.gov/sites/default/files/publications/national-spectrum-strategy-implementation-plan.pdf; *see also* Comments of CTIA on Implementation of the National Spectrum Strategy, at 10, 13-15 (filed Jan. 2, 2024) ("CTIA Strategy Implementation Plan Comments"); *America's Spectrum Policy: A*

"[b]ecause it offers an ideal blend of capacity and coverage, [mid-band] spectrum is key to delivering on the promise of 5G services and ensuring that it reaches as many people as possible."[10]

Unfortunately, the CBRS framework makes the United States an outlier in the 3.5 GHz band, and its distinct three-tier, lower powered approach has contributed to the U.S. falling behind other nations in terms of the amount of robust, mid-band spectrum that is being made available for licensed use. Today, unlicensed and shared mid-band spectrum outpace licensed spectrum in the U.S. by four to one.[11] As compared to peer nations globally, the U.S. also lags behind in licensed mid-band spectrum access and is facing a 520-megahertz mid-band spectrum deficit by 2027 relative to five leading countries.[12] As Commissioner Carr recently highlighted, the U.S. ranks 13th out of 15 leading markets in licensed mid-band spectrum, and "our global competitors and adversaries are passing us by."[13] Moreover, the U.S. also faces a mid-band gap relative to meeting future data demands: without further government action, experts expect a nearly 1,500-megahertz licensed spectrum deficit in the United States by 2032.[14]

Roadmap for Action in 2024, CTIA (Jan. 2024), https://api.ctia.org/wp-content/uploads/2024/01/Americas-Spectrum-Policy-A-Roadmap-for-Action-in-2024.pdf.

[10] Chairwoman Jessica Rosenworcel, Remarks "New Frontier of Partnerships" at Mobile World Congress, at 2 (Mar. 1, 2022), https://docs.fcc.gov/public/attachments/DOC-380838A1.pdf.

[11] *See Spectrum Allocation in the United States*, ACCENTURE, at 2 (Sept. 2022), https://api.ctia.org/wp-content/uploads/2022/09/Spectrum-Allocation-in-the-United-States-2022.09.pdf.

[12] *See Advancing US Wireless Excellence: The Case for Global Spectrum Harmonization*, ACCENTURE, at 4 (Jan. 2024), https://api.ctia.org/wp-content/uploads/2024/01/Advancing-US-Wireless-Excellence-Global-Harmonization.pdf ("Accenture Harmonization Report").

[13] Testimony of Brendan Carr, Commissioner, FCC, Before the U.S. House Committee on Oversight and Accountability, at 9 (Sept. 19, 2024), https://oversight.house.gov/wp-content/uploads/2024/09/Carr-Testimony.pdf.

[14] *See* Coleman Bazelon & Paroma Sanyal, *How Much Licensed Spectrum is Needed to Meet Future Demands for Network Capacity?*, THE BRATTLE GROUP (Apr. 17, 2023), https://api.ctia.org/wp-content/uploads/2023/04/Network-Capacity-Constraints-and-the-Need-for-Spectrum-Brattle.pdf; *see also* Accenture Harmonization Report at 4.

III. THE U.S. SHOULD FOCUS ON BALANCED SPECTRUM POLICIES THAT SUPPORT INVESTMENT IN A VARIETY OF NATIONAL AND LOCAL CONNECTIVITY SOLUTIONS.

A. Licensed, Full-Power Spectrum Remains Essential to Meeting National Broadband Deployment and Innovation Goals.

As discussed, the availability of effective mid-band spectrum is critical to supporting our wireless future. Licensed, full-power spectrum is especially needed, as its rights of assured access and interference protection allow the holder to deliver a high and consistent level of service. This, in turn, provides security, predictable access, and quality of service that consumers expect and that are needed to support mission-critical, interference-protected use cases. It is also foundational for wide-area coverage, including in rural and remote parts of the country.[15] No other spectrum access framework has enabled the combination of massive investment, security, and reliability as full-power licensed spectrum, putting this access model at the forefront of advancing consumer welfare, economic growth, and our national security.

Although CTIA has long supported an approach to spectrum that enables both full-power commercial licensed use and unlicensed use, current U.S. mid-band allocations are out of balance and necessitate a renewed focus on licensed spectrum. There is now an urgent need to ensure that additional licensed mid-band frequencies are made available for full-power use to promote U.S. wireless leadership and help meet growing data demands. It is therefore essential that the U.S. avoid a singular focus on sharing models at the expense of the full-power, licensed spectrum that has made our nation's wireless ecosystem the global leader in the first quarter of the century.

[15] *See*, *e.g.*, Comments of CTIA, Docket No. NTIA-2023-0003, at 19-21 (filed Apr. 17, 2023).

While this proceeding is focused on the CBRS band, there are other bands that warrant action to advance full-power commercial use. To that end, the Commission, National Telecommunications and Information Administration ("NTIA"), and other federal agencies should remain focused on the core tenets of wireless success by making additional spectrum available for full-power, licensed use to support wide-area access by consumer, enterprise, and business users. Notably, this includes completing the studies outlined in the National Spectrum Strategy to make additional licensed, full-power spectrum available in the mid-band range and actively working internationally to promote opportunities for 5G use of the 7.125-8.4 GHz, 4.4-4.94 GHz, and 3.98-4.2 GHz bands.[16]

B. CBRS Has Played a Complementary Role in Our Spectrum Policy Framework, But It Cannot Replace Full-Power Licensing in Supporting Our Nation's Holistic Wireless Needs.

When it was conceived, the CBRS framework was envisioned as an "innovation band" that could "make the 3.5 GHz Band hospitable to a wide variety of users, deployment models, and business cases," including for enterprise and neutral host applications.[17] Yet despite rules that enable such use cases, available evidence shows that CBRS is largely used to augment capacity for wide-area deployments and to provide wireless broadband connectivity.[18] The bespoke framework envisioned for this spectrum in the United States has yet to foster significant

[16] *See*, *e.g.*, Comments of CTIA, OIA Docket No. 24-30 (filed Aug. 20, 2024); Comments of CTIA, GN Docket No. 24-214, at 20-23 (filed Oct. 7, 2024).

[17] *See 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, ¶¶ 2, 6 (2015).

[18] *See CBRS: An Unproven Spectrum Sharing Framework*, RECON ANALYTICS, at 4-5 (Nov. 14, 2022), https://www.ctia.org/news/cbrs-an-unproven-spectrum-sharing-framework (explaining that nine out of top ten PAL auction winners plan to use their spectrum for traditional mobile wireless or fixed wireless purposes) ("Recon Analytics Report").

investment or innovation of any of the wide variety of potential users of the band. And for enterprise users, the CBRS band is just one of many spectrum options to support connectivity.[19]

1. The CBRS framework has been an experiment in the U.S., beginning with a limited, inefficient use of the band, and has evolved over years of collaboration by industry and government stakeholders.

The Commission adopted the CBRS framework as a way to explore new approaches to wireless technology and policy. This exploration was unique, setting the U.S. on its own path for the 3.5 GHz band, which is not aligned with global harmonization efforts.[20] The Commission,[21] Department of Defense ("DoD"),[22] NTIA,[23] and the Department of Commerce Spectrum Management Advisory Committee ("CSMAC")[24] have all recognized the opportunity for this

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[19] *See*, *infra*, Section V.

[20] *See generally* Accenture Harmonization Report.

[21] *See*, *e.g.*, *Promoting Investment in the 3550-3700 MHz Band*, Order, 33 FCC Rcd 4987, 4988, ¶ 2 (WTB/OET 2018) ("*DPA Waiver Order*") (acting on its own motion through the Wireless Telecommunications Bureau and Office of Engineering and Technology to grant a conditional waiver of certain CBRS rules to replace static Exclusion Zones with a more "targeted methodology"—i.e., Dynamic Protection Areas ("DPAs")); *see also* NPRM ¶ 7, n.13 (stating that DPA-enabled SASs offer "a more targeted and faster means to authorize higher power commercial operations in more geographic areas" than the originally adopted Exclusion Zones).

[22] *See*, *e.g.*, Keri Pasquini-Thompson, Deputy Director, Spectrum Policy and Innovation, DoD CIO, Remarks at Announcing CBRS 2.0: The Next Generation of Spectrum Sharing with the U.S. Military, at 14:45 (June 18, 2024), https://www.newamerica.org/oti/events/announcing-cbrs-20/ (discussing a variety of "incremental improvements" to the CBRS framework, including modifications to the aggregate interference model, that were a result of collaboration by DoD with government and industry stakeholders, which created "more stability and predictability" and which opened opportunities to decrease the size of DPA neighborhoods and "increase the fidelity of the propagation model").

[23] *See*, *e.g.*, E. Drocella et al., NTIA Report 15-517, *3.5 GHz Exclusion Zone Analyses and Methodology*, NTIA, at 17 (reissued Mar. 2016), https://its.ntia.gov/publications/download/TR-15-517r1.pdf ("[G]iven the critical missions of federal incumbent systems operating in the 3550–3650 MHz band, it was agreed following some deliberations to take a conservative approach and use a higher percentage for establishing the exclusion zone distances.").

[24] *See* Jennifer Alvarez et al., *CSMAC, Report of Subcommittee on CBRS*, NTIA (Dec. 2023), https://www.ntia.gov/sites/default/files/2023-12/cbrs_subcommittee_final_report.pdf (acknowledging concerns raised by numerous stakeholders regarding the limitations of the CBRS band for wide-area deployments, including its preemptibility and overly restrictive technical limits, resulting in increased costs for deployment and adverse impacts on operations).

framework to evolve. Among its challenges, the initial framework suffered from a lack of real-world modeling, measurements, and system capabilities, which resulted in over-protection of federal incumbents in the band.[25] The multiple, iterative changes to that initial framework have enabled better coordination with federal incumbents and expanded opportunities for commercial use. Nevertheless, the process of starting with an overly conservative approach to protecting federal uses resulted in years of lost opportunity and, by the government's estimates, unnecessarily restricted access to one in five Americans—72 million people.[26]

2. The fundamental characteristics of CBRS—i.e., its low-power, preemptible nature—inhibit efficient spectrum use.

CBRS is a preemptible service that results in unpredictability as to the quality of service a provider may offer, or a user may rely on. The lower power levels have also limited the use of the spectrum, relegating what could have been a globally harmonized band that supports nationwide coverage to a band that serves predominantly to augment capacity for wide-area uses that utilize other existing spectrum bands. These factors contribute to less efficient use of what could otherwise be a target band for robust wide-area 5G deployments.

Contrary to some parties' suggestions that the number of deployed Citizens Broadband Radio Service Devices ("CBSDs") is an indicator of a successful and spectrally efficient sharing framework,[27] it is instead a sign that CBRS-style sharing is inefficient, particularly in rural areas. Technical studies have shown that, to compensate for the low power levels in the band, CBRS

[25] *See*, *e.g.*, Letter from Thomas C. Power, Senior Vice President and General Counsel, CTIA, to Charles Cooper, Acting Director, Institute for Telecommunications, NTIA (May 31, 2023); CTIA Strategy Implementation Plan Comments at 8-9.

[26] Letter from Charles Cooper, Associate Administrator, Office of Spectrum Management, NTIA, to Ronald T. Repasi, Chief, Office of Engineering and Technology, FCC & Joel Taubenblatt, Chief, Wireless Telecommunications Bureau, FCC, GN Docket Nos. 15-319 & 17-258 (dated June 11, 2024).

[27] *See, e.g.*, NPRM ¶ 14 (noting OnGo Alliance statistics purporting that there are more than 370,000 active CBSDs nationwide).

requires five times the number of cell sites typically deployed in suburban areas and seven times as many in rural areas than a typical mid-band spectrum (e.g., 3.7 GHz) site configuration would require—making the investment case even more challenging.[28] Thus, while CBRS spectrum can be used to increase capacity in localized areas, the spectrum cannot be used efficiently to extend broadband across the nation or provide expansive "on-the-go" connectivity, making it ill-suited as a linchpin wireless band.

3. The low power levels and preemptible nature of CBRS have hindered investment and deployment in the band.

Available data show that the CBRS framework has yet to gain meaningful marketplace traction a decade after it was developed. SNS Telecom & IT estimates that investment in CBRS will reach $1.5 billion by 2026[29]—a fraction of the investments that wireless providers are making annually in licensed, full-power deployments.[30] Predictions of CBRS-capable Radio Access Network ("RAN") equipment sales have also been reduced because of lower-than-predicted adoption.[31]

Notably, despite the cable industry's widespread call for more spectrum sharing,[32] they do not appear to be deploying the shared CBRS spectrum that they hold. Rather, cable industry executives have stated publicly that they remain in no rush to deploy in the band, with one cable

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[28] *See* Recon Analytics Report at 7; *see also 5G Mid-Band Spectrum Deployment*, RYSAVY RESEARCH, at 3 (Feb. 11, 2021), https://rysavyresearch.files.wordpress.com/2021/02/2021-02-5g-mid-band-spectrum-deployment.pdf.

[29] Press Release, SNS Telecom & IT, CBRS Network Infrastructure a $1.5 Billion Opportunity, Says SNS Telecom & IT (Sept. 22, 2023), https://www.snstelecom.com/cbrs-network-infra.

[30] *See* CTIA 2024 Annual Survey Highlights at 5 (noting wireless investments of $30 billion last year alone and $190 billion since 2018 when 5G was launched).

[31] *See* Mike Dano, *CBRS isn't living up to expectations – Dell'Oro Group*, LIGHT READING (Jan. 27, 2022), https://www.lightreading.com/5g/cbrs-isn-t-living-up-to-expectations-dell-oro-group.

[32] *See*, *e.g.*, Letter from Traci Biswese, VP & Associate General Counsel, NCTA, to Marlene H. Dortch, Secretary, FCC, ET Docket No. 18-295, et al. (dated Sept. 18, 2024).

provider recently acknowledging it has rolled out CBRS spectrum in just one city.[33] To the extent cable providers put CBRS to use, they use it as part of what one provider called a "capital-light" wireless strategy, i.e. offloading through Wi-Fi and adding capacity via shared spectrum resources in pockets within areas where the company already has an MVPD foothold.[34] This capital-light strategy is confirmed by the Commission's Broadband Data Collection, where Comcast and Charter—two CBRS Priority Access License ("PAL") holders—have not reported any data showing the provision of either mobile or fixed wireless service.[35] Instead, cable companies rely primarily on the wide-area networks of their underlying mobile network operator, which in turn rely on full-power, commercial spectrum for deployments at scale.

CTIA's drive tests also confirm the low level of deployment in the band, as CTIA was unable to identify a single CBRS signal from a cable provider, despite cable operators owning licenses in six of the eight cities examined.[36] To the extent the cable industry or others seek to continue to promote the benefits of CBRS deployment for purposes of informing the Commission's or the Administration's policymaking, they should provide detailed public information on the scope and nature of their current usage of, and investment in, the CBRS band, above and beyond simply pointing to the number of CBSDs deployed.[37]

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[33] Jeff Baumgartner, *Charter still in no hurry to deploy CBRS*, LIGHT READING (Sept. 11, 2024), https://www.lightreading.com/wireless/charter-still-in-no-hurry-to-deploy-cbrs.

[34] Tom Nagel, *Comcast's Evolving Wireless Strategy*, COMCAST (Sept. 21, 2022), https://corporate.comcast.com/stories/comcasts-evolving-wireless-strategy.

[35] FCC National Broadband Map, FCC, https://broadbandmap.fcc.gov/providerdetail/ (last visited Oct. 18, 2024).

[36] *See* NTIA CBRS Data Report (finding, among other things, that outdoor devices are predominant in the limited CBRS landscape).

[37] *See* NPRM ¶¶ 43-44.

4. CBRS proponents overstate the success of the framework in promoting innovation.

In the CBRS auction, 16 of the top 20 PAL winners were traditional communications providers. Those PAL auction winners that are putting CBRS to use are largely using the band to augment other wide-area licensed spectrum or enable wireless broadband connectivity, while others seem to be delaying deployment on CBRS spectrum altogether. NTIA's aggregated data from April 2021 to January 2023—the most recent data available—support this, showing that at least 96 percent of all CBRS deployments during that time were outdoor Category B devices that are largely used to facilitate more traditional broadband deployments.[38] Conversely, less than four percent of the CBSDs deployed in the reporting period were the lower powered, indoor Category A devices that were targeted for innovative uses,[39] suggesting that Category A devices are not desirable in the marketplace. Indeed, OnGo Alliance's recent annual awards—which promote "top achievers" and "innovations in real-world CBRS solutions"—awarded a cable-sponsored partnership with a university that merely "extends public cellular service (of AT&T and T-Mobile subscribers) indoors using shared CBRS spectrum."[40]

In short, the available evidence regarding CBRS usage and investment continues to show that the band has led to inefficient spectrum usage.

[38] NTIA CBRS Data Report at 12, tbl. 3.

[39] *Id*.

[40] Press Release, OnGo Alliance, OnGo Annual Award Winners Announced: Honoring Top Achievers in CBRS Innovation (Mar. 27, 2024), https://ongoalliance.org/news/ongo-annual-award-winners-announced-honoring-top-achievers-in-cbrs-innovation/.

IV. TARGETED CHANGES SHOULD BE MADE TO THE CBRS FRAMEWORK.

A. CBRS Protection Criteria Should Evolve with the Coordination Landscape.

As the Commission highlights, the CBRS protection criteria have been updated various times over the last decade as a result of ongoing collaboration between the Commission, DoD, NTIA, and industry stakeholders. Most notably, these efforts resulted in the *DPA Waiver Order*, which conditionally waived various sections of the Part 96 rules to enable Spectrum Access System ("SAS") administrators to implement an incumbent protection framework using DPAs rather than static exclusion zones.[41] This revised protection criteria model has been iteratively updated over the years, as the Commission details in the NPRM,[42] but the Commission's rules have not been updated to reflect these revisions. The Commission should now adopt its proposal to update its rules to reflect the revised coordination framework,[43] as doing so will better ensure transparency as to the obligations of SAS administrators and expectations for current and future CBRS users.

B. The Commission Should Adjust the Upper-Band OOBE Limit.

The fragmented technical criteria among the bands in the 3 GHz range have hindered deployment, innovation, and economies of scale. In particular, the CBRS OOBE limits make deployment more challenging in a band segment where the U.S. is already an outlier in terms of 5G use. And as the Commission recognizes, the disparate OOBE limits across the 3 GHz bands have made it more difficult for equipment manufacturers to introduce multi-band radio

[41] *See* NPRM ¶¶ 8, 20-21; *see also DPA Waiver Order*.

[42] *See* NPRM ¶¶ 9, 22-25.

[43] *Id*. ¶ 26.

equipment, which can promote deployment efficiencies and reduce the footprint of the network architecture, thereby facilitating mobile and fixed wireless competition.[44]

The Commission should therefore adopt its proposal to relax the CBRS base station OOBE limits at the upper edge of the 3.5 GHz band.[45] Taking this step will promote efficiencies in equipment development and deployment and better enable wider channels, which are foundational to 5G and beyond.[46]

C. Obsolete Regulatory Requirements Governing and Protecting Now-Transitioned Operations Should Be Removed from the Commission's Rules.

The Commission is correct to propose cleaning up its regulations regarding FSS protections now that the 3.7 GHz transition is complete. As the Commission recognizes, while FSS earth stations used for telemetry, tracking, and control ("TT&C") in the 3.7-4.2 GHz band are eligible for protection, "some of those sites have been consolidated or taken off-line as part of the 3.7 GHz transition process."[47] Likewise, some grandfathered FSS operators that retain

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[44] The Commission notes in the NPRM that several requests for waiver have been filed by equipment manufacturers seeking to introduce multi-band devices in the 3 GHz frequency range. *Id.* ¶ 49, n.133. Contrary to the suggestion in the NPRM, however, Samsung does not seek waiver of any rules that would permit higher emissions levels into the CBRS band than are otherwise already permitted under the Part 27 or Part 96 regulations. *See* Samsung Electronics America, Inc. Petition for Waiver, WT Docket No. 23-93 (filed Aug. 23, 2022). Rather, Samsung's narrow request is for a waiver to exceed the 3.7 GHz Service power limits in one specific circumstance: when the radio is being tested. The radios are otherwise fully compliant with the Commission's rules and would speed deployment in both the CBRS and 3.7 GHz bands. The testing approach is, moreover, wholly consistent with the Commission's longstanding application of Section 2.947(f). CTIA continues to urge the Commission to grant the Samsung request as well as the Ericsson waiver seeking similar relief. *See* Letter from Michael Mullinix, VP, Regulatory Affairs, CTIA, to Marlene H. Dortch, Secretary, FCC, WT Docket No. 23-93 (filed Jan. 19, 2024); Letter from Michael Mullinix, VP, Regulatory Affairs, CTIA, to Marlene H. Dortch, Secretary, FCC, WT Docket No. 23-93 (filed Apr. 25, 2024); *see also* Ericsson Petition for Waiver of Rule 96.41(e)(2), Docket No. ____ (filed Mar. 16, 2023).

[45] *See* NPRM ¶¶ 46-49.

[46] *See*, *e.g.*, *5G Mid-Band Spectrum: The Benefits of Full Power, Wide Channels, and Exclusive Licensing*, RYSAVY RESEARCH (Nov. 2022), https://api.ctia.org/wp-content/uploads/2022/11/Rysavy-5G-Midband-Spectrum.pdf.

[47] NPRM ¶ 68.

incumbent status in the 3.5 GHz band may have been decommissioned as a result of the 3.7 GHz transition.[48] The Commission should therefore adopt its proposal to limit incumbent FSS protections to sites that were specifically identified in the 3.7 GHz Report and Order and in annual FSS registration submissions.[49] To the extent necessary, the Commission should modify Rule 96.17 to require FSS operators to provide additional technical or operational parameters as part of their annual registrations to confirm operations.[50]

The Commission should similarly adopt its proposals to eliminate unnecessary rules regarding protections of and by GWBLs in the 3.65-3.7 GHz band now that the transition window for such licensees has closed. Specifically, the Commission should eliminate in its entirety Rule 96.21 regarding GWBL operations and incumbent user protections.[51] In so doing, and to remove any doubt regarding protections for grandfathered FSS stations, the Commission should adopt its proposal to clarify that the protection criteria of Rule 96.17 apply to grandfathered FSS earth stations in the 3.65-3.7 GHz band going forward, consistent with current practice following the GWBL transitions.[52]

V. THE COMMISSION CAN SUPPORT INDOOR USE CASES AND PRIVATE NETWORKS WITHOUT RESERVING SPECTRUM FOR LOW-POWER INDOOR USE.

As the Commission highlights, private and indoor wireless use cases are expected to continue to expand as more consumers, businesses, and enterprises explore customized

[48] *Id*.

[49] *Id*.

[50] *Id*.

[51] *Id*. ¶¶ 69-71.

[52] *Id*. ¶ 69.

networking options.[53] This activity does not hinge on use of CBRS. To the contrary, leading trusted vendors and wireless providers are deploying innovative solutions for indoor and outdoor private and enterprise deployments leveraging a wide variety of licensed, unlicensed, and shared-spectrum technologies,[54] and wireless providers are expanding and densifying their networks to increase capacity to support these deployments.[55]

For example, wireless network operators continue to advance network slicing and private network opportunities to provide targeted connectivity that supports differentiated functionalities for non-traditional verticals, benefitting consumers, enterprises, and government users. Through network slicing, wireless providers can offer a series of logically defined virtual networks over a single physical network for different use cases, including enhanced network security, and it can mitigate environmental impacts by sharing the same network between private and public users, thereby reducing the overall power, space, and land used and waste generated.[56] Many enterprises are also turning to private networks for connectivity, which provide a secure,

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[53] *See*, *e.g.*, *id*. ¶ 76; *see also* Press Release, Dell'Oro Group, Private Wireless RAN Revenues up 24 percent in 2Q 2024, According to Dell'Oro Group (Sept. 17, 2024), https://www.delloro.com/news/private-wireless-ran-revenues-up-24-percent-in-2q-2024/ (projecting private wireless RAN revenues to grow at a 21 percent compound annual growth rate in the next five years).

[54] *See*, *e.g.*, 5G for Enterprise Networking, Ericsson, https://www.ericsson.com/en/reports-and-papers/white-papers/5g-for-enterprise-networking (last visited Oct. 18, 2024); Core Enterprise Solutions, Nokia, https://www.nokia.com/industries/core-enterprise-solutions/ (last visited Oct. 18, 2024); Expanding 5G NR to industrial IoT, Qualcomm, https://www.qualcomm.com/research/5g/5g-industrial-iot (last visited Oct. 18, 2024); David Kim, *Private Networks – The Path to 5G for Enterprise*, Samsung (Mar. 3, 2021), https://www.samsung.com/global/business/networks/insights/webinars/0303-private-networks-the-path-to-5g-for-enterprise/.

[55] *See* CTIA 2024 Annual Survey Highlights at 6 (highlighting that operational cell sites across the U.S. increased by 24 percent since wireless siting reforms were enacted in 2018).

[56] *See* Comments of CTIA, NTIA-2024-0001; 240430–0121, at 7 (filed Aug. 21, 2024); Comments of CTIA, GN Docket No. 24-119, at 18-19 (dated June 6, 2024).

dedicated network in a specific area that can allow an enterprise or campus, for example, to customize and fully control its network resources.[57]

As the Commission highlights, there are already abundant mid-band spectrum resources available in the 6 GHz and 5.9 GHz bands for low-power shared uses that do not require the dedicated quality of service or security that a licensed wireless network might otherwise provide.[58] Indeed, a recent report found that additional unlicensed allocations are unnecessary for the foreseeable future, as Wi-Fi already has access to more unlicensed spectrum than it needs, and more unlicensed spectrum would provide no practical benefit to Wi-Fi users.[59]

Given these available resources and capabilities, there is no demonstrated need for establishing a new set-aside for low-power indoor operations or an enhanced GAA category, and the Commission should therefore not adopt its proposal to reserve GAA spectrum for low-power indoor use.[60] The available data do not suggest that there is a need for such an approach: Category A CBSDs are specifically designed to facilitate indoor use, and there is only very limited use today.[61] Further, this proposal would undermine the underlying purpose of the GAA tier to enable dynamic access by a variety of users by instead promoting some GAA use and

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[57] *See*, *e.g.*, Ericsson, Private Networks, Ericsson, https://www.ericsson.com/en/private-networks (last visited Oct. 18, 2024); Intel, Accelerate Your Private Network Deployment, Intel, https://www.intel.com/content/www/us/en/wireless-network/private-networks.html (last visited Oct. 18, 2024); Private Networks, Nokia https://www.nokia.com/networks/private-networks/ (last visited Oct. 18, 2024); Expanding 5G NR to industrial IoT, Qualcomm, https://www.qualcomm.com/research/5g/5g-industrial-iot (last visited Oct. 18, 2024); Tapping into Industry 4.0, Samsung, https://www.samsung.com/global/business/networks/solutions/private-networks/ (last visited Oct. 18, 2024).

[58] *See* NPRM ¶¶ 76-77.

[59] *See* Richard Bennett, *Lessons from the History of Wi-Fi*, HIGHTECH FORUM (Oct. 2024), https://api.ctia.org/wp-content/uploads/2024/10/WiFi-Lessons_RB.pdf.

[60] NPRM ¶ 78.

[61] NTIA CBRS Data Report at 8 (providing data showing that just 3.5 percent of all active CBSDs during the reporting period were for Category A (indoor) devices).

users over others. The Commission should steer clear of assigning preferential or elevated rights to certain GAA users.

To the extent the Commission seeks to further encourage indoor deployments and/or private networks, it should make additional full-power, licensed spectrum available, which can enable wide-area coverage and be used to support customized, quality of service, and security-dependent uses for enterprises and consumers.

VI. CONCLUSION.

The CBRS band has been underutilized to date and has made the U.S. an outlier in a frequency range that is central to licensed, full-power 5G deployments across the globe. The Commission should move forward with its proposals to incorporate changes to the coordination and sharing framework for this spectrum, consistent with CTIA's comments here. As it does so, the Commission and the Administration should remain focused on advancing opportunities for licensed, full-power spectrum use, which has been the linchpin of U.S. wireless success as a proven model for supporting investment, innovation, and connectivity across the country.

Respectfully Submitted,

/s/ Christiaan Segura

Christiaan Segura
Director, Regulatory Affairs

Umair Javed
Senior Vice President and General Counsel

Scott K. Bergmann
Senior Vice President, Regulatory Affairs

CTIA
1400 Sixteenth Street, NW
Suite 600
Washington, DC 20036
(202) 736-3200

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