

Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of)	
)	
Promoting Investment in the 3550-3700 MHz)	GN Docket No. 17-258
Band;)	
)	
Petitions for Rulemaking Regarding the Citizens)	RM-11788 (Terminated)
Broadband Radio Service)	RM-11789 (Terminated)

NOTICE OF PROPOSED RULEMAKING AND ORDER TERMINATING PETITIONS

Adopted: October 24, 2017

Released: October 24, 2017

Comment Date: (30 days after date of publication in the Federal Register)

Reply Comment Date: (60 days after date of publication in the Federal Register)

By the Commission: Chairman Pai and Commissioners O’Rielly and Carr issuing separate statements, Commissioner Clyburn concurring and issuing a statement, Commissioner Rosenworcel dissenting and issuing a statement.

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I. INTRODUCTION

1. In this Notice of Proposed Rulemaking (Notice), we seek comment on several proposed changes to the rules governing Priority Access Licenses (PALs) that will be issued in 3550-3700 MHz band (3.5 GHz Band)—including longer license terms, renewability, larger geographic license areas, and auction methodology. These changes are consistent with the service rules and license assignment models that helped foster the development of 4G and LTE services in the United States. We anticipate that adopting similar rules for the 3.5 GHz Band similarly will encourage robust investment in network deployment. We also seek comment on changes to the technical rules that could facilitate operations over wider bandwidths while ensuring that current and future incumbent operations continue to be protected from interference.¹ In addition, we seek changes to the information security requirements that would help safeguard private information and protect critical infrastructure.

2. Since the Commission established these rules,² it has become increasingly apparent that the 3.5 GHz Band will play a significant role as one of the core mid-range bands for 5G network deployments throughout the world.³ In that time, several countries have moved forward with policies that would make this band available for 5G,⁴ global bodies have developed standards for next generation devices in the band,⁵ and new technologies have become available that more fully leverage the potential of this spectrum. In the two years since the Commission first adopted rules for this “innovation band,” it has authorized service in other bands that also will be critical to 5G deployment,⁶ and we are currently evaluating additional bands for 5G use.⁷ To maintain U.S. leadership in the global race for 5G, we must ensure that the service rules governing bands that are critical for 5G network deployments—including the 3.5 GHz Band—keep up with technological advancements, create incentives for investment, encourage efficient spectrum use, support a variety of different use cases, and promote robust network deployments in both urban and rural communities.

3. In light of international attention and given the international focus on commercial deployments in the 3.5 GHz Band, global harmonization will promote innovation and investment by allowing for efficiency-promoting economies of scale.⁸ We anticipate that the targeted changes

¹ See 47 CFR §§ 96.15, 96.17, and 96.21.

² See generally *Amendment of the Commission’s Rules with Regard to Commercial Operations in the 3550-3650 MHz Band*, GN Docket No. 12-354, Report and Order and Second Further Notice of Proposed Rulemaking, 30 FCC Rcd 3959 (2015) (*First Report and Order or Second FNPRM*, as applicable).

³ See, e.g., T-Mobile Reply Comments at 3-4 (“Circumstances have changed since the Commission initiated [the 3.5 GHz proceeding] in 2012. International focus on 5G spectrum has shifted to mid-band spectrum with the 3.5 GHz band in the spotlight.”).

⁴ See GSM Association (GSMA) Reply Comments at 1-3 (detailing international initiatives to make spectrum in the 3 GHz band available for 5G in Australia, China, Japan, Singapore, the United Kingdom, Ireland, Italy, and Germany).

⁵ See 3rd Generation Partnership Project (3GPP), TR 36.744 v14.0.0, *CBRS 3.5 GHz band for LTE in the United States* (Release 14).

⁶ See *Use of Spectrum Bands Above 24 GHz for Mobile Radio Services et al.*, GN Docket No. 14-177 et al., Report and Order and Further Notice of Proposed Rulemaking, 31 FCC Rcd 8014, 8020, paras. 6-7 (2016) (*Spectrum Frontiers R&O and FNPRM*).

⁷ See *Expanding Flexible Use in Mid-Band Spectrum Between 3.7 and 24 GHz*, GN Docket No. 17-183, Notice of Inquiry, 32 FCC Rcd 6373 (2017) (*Mid-Band Spectrum NOI*).

⁸ See T-Mobile Reply Comments at 3 (arguing that re-assessment of the 3.5 GHz Band will allow the Commission to recognize global harmonization to “best promote innovation and investment in the 3.5 GHz band, and . . . allow for efficiency-promoting economies of scale”).

considered in this Notice will foster an investment environment for the band to flourish in the United States, as other nations target these frequencies for 5G and next-generation technologies.⁹

4. A number of commenters maintain that the current PALs paradigm generally does not incentivize investment. As discussed further below, they argue that the current combination of short license terms, small license areas, and lack of renewability will diminish interest in the band. And those that do invest nonetheless, they argue, risk having that investment stranded in just three years. Other entities maintain that they prefer the rules previously adopted by the Commission. This Notice is designed to develop a thorough record about the investment-backed expectations of all interested stakeholders and we seek comment on the appropriate balance moving forward.

II. BACKGROUND

5. In 2015, the Commission adopted rules for commercial use of 150 megahertz in the 3.5 GHz Band.¹⁰ Specifically, the *First Report and Order* created a three-tiered framework to coordinate shared federal and non-federal use of the band. Incumbents comprise the highest tier and receive protection from all other users, followed by PAL, the second tier, and General Authorized Access (GAA), the third tier.¹¹ PALs receive protection from GAA operations;¹² GAA is licensed-by-rule and must accept interference from all other users.¹³ Automated frequency coordinators, known as Spectrum Access Systems (SASs), will coordinate operations between and among users in different access tiers.¹⁴ The service and technical rules governing the 3.5 GHz Band were adopted as the new Part 96 of the Commission's rules.¹⁵

⁹ See Petition of CTIA for Rulemaking to Amend the Commission's Rule Regarding the Citizens Broadband Radio Service in the 3550-3700 MHz Band, RM-11788, at 4 (filed June 16, 2017) (CTIA Petition).

¹⁰ See generally *First Report and Order*, 30 FCC Rcd 3959.

¹¹ Incumbent users include federal radiolocation users, Fixed Satellite Service earth stations, and, for a finite period, certain grandfathered terrestrial wireless licensees in the 3650-3700 MHz band. See *id.*, 30 FCC Rcd at 3964-3967, paras. 15-22 (detailing incumbent use of the band); *id.* at 4075-4080, paras. 400-412 (adopting protections for grandfathered terrestrial wireless operations for five years or until the end of the license term, whichever is longer). The Commission collaborated with the National Telecommunications and Information Administration (NTIA) on protections for Department of Defense radar systems. See *id.*, 30 FCC Rcd at 4035-4042, paras. 247-275 (discussing NTIA recommendations for incumbent protection). Non-federal incumbents must register the parameters of their operations with the Commission and/or an SAS to receive interference protection. See 47 CFR §§ 96.15, 96.17, 96.21.

¹² See *First Report and Order*, 30 FCC Rcd at 3962, para. 4. PALs will be assigned in up to 70 megahertz of the 3550-3650 MHz portion of the band. See *id.*, 30 FCC Rcd at 3982, para. 67 (reserving 70 megahertz—i.e., seven ten megahertz channels—for PALs in a given license area).

¹³ See *id.*, 30 FCC Rcd at 4009, para 156. GAA users can operate throughout the entire 150 megahertz of the 3.5 GHz Band on any frequencies not in use by PALs. See *id.*, 30 FCC Rcd at 4011, paras. 159-161. GAA users may use only certified, Commission-approved devices and must register with the SAS. *Id.* at 4012, para. 162

¹⁴ The three-tier access framework adopted in the *First Report and Order* is generally consistent with proposals in the Commission's 2014 Further Notice of Proposed Rulemaking. See generally *Amendment of the Commission's Rules with Regard to Commercial Operations in the 3550-3650 MHz Band*, GN Docket No. 12-354, Further Notice of Proposed Rulemaking, 29 FCC Rcd 4273 (2014) (3.5 GHz FNPRM). See also *Commission Seeks Comment on Licensing Models and Technical Requirements in the 3550-3650 MHz Band*, GN Docket No. 12-354, Public Notice, 28 FCC Rcd 15300 (2013); *Amendment of the Commission's Rules with Regard to Commercial Operations in the 3550-3650 MHz Band*, GN Docket No. 12-354, Notice of Proposed Rulemaking, 27 FCC Rcd 15594 (2012).

¹⁵ See generally *First Report and Order*, 30 FCC Rcd 3959; 3.5 GHz FNPRM, 29 FCC Rcd 4273. See also 47 CFR, Part 96. While the Commission adopted a complete set of rules and policies for the establishment of the Citizens Broadband Radio Service, it also determined that a few focused issues required further record development, and simultaneously released the *Second FNPRM*. The Commission resolved these issues in its *Second Report and*

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6. In June 2017, both CTIA and T-Mobile (together, Petitioners) filed petitions for rulemaking, which ask the Commission to reexamine several of the PAL licensing rules.¹⁶ CTIA proposes several changes to the PAL licensing rules; T-Mobile supports CTIA's proposals and makes additional proposals, including proposed changes to the amount of spectrum available for PALs and to the technical rules governing the 3.5 GHz Band. Petitioners argue that these changes are necessary to promote 5G network deployment in the Citizens Broadband Radio Service.¹⁷

7. Petitioners also point to Congress's introduction of the AIRWAVES Act and the Commission's *Mid-Band Spectrum NOI* as further illustrating the importance of mid-band spectrum. With respect to the *Mid-Band Spectrum NOI*, T-Mobile argues that the Commission "should consider now how the 3.5 GHz rules can be best positioned to take into consideration potential use of the 3.7-4.2 GHz band for 5G mobile broadband use in the future."¹⁸ Petitioners argue that their proposals do not "seek the type of fundamental changes to rules governing the 3.5 GHz band that would strand past investment" and that the Commission's consideration of the changes will not delay introduction of commercial service in the 3.5 GHz Band.¹⁹

8. The Wireless Telecommunications Bureau and Office of Engineering and Technology sought comment on the Petitions—and on related issues raised in *ex parte* communications—on June 22, 2017,²⁰ and received comments and reply comments from more than 120 parties.

III. NOTICE OF PROPOSED RULEMAKING

A. PAL Licensing Rules

1. License Term and Renewability

9. *Background:* The rules adopted in the *First Report and Order* established a three-year license term for PALs.²¹ Under the current rules, at the end of its term, a PAL will terminate automatically and may not be renewed.²² During the first application window, however, an applicant may

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Order. At the same time, the Commission addressed multiple petitions for reconsideration of the *First Report and Order* in a simultaneously released *Order on Reconsideration*. See generally *Amendment of the Commission's Rules with Regard to Commercial Operations in the 3550-3650 MHz Band*, GN Docket No. 12-354, Order on Reconsideration and Second Report and Order, 31 FCC Rcd 5011 (2016) (*Order on Reconsideration* or *Second Report and Order*, as appropriate).

¹⁶ CTIA Petition; Petition of T-Mobile USA, Inc. for Rulemaking To Maximize Deployment of 5G Technologies in the Citizens Broadband Radio Service, RM-11798 (filed June 19, 2017) (T-Mobile Petition) (together, the Petitions).

¹⁷ See CTIA Petition at 3-6, T-Mobile Petition at 5-9.

¹⁸ T-Mobile Reply Comments at 3.

¹⁹ *Id.* at 6; see CTIA Petition at 1-2. See also Letter from Scott K. Bergmann, Vice President, Regulatory Affairs, CTIA, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-354 et al., at 1-2 (filed Oct. 12, 2017) (CTIA *Ex Parte*) ("[T]he limited proposals in [the] Petition for Rulemaking in this proceeding were designed to maximize investment and innovation in this spectrum without undermining the novel three-tier spectrum framework that the Commission designed to encourage innovation in the band.").

²⁰ *Wireless Telecommunications Bureau and Office of Engineering and Technology Seek Comment on Petitions for Rulemaking Regarding the Citizens Broadband Radio Service*, GN Docket No. 12-354, RM-11788, RM-11789, Public Notice, 32 FCC Rcd 5055 (WTB/OET 2017).

²¹ See 47 CFR § 96.25(b)(3); *First Report and Order*, 30 FCC Rcd at 3394, para. 105. This was longer than the one-year license term originally proposed in the 3.5 GHz FNRPM.

²² See 47 CFR § 96.25(b)(3); *First Report and Order*, 30 FCC Rcd at 3394, para. 105.

apply for up to two consecutive three-year terms for a given PAL.²³ During subsequent regular application windows, only the next three-year license term will be made available for any given PAL.²⁴

10. Petitioners ask the Commission to increase the PAL license term to ten years, and to include an expectation of renewal.²⁵ Petitioners and some commenters argue that a longer, renewable license term will better encourage investment in the 3.5 GHz Band,²⁶ stressing that a three-year term with automatic termination creates a risk that Priority Access licensees will face stranded investment in just three (or, initially, six) years.²⁷ Petitioners and some commenters also disagree with the assumption underlying the current rule—that a user’s ability to switch between Priority Access and GAA use will provide sufficient incentives for investment.²⁸ T-Mobile argues that the current rule does not account for challenges “that providers have reported experiencing in the real world today”²⁹ that can delay network deployment. For example, CTIA cites difficulties in obtaining siting approvals, which they argue are magnified in this band, given the complexity of rolling out a high number of small cell deployments.³⁰

11. CTIA and several commenters also note that a ten-year, renewable licensing scheme is consistent with the Commission’s “proven approach” in most other licensed mobile bands,³¹ including the

²³ See 47 CFR § 96.27(b). Even if the same licensee purchases two PALs in the same license area during the first auction, the second license will not be considered a renewal. Rather, the two licenses will be considered independent initial licenses that automatically terminate at the end of their respective terms.

²⁴ *Id.*

²⁵ See CTIA Petition at 6-9; T-Mobile Petition at 11-13.

²⁶ See, e.g., 5G Americas Comments at 12, AT&T Comments at 3-4 (ten-year term with expectation of renewal will “enhance the value of PAL licenses at auction and will encourage investment in 3.5 GHz equipment and services”); Boingo Wireless Comments at 1 (arguing that neutral host operators will be negatively affected because carriers will be less willing to invest in networks with shorter than ten-year license terms), Ericsson Comments at 6; GeoLinks Comments at 2; Nokia Comments at 4-5; Verizon Comments at 4-5; CTIA *Ex Parte* at 2; Letters from Danielle Pineres, Associate General Counsel, NCTA, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 17-258 et al., at 2 (filed Oct. 12, 17, 2017) (noting cable industry’s support for reasonable changes to PAL license term and geographic area that will facilitate investment by a wide variety of providers in the band). *But see* Letter from Phillip Berenbroick, Senior Policy Counsel, Public Knowledge, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 17-258 et al., at 3-4 (filed Oct. 17, 2017) (raising concerns about the impact of larger license areas on the sharing framework).

²⁷ See CTIA Petition at 6 (arguing that this, in turn, will diminish the attractiveness of PALs, depress applications for licensed use of the spectrum, and threaten the overall potential of the three-tiered Citizens Broadband Radio Service spectrum access regime); T-Mobile Petition at 11-12 (same); AT&T Comments at 3-4 (contending that three years is insufficient to ensure a return on investment) Boingo Wireless Comments at 1 (same); Ericsson Comments at 6 (same); Nokia Comments at 4 (arguing that it takes “several quarters to standardize a new frequency band, another year to develop infrastructure equipment and certify it, and over a year to deploy a network” making the non-renewable three-year term a barrier to investment). Nokia adds that the small cell deployments envisioned for the band “will add a greater layer of complexity to roll-out.” Nokia Comments at 5

²⁸ See, e.g., CTIA Petition at 6; T-Mobile Petition at 12 (citing *Order on Reconsideration*, 31 FCC Rcd at 5022, para. 45); Ericsson Comments at 10 (“Presumably, a carrier that invests in a PAL has a business reason to require the interference protection and certainty that a PAL ensures.”); United States Cellular Corp. (USCC) Comments at 7 (“This reasoning, however, is based on the false premise that a former licensee’s operations could be adequately accommodated via access to the 3.5 GHz band on a GAA basis.”).

²⁹ T-Mobile Petition at 12.

³⁰ CTIA Petition at 6.

³¹ See, e.g., CTIA Petition at 9; AT&T Comments at 5 (citing WCS, AWS-1, BRS/EBS, AWS-4, and H Block licenses as having 10-year terms with renewal expectancy); Verizon Comments at 5 (arguing that for bands with novel or challenging characteristics like AWS-3 and 600 MHz, the Commission found that longer initial terms were
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bands at issue in the *Spectrum Frontiers* proceeding which, like the 3.5 GHz Band, “will see network deployments comprised mostly of small cells.”³² Others argue that ten-year terms would harmonize the U.S. approach with the global approach to actively encourage 5G network deployment in the mid-band spectrum.³³

12. Other commenters, however, support the existing rules. They argue that a longer, renewable license—combined with other potential rule changes sought by the Petitioners—would make PALs economically viable investments only for large entities, and would convert the 3.5 GHz Band from an innovative framework into a traditionally licensed band.³⁴ These commenters also argue that the investments already made in the band based on the current rules belie concerns about barriers to investment and that any changes to the band should permit a diversity of deployment models and use cases and not be solely designed for the benefit of one technology (i.e., 5G).³⁵

13. *Discussion:* We propose to revise our rules by increasing the PAL license term from three years to ten years and by eliminating the requirement that PALs automatically terminate at the end of the license term. We also seek comment on this change and on the appropriate performance requirements and renewal standards for PALs. This approach is consistent with that adopted for other wireless services and will afford each licensee sufficient time to design and acquire the necessary equipment and devices and to deploy facilities across the license area. We invite detailed comments on this proposal from all stakeholders.

14. We seek comment on whether the proposed rule changes will affect investment already made, as well as how they will incentivize future investment, in this band. What specific impact will a longer, renewable license have on investments and business plans already underway? How will the proposal affect investment in the future, particularly given the longer term of ten years and the possibility of renewal? To what extent would a longer license term with the possibility of renewal facilitate the deployment of a wide array of technologies?

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in the public interest) Qualcomm Comments at 7 (arguing that this approach that “has helped make the United States the global leader in wireless”).

³² Qualcomm Comments at 6-7. *See also* TIA Comments at 2 (noting that, in the *Spectrum Frontiers* proceeding, the Commission explained that longer license terms were appropriate in bands where nascent technology will require time to fully develop); Verizon Comments at 4-5 (same); USCC at 6 (noting that the mmW bands, like the 3.5 GHz Band, will be used for 5G network deployment).

³³ *See* 5G Americas Comments at 4, 8, and 11; GSMA Reply Comments at 3-5. *See also* AT&T Comments at 1-2; Qualcomm Comments at 3 (“These requested modifications will help promote U.S. investment in the 3.5 GHz band and help the U.S. continue its global leadership as 5G begins to launch commercially around the world . . .”).

³⁴ *See, e.g.*, Dynamic Spectrum Alliance (DSA) Comments at 7; Rural Wireless Association and NTCA—The Rural Broadband Association (RWA/NTCA) Comments at 7 (arguing that the proposed change would hinder “deployments by a wide range of service providers [at] lower costs of entry); Southern Linc Comments at 6-7 (“Changing the licensing framework of the [Citizens Broadband Radio Service] band to conform with the existing licensing models for other bands would defeat the entire purpose of making this band ‘hospitable to a wide variety of users, deployment modes, and business cases[.]’” (citation omitted)); Wireless Internet Service Providers Association (WISPA) Comments at 7 (arguing that a longer-term, renewable license would drive up the price of PALs to amounts that small providers cannot afford). *See also* RWA/NTCA Comments at 9 (“Applying the traditional exclusive licensing regime model to the CBRS would completely undercut the Commission’s innovative objectives with the band and would encourage large providers to accumulate CBRS spectrum in contravention of Section 309(j) of the Act ‘to prevent stockpiling and warehousing of spectrum.’” (quoting 47 U.S.C. § 309(j))); Open Technology Institute and Public Knowledge (OTI/PK) Comments at 20-21, 26-27.

³⁵ *See, e.g.*, DSA Comments at 5; Google and Alphabet Access (Google) Comments at 17-18; Southern Linc Comments at 4; WISPA comments at 5-6.

15. We also seek comment on how a longer, renewable license term for PALs could affect deployments in rural areas.³⁶ Does the proposed rule change effectively promote “the development and rapid deployment of new technologies, products, and services to benefit the public, including those residing in rural areas?”³⁷ Given concerns raised by WISPA and other commenters about access to spectrum in rural areas, does the proposed rule change appropriately balance the objectives in Section 309(j)?³⁸ Do these arguments present a persuasive case for maintaining the current three-year license term for PALs in rural areas? Further, does extending the license term to ten years lead to barriers to exit for companies that could impede innovation and investment or is the ability to return a license to the Commission sufficient to allay such concerns?

16. Additionally, we seek comment on alternative approaches to the length of the license term, including different, hybrid approaches for particular subsets of PALs (*e.g.*, three years for some PALs, five years for some, and ten for yet others). Many of these other approaches are already in the record. For example, Charter proposes a six-year renewable term, Motorola Solutions proposes a five-year term with only a single renewal allowed, and Southern Linc and WISPA suggest that a subset of PALs could have a five-year term, with PALs seeking renewal paying a fee.³⁹ What other alternative licensing terms and conditions might be appropriate for this band? What impact would these alternatives have on investment, deployment, and on smaller or rural entities seeking PALs? Commenters that submit alternative proposals should include a cost-benefit analysis to support their approach.

17. If the license term is increased to ten years with the possibility of renewal, PALs would more closely resemble other licenses issued by the Commission under its auction authority. Such licenses include performance requirements—typically construction requirements—and many services also include renewal standards.⁴⁰ Some commenters argue that, if PALs are licensed for a ten-year, renewable term, the Commission should impose construction requirements on Priority Access licensees, as it has for other licensed wireless services.⁴¹ We seek comment on whether, if we adopt longer term, renewable PALs, it would serve the public interest to adopt certain performance requirements to ensure that the spectrum is put to its best use in an efficient and effective manner. If so, what types of performance requirements would be appropriate? Which performance metrics (*e.g.*, population coverage, geographic coverage) and benchmarks would be appropriate? Does the opportunistic GAA use of the band—including unused PAL channels—alleviate concerns involving spectrum warehousing or otherwise satisfy the Commission’s

³⁶ See, *e.g.*, Viaero Wireless Comments at iii-iv (“The proposal would have alarming consequences for rural consumers, because it would make it extremely difficult, if not impossible, for small rural broadband providers . . . to continue utilizing 3650-3700 MHz spectrum.”); WISPA Comments at 6-7 (arguing the current rules support rural broadband). *But see* GeoLinks Comments at 2-3 (WISP serving largest coverage area of any singled fixed WISP in California, supportive of a ten-year PAL, but urging the Commission to ensure “that such licenses are allocated in ways that allow for robust competition”).

³⁷ 47 U.S.C. § 309(j)(3)(A).

³⁸ See, *e.g.*, *id.* § 309(j)(3)(B) (setting goals of “avoiding excessive concentration of licenses” and “disseminating licenses among a wide variety of applicants . . .”); *id.* § 309(j)(3)(C) (setting goal of “efficient and intensive use of electromagnetic spectrum”).

³⁹ See Charter Comments at 3; Motorola Solutions Comments at 5; Southern Linc Comments at 9-10; WISPA Comments at 19-20. See also RWA/NTCA Comments at 10 (supporting a PAL license term ranging from three to five years with the opportunity to renew); NCTA Reply Comments at 5 (urging the Commission to seek comment on compromise proposals); Letter from Stephen E. Coran, Counsel to WISPA, Lerman Senter PLLC, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 17-258 et al., at 2 (filed Oct. 19, 2017) (WISPA *Ex Parte*) (suggesting it could support PAL terms of five years with one five-year renewal “*so long as census tracts remain the geographic bidding unit for PALs*” (emphasis in original)).

⁴⁰ 47 U.S.C. § 309(j)(4)(B); see, *e.g.*, 47 CFR § 27.14 (construction requirements for AWS, WCS, BRS/EBS).

⁴¹ See, *e.g.*, Starry, Inc. (Starry) Comments at 6; OTI/PK Comments at 26-27.

statutory obligations? If so, how can we take that into account in determining performance requirements for longer term, renewable PALs?

18. In addition, to obtain renewal, a licensee generally must show that it has continued to provide at least the initially-required level of service necessary to satisfy its performance requirement, and that it has substantially complied with the Communications Act and Commission rules. If we adopt the proposed changes to PALs, what standard, if any, would be appropriate for the Commission to apply at the end of the PAL license term to determine whether renewal is warranted?⁴² Would such a requirement be appropriate in this band? If so, how should it be applied and what level of service should be used as a renewal standard?

19. Some commenters have argued that, instead of renewability, the licenses should be reauctioned at the end of the license term. For example, Paul Milgrom describes an auction format under which an incumbent would be required to bid for a renewal of its license at the end of the license term, but it would be given a bidding credit so that, if it won, it would have to pay only a fraction of the auction-determined price.⁴³ Moreover, if the incumbent loses, it would be compensated with a transferable bidding credit to apply to the purchase of other outcomes.⁴⁴ Milgrom argues that this would mitigate the risk that the incumbent licensee's investments may become stranded.⁴⁵ We seek comment on this approach and its assumptions, as well as on other approaches that might offer an alternative to renewability and still encourage robust investment in the band. Could this approach promote competition and efficient use of spectrum?

2. Geographic License Area

20. *Background:* The *First Report and Order* defined the geographic license area for each PAL as one census tract.⁴⁶ Petitioners request that the Commission increase the geographic licensing area from census tracts to Partial Economic Area (PEAs). T-Mobile argues that doing so would “be consistent with the geographic licensing area that the Commission has already identified as best for 5G operations” in the *Spectrum Frontiers* proceeding.⁴⁷ Petitioners and some commenters contend that licensing PALs on a census tract-basis—which could result in over 500,000 PALs—will be challenging for SAS

⁴² The Commission adopted renewal safe harbors for certain Wireless Radio Services (WRS) earlier this year. See generally *Amendment of Parts 1, 22, 24, 27, 74, 80, 90, 95, and 101 To Establish Uniform License Renewal, Discontinuance of Operation, and Geographic Partitioning and Disaggregation Rules and Policies for Certain Wireless Radio Services*, WT Docket No. 10-112, FCC 17-105, 2017 WL 3381028 (Aug. 3, 2017) (*WRS Renewal Reform Order*). None of those safe harbors appear relevant here, because PALs—under the current rules—do not have a construction requirement. See *id.* at para. 3, n.3 (“The action we take today does not apply to services that have no construction/performance obligation.”). However, the *WRS Renewal Reform Order* may provide helpful guidance should we consider proposals for construction requirements for PALs.

⁴³ Letter from Paul Milgrom, Auctionomics, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-354, at 6, para. 24 (Aug. 7, 2017) (Milgrom Letter).

⁴⁴ *Id.*

⁴⁵ *Id.* at 5, para. 19.

⁴⁶ 47 CFR § 96.3.

⁴⁷ T-Mobile Petition at 18 (citing *Spectrum Frontiers R&O*, 31 FCC Rcd at 8046-47, para. 82 and *Spectrum Frontiers FNPRM*, 31 FCC Rcd at 8145, para. 375). See also TIA Comments at 3 (noting that, for the 37 and 39 GHz bands, the Commission initially proposed to use counties, but determined that PEAs would “strike the appropriate balance between facilitating access to spectrum by both large and small providers and simplifying frequency coordination while incentivizing investment in, and rapid deployment of, new technologies” (quoting *Spectrum Frontiers R&O*, 31 FCC Rcd at 8061, para. 121)); Qualcomm Comments at 6 (revising the rules to “better match the rules that apply to . . . the new 600 MHz band and the millimeter wave bands[,] which are all licensed on a PEA basis, for this mid-band spectrum will serve a critical role in mobile providers’ ability to provide users a seamless 5G experience”); Verizon Comments at 8.

Administrators, the Commission, and licensees to manage, and will create unnecessary interference risks due to the large number of border areas that will need to be managed and maintained.⁴⁸ Petitioners and some commenters contend that these challenges ultimately will make PALs unattractive to licensees and reduce investment.⁴⁹ They argue that PEAs are small enough to allow for flexible and targeted networks, but large enough to reduce border areas and decrease administrative burdens.⁵⁰ Some commenters also contend that a larger license area (along with a longer, renewable license term) will promote global harmonization of the 3.5 GHz Band for 5G development.⁵¹

21. Many commenters oppose expanding the geographic license area of PALs from census tracts to PEAs or other larger areas.⁵² These commenters argue that PEAs—especially in combination with other potential changes to the PAL licensing rules—could foreclose smaller entities from participating in the PAL auction.⁵³ Some commenters similarly contend that enlarging the geographic area and extending the license term will effectively grant permanent spectrum rights to large carriers, and

⁴⁸ See CTIA Petition at 9-10; T-Mobile Petition at 16-18. See also AT&T Comments at 8; CTIA Reply Comments at 3-4; Ericson Comments at 6; Qualcomm Comments at 5; USCC Comments at 3; Verizon Comments at 7; CTIA *Ex Parte* at 2.

⁴⁹ See T-Mobile Petition at 16. See also 5G Americas Comments at 12-13; Boingo Wireless Comments at 2 (arguing that adopting PEA-based licensing will “facilitate and encourage carriers to provide service on a larger geographic scale, enabling efficiencies,” giving “sufficient licensing flexibility and promot[ing] the participation by a broader array of carriers”); Verizon Comment at 3.

⁵⁰ See CTIA Petition at 9-10; T-Mobile Petition at 16-18.

⁵¹ See GSMA Reply Comments at 1-2; 5G Americas Comments at 13; Nokia Comments at 3, 6.

⁵² See, e.g., Cantor Comments at 3-4; City of NY Comments at 2; County of Bland, VA Comments at 1; DSA Comments at 9; General Electric (GE) Reply Comments at 8-13; Google Comments at 22-26; Hudson Valley Wireless Comments at 1; Motorola Solutions Comments at 3-4; OTI/PK Comments at 20-24; RWA/NTCA Comments at 4-6; Sony Comments at 1-2; Southern Linc Comments at 8; Starry Comments at 4-5; Telrad Comments at 2; Vivint Wireless Comments at 2; WISPA Comments at 14; WISPA *Ex Parte* at 2.

⁵³ See, e.g., Amplex Internet Comments at 1 (stating it had intention of bidding on PALs in its service area, but has started to scale back investment due to uncertainty of the band); Brendhart Comments at 2 (arguing that the proposals would “devastate opportunities for WISPs . . . to enter, use and provide service under CBRs”); City of Bland, Virginia Comments at 1 (offering PALs in “reasonable census block sizes” with “limited terms” is “the main reason the [WISP] we are working with [made] investment in this technology and this band. This model gives small companies like them the opportunity to have quality spectrum in the areas they cover at a cost they can afford.”); DSA Comments at 9 (“Increasing the size of the license areas to PEAs will correspondingly increase the cost of the license to the point where PALs are economically reasonable only for large carriers with a business model of monetizing spectrum over a large area.”); e-vergent Comments at 1 (stating its intention to bid on PALs as currently designed but contending that PEAs would be “simply too large and make deployment a non-starter”); OTI/PK Comments at 20 (“Auctioning PALs as large as [PEAs], or even counties, will make licenses prohibitively expensive for smaller and more locally-focused wireless providers (e.g., WISPs) seeking to offer service to smaller, more targeted areas.”); Telrad Reply Comments at 2 (noting that many of its small customers’ business models “do not support service of multi-county or multi-tract areas when their geographic market may be only a few square miles or a small town”); WISPA Comments at 14 (“Greatly increasing both license terms and geographic license areas will make it impossible for WISPs and other smaller entities desiring to serve smaller geographic areas to even bid at a PAL auction.”); Letter from Stephen E. Coran, Counsel to WISPA, Lerman Senter PLLC, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-354 et al., at 1 (filed Oct. 5, 2017) (Google/WISPA *Ex Parte*); (“The proposed rules under consideration, however, would . . . assure that only a select few large mobile carriers would hold [PALs]”). See also Letter from Michael Calabrese, Director, Wireless Future Project, OTI/New America, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 17-258, et al., at 1-2 (filed Oct. 12, 2017) (arguing that PEAs are unnecessary as large mobile carriers will not use this spectrum for coverage, but rather for capacity in localized areas).

upend planned business models for targeted, local, and rural uses.⁵⁴ Some of these commenters—including, Google and Sony, which have applied to be SAS Administrators—argue that managing licenses in over 70,000 geographic areas would not pose an undue burden “given the meaningful advances in database management, cloud computing, and other technologies and engineering systems in recent years.”⁵⁵

22. NCTA and Charter suggest that county-sized license areas could strike a balance between preserving low barriers to entry and minimizing administrative burdens.⁵⁶ Some commenters propose using a hybrid approach to offer more than one PAL license size (*e.g.*, offering some licenses by PEAs and others by county or census tracts).⁵⁷ GeoLinks similarly asks us to consider whether rural areas would benefit more from using census tracts or counties to ensure more timely broadband access to rural communities, while more urban areas could benefit from using PEAs.⁵⁸

23. *Discussion:* We seek comment on increasing the geographic licensing area of PALs to stimulate additional investment, promote innovation, and encourage efficient use of spectrum resources. We seek comment on this proposal and on the potential effects of this change on investment in and use of the 3.5 GHz Band. We also seek comment on whether a larger license area would provide additional flexibility to facilitate the deployment of a wide variety of technologies, including 5G.

24. We seek comment on Petitioners’ specific request to increase the license size of PALs to PEAs, and how this would affect investment in PALs—both investments currently underway and future PAL investment—and diversity of PAL uses and users.⁵⁹ Would PEAs strike an appropriate balance between facilitating access to spectrum by both large and small providers while incentivizing investment in, and rapid deployment of, new technologies? We also note that, like census tracts, counties nest into PEAs, which in turn nest into EAs. This nesting would make it easier for operators to combine or partition their PEAs into the license area of their choice.⁶⁰ Would the larger size of PEAs and the ability to combine and partition licenses to customize service areas effectively address the concerns raised by commenters and promote robust deployment in the band? Commenters should include cost-benefit analyses when comparing licensing PALs on a PEA-basis versus a census tract-basis, as well as for options in between these choices (*e.g.*, licensing on a county-basis). Would PEAs effectively balance the objectives set forth in section 309(j) of the Act, including encouraging “efficient and intensive” use of the 3.5 GHz spectrum and prescribing license area designations that promote “an equitable distribution of licenses and services among geographic areas” and “economic opportunity for a wide variety of

⁵⁴ *See, e.g.*, DSA Comments at 8; Vivint Wireless Reply Comments at 4; GE Reply Comments at 8-11 (highlighting specific targeted use cases); Google Comments at 23; Starry Comments at 4-5; Letter from Michael Calabrese, Director, Wireless Future Project, OTI/New America, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 17-258 et al., at 1-2 (filed Oct. 9, 2017) (highlighting use cases presented at OTI’s recent policy forum on 3.5 GHz).

⁵⁵ Google Comments at 24. *See also* Vivint Wireless Reply Comments at 3; Sony Comments at 1-2; DSA Comments at 10.

⁵⁶ *See* Charter Comments at 3; NCTA Comments at 8-9. *See also* Letter from Colleen King, Vice President, Regulatory Affairs, Charter Communications, Inc. to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-354 et al., at 2-3 (filed Oct. 18, 2017) (Charter *Ex Parte*) (supporting geographic license areas bigger than census tracts but no bigger than counties).

⁵⁷ *See* DSA Comments at 11; Nokia Comments at 6-7.

⁵⁸ *See* GeoLinks Comment at 2.

⁵⁹ *See, e.g.*, Google/WISPA *Ex Parte* at 1 (noting that WISPs and others had invested and deployed commercial services and experimental services in reliance on the existing rules.)

⁶⁰ *But see* Letter from Michael Calabrese, Director, Wireless Future Project, OTI/New America, GN Docket No. 17-258 et al., at 2 (filed Oct. 16, 2017) (arguing that it would be easier for carriers to assemble larger contiguous areas by acquiring census tracts than it would be for other potential users to win a PEA at auction).

applications”⁶¹ What impact would licensing PALs using PEAs have on smaller entities, rural deployments, and existing investments?⁶² Would PEA-based licensing facilitate compatible, authorized users and uses occupying the same spectrum?

25. We also seek comment on alternatives or hybrid approaches, including those already in the record. Would counties, or a combination of PAL license areas (e.g., a hybrid combination of PEAs in urban areas and census tracts in rural areas, offering PALs of different sizes, such as PEAs and census tracts, or some other combination) ensure a diversity of auction participants, differing technologies, and rural deployments? Since we are offering seven PALs, commenters in favor of offering different license sizes in rural and urban areas should discuss what would be the appropriate balance between larger geographic areas and census tracts. Are there other possibilities that could promote such objectives? Should the Commission reconsider package bidding of census tracts or other geographic areas for a limited number of PALs?⁶³ Would this approach promote our objectives? Would package bidding, bidding credits for certain bidders or areas, or other auction design mechanisms be appropriate for us to consider if we were to increase the license area?⁶⁴ Specifically, we seek comment on whether we should adopt the bidding credits we used in the 600 MHz Band (Incentive Auction).⁶⁵ Commenters should include a cost-benefit analysis of their proposed alternatives or hybrid approaches and discuss how their proposed approach appropriately balances the objectives set forth in section 309(j) of the Act.⁶⁶

26. In addition, we seek comment generally on how changes to the license area (on their own, and in combination with changes to the license term) could affect auction complexity. How might such changes affect bidding strategies? How would a combination of license areas affect the auction mechanism and bidding strategies? Are there insights from bidders’ experience during recent auctions that may be relevant in this context?

27. In light of the proposed change to modify the geographic license area, as well as any other changes considered in this Notice, should the Commission modify the current 40 megahertz spectrum aggregation limit?⁶⁷ Should we remove it altogether? What are the costs and benefits of higher or lower limits? How would changes affect competition and new entrants?

⁶¹ 47 U.S.C. § 309(j)(4)(C), (D).

⁶² See, e.g., *Google/WISPA Ex Parte* at 1 (arguing that the proposed rules “would undermine broadband expansion in rural areas,” and that WISPs and others had invested and deployed commercial services and experimental trials in reliance on existing rules).

⁶³ OTI/PK Comments at 24-25. See also *Starry* Comments at 5.

⁶⁴ Cf. *WISPA* Comments at 29 (noting, in the context of T-Mobile’s proposal to designate the entire 3.5 GHz Band for PAL use, that auction design techniques would affect bidding entry and strategies, meaning T-Mobile’s assertion that increasing spectrum allocation for PALs would generate additional auction revenue is premature and conjecture).

⁶⁵ For the Incentive Auction, we used the Rural Service Provider bidding credit and the 25 percent and 15 percent bidding credits for very small businesses and small businesses. See *Updating Part 1 Competitive Bidding Rules et al.*, WT Docket No. 14-170 et al., Report and Order, 30 FCC Rcd 7493 (2017). Under the Rural Service Provider bidding credit, an entity could demonstrate eligibility for a 15 percent bidding credit if all of their wireless, wireline, broadband service together were fewer than 250,000 and they served predominantly rural areas. *Id.* at 7530, para. 88. Businesses with average annual gross revenues for the preceding three years not exceeding \$20 million could qualify for a 25 percent bidding credit. *Id.* at 7525, para. 74. Businesses with average annual gross revenues for the preceding three years not exceeding \$55 million could qualify for a 15 percent bidding credit. *Id.* See also 47 CFR § 1.2110(f)(2), (4).

⁶⁶ See 47 U.S.C. § 309(j)(4).

⁶⁷ See 47 CFR § 96.31. We note that T-Mobile asked for the limit to be increased to 50 megahertz in its Petition, but in combination with its proposal to license the entire 3.5 GHz Band for PAL use. See *T-Mobile Petition* at 9-10.

3. Secondary Markets

28. *Background:* In the *Second Report and Order*, the Commission prohibited Priority Access licensees from partitioning or disaggregating their licenses because the Commission found typical reasons for permitting partitioning and disaggregation in more traditionally licensed bands were not present in the 3.5 GHz Band.⁶⁸ The Commission also determined that a light-touch leasing process could achieve the goal of making PAL spectrum use rights available in secondary markets—on a targeted, flexible basis—without the need for the Commission oversight required of partitioning and disaggregation.⁶⁹

29. In its Petition, T-Mobile asks the Commission to consider allowing partitioning and disaggregation of PALs, if it permits licensing on a PEA basis.⁷⁰ T-Mobile and several commenters, including AT&T, Ericsson, Qualcomm, USCC, and Verizon, agree that allowing partitioning and disaggregation will help ensure that PAL spectrum rights flow to their best use and support a wide variety of deployments.⁷¹ These commenters also argue that partitioning and disaggregation will encourage service to targeted areas, mitigating concerns that licensing larger area PALs might result in inefficient spectrum use.⁷²

30. Several commenters, including DSA, Southern Linc, and WISPA, oppose the concept of secondary market transactions as a replacement for smaller geographic areas and shorter term PALs to encourage efficient use of spectrum by a variety of users. They argue that there is no guarantee that the licensee will lease or sell idle spectrum in the secondary market.⁷³ Other commenters, however, suggest that, if the Commission were to make changes to the PAL license term, renewability, and geographic area, then the ability of a PAL licensee to partition or disaggregate its license on the secondary market could be a useful tool to ensure robust and targeted use of the spectrum throughout the license area.⁷⁴

⁶⁸ 47 CFR § 96.32(b). *See Second Report and Order*, 31 FCC Rcd at 5077-5078, paras. 229-230. (citing ten-year license terms, larger license areas, higher power limits, and constructions obligations as reasons that partitioning and disaggregation served the Commission's goals of access to spectrum and flexible use in other traditionally licensed bands).

⁶⁹ *Second Report and Order*, 31 FCC Rcd at 5077, para. 228.

⁷⁰ *See* T-Mobile Petition at 18-19 (asking the Commission to allow partitioning and disaggregation using rules similar to those in Part 30 governing the Upper Microwave Flexible Use Service).

⁷¹ T-Mobile Petition at 19; AT&T Comments at 6; Ericsson Comments at 7; Nokia Comments at 7; Qualcomm Comments at 5-6; USCC Comments at 4-5; Verizon Comments at 9.

⁷² *See, e.g.*, AT&T Comments at 8; Ericsson Comments at 7; Nokia Comments at 7; Qualcomm Comments at 5-6; T-Mobile Reply Comments at 11-12; Verizon Comments at 8-9.

⁷³ *See, e.g.*, DSA Comments at 9; Google Comments at 21 (“Reliance on the secondary market [] assumes that licensees’ economic interests are necessarily aligned with the public interest in intensive use of spectrum, and overlooks potential incentives to warehouse it.”); Motorola Solutions Comments at 3-4 (“[S]econdary markets for PAL sub-licensing offer no guarantees or assurances that the primary PAL holders will lease idle, interference-protected spectrum to other users, and thus will not be a viable option for providing access for other innovative uses of the spectrum.”); Southern Linc Comments at 7-8; UTC Reply Comments at 4 (arguing that secondary market transactions would be unlikely if the Petitioners’ proposals were adopted, because “major wireless carriers would have little incentive to disaggregate or partition their licenses and lease capacity to utilities or third parties”); WISPA Comments at 18, 25-26; WISPA *Ex Parte* at 2 (expressing “dissatisfaction with partitioning and disaggregation as a means of obtain access to PAL spectrum on the secondary market” because “[h]istorically, large carriers have been unwilling to partition spectrum, even where they are not using it”).

⁷⁴ *See, e.g.*, Nokia Comments at 6-7; USCC Comments at 4. *See also* Motorola Solutions Comments at 5 (“Should the Commission choose to expand the rights of PAL licensees as proposed by CTIA and T-Mobile, it should consider more robust secondary market policies to promote additional PAL access through sub-leasing in fallow areas under PAL control.”).

31. *Discussion:* We propose to allow partitioning and disaggregation of PALs in secondary market transactions. Allowing partitioning and disaggregation would be consistent with other changes considered in this Notice, and is consistent with the licensing paradigm for other similarly licensed services. We also anticipate that the ability to partition and disaggregate a PAL will be an effective way to improve spectral efficiency and facilitate targeted network deployments, particularly if the Commission adopts a longer license term or larger license area for PALs.⁷⁵ We seek comment on this proposal and its underlying assumptions. If we were to adopt a larger geographic license area for some or all PALs, would allowing partitioning and disaggregation of PALs enable prospective PAL licensees “to acquire PAL rights in smaller geographic areas where their business needs call for it”⁷⁶ Are partitioning and disaggregation effective means to facilitate the ability of small entities to access the spectrum they desire for targeted, local deployments? If the Commission does not adopt some or all of the other proposed revisions to PALs, should we still allow partitioning and disaggregation? If so, why? To what extent would partitioning and disaggregation help the Commission facilitate the objectives of Section 309(j), which, among other considerations, asks us to promote “economic opportunity for a wide variety of applications”⁷⁷

32. We note that several commenters argue the PAL licensees will lack an incentive to disaggregate or partition a larger, longer-term PAL.⁷⁸ T-Mobile, in response, suggests that this “can be remedied by adopt[ing] reasonable performance requirements associated with renewal expectations.”⁷⁹ We seek comment on the relationship between secondary market transactions and performance requirements. What types of requirements would be appropriate to encourage a robust secondary market for PALs to facilitate targeted and intensive spectrum use? How would requirements related to secondary markets interplay with construction requirements for PALs more broadly? How could performance requirements and secondary markets incentivize users to provide service to rural and other difficult-to-serve areas?

4. SAS Public Disclosure of CBSD Registration Information

33. *Background:* In the *First Report and Order*, the Commission required that SAS Administrators make CBSD registration information available to the general public. When doing so, however, SAS Administrators must “obfuscate the identities of the licensees.”⁸⁰ In doing so, the Commission acknowledged “the concerns raised by commenters about disclosure of confidential business information to the public.”⁸¹

34. Both CTIA and T-Mobile, supported by several commenters, ask the Commission to eliminate the rule requiring public disclosure of CBSD registration information.⁸² Petitioners assert that

⁷⁵ Nokia Reply Comments at 2.

⁷⁶ AT&T Reply Comments at 6-7.

⁷⁷ 47 U.S.C. § 309(j)(4)(C).

⁷⁸ See, e.g., Google Reply Comments at 14-15; Southern Linc Comments at 7-8; UTC Reply Comments at 4; WISPA Comments at 25.

⁷⁹ T-Mobile Reply Comments at 12. *But see* WISPA *Ex Parte* at 2 (arguing that build-out obligations would encourage PAL holders to make only minimal deployments that would block GAA use).

⁸⁰ See *First Report and Order*, 30 FCC Rcd at 4057, para 328; 47 CFR § 96.55(a)(3).

⁸¹ See *First Report and Order*, 30 FCC Rcd at 4057, para. 327.

⁸² See CTIA Petition at 11 and Appendix A at 2; (requesting modification of Section 96.55(a)(3) to state that “SAS Administrators shall not make CBSD registration information available to the general public”); T-Mobile Petition at 19-20 (requesting elimination of Section 96.55(a)(3), 47 CFR § 96.55(a)(3)). See also AT&T Comments at 11-12; AT&T Reply Comments at 8-9; Ericsson Comments at 3; 8-9; GSMA Reply Comments at 3-4; Nokia Comments at 8-9; Nokia Reply Comments at 2; Verizon Comments at 9; CTIA *Ex Parte* at 2.

the rule raises both competitive concerns and “cybersecurity and national security concerns.”⁸³ AT&T also claims that “the SAS will be required to collect extensive data regarding users’ network configuration, uses, and technical parameters”—data that “amounts to critical infrastructure data” that must be adequately protected to avoid competitive and cybersecurity concerns.”⁸⁴ In addition, Petitioners and commenters argue that obfuscating the licensees’ identities does not adequately address these concerns because it still may be possible to uncover the identities of individual licensees based on publicly available information.⁸⁵ Petitioners and commenters also contend that, since potential GAA operators can coordinate directly with the SAS Administrators to deploy GAA services, the public disclosure requirement is unnecessary to ensure that operations in the band are effectively coordinated.⁸⁶

35. Google, OTI/PK, and WISPA support retention of the current rule, arguing that it benefits potential operators that need to investigate the feasibility of deploying GAA or PAL service before incurring the cost of attempting to reserve or auction spectrum.⁸⁷ OTI/PK contends that meaningful transparency allows incumbents and public advocacy groups to play a productive role in holding SAS Administrators and other stakeholders accountable for responsibilities such as military radar protection and ensuring that valuable PAL spectrum does not lie fallow.⁸⁸ Google denies that anonymized public registration data presents security or competitive concerns and argues that such information is already available, as wireless carriers’ transceiver locations are visible to a passerby, logged by crowd-sourced applications, and publicly documented.⁸⁹ Google also notes that several aspiring SAS Administrators—including CTIA—already have negotiated a model sharing agreement, and that CTIA itself has stated that the agreement “provides the necessary protections for SAS customers’ proprietary and competitively sensitive information, as well as end users’ private information.”⁹⁰ In response, AT&T argues that the model sharing agreement that Google references addresses SAS-to-SAS information sharing, not public

⁸³ See CTIA Petition at 11-12 (stating CBSD registration requirements include geolocation data and information on whether the CBSD will be operated indoors or outdoors). See 47 CFR §§ 96.39(c), 96.43(b).

⁸⁴ AT&T Comments at 11. See also Ericsson Comments at 8; Nokia Comments at 8. AT&T argues that the Commission should eliminate Section 96.55(a)(3) and instead apply the same standards of protection used for other critical infrastructure. See AT&T Comments at 12; AT&T Reply Comments at 9. AT&T also asks the Commission to consider a requirement that SAS Administrator maintain registration data confidentially and use the data only for SAS functions (such as spectrum assignment and interference management).

⁸⁵ See CTIA Petition at 12; T-Mobile Petition at 20; AT&T Comments at 11-12; Ericsson Comments at 9.

⁸⁶ See CTIA Petition at 11-12; T-Mobile Petition at 20. See also AT&T Comments at 11; Ericsson Comments at 9; Verizon Comments at 9.

⁸⁷ See Google Comments at 29; OTI/PK Comments at 32 (stating that CTIA and T-Mobile are “seeking secrecy as a backdoor means of undermining more efficient and intensive use of the entire [Citizens Broadband Radio Service] band”); WISPA Comments at 31.

⁸⁸ See OTK/PKI Comments at 32-33. OTI/PK states the importance of accountability is demonstrated by the TVWS database, where NAB has used public registration to hold administrators accountable for erroneous or expired registrations. See *id.* at 32-33.

⁸⁹ See Google Comments at 28-29 (citing to CELLMAPPER, Index, <https://www.cellmapper.net/Index> (last visited Oct. 20, 2017)).

⁹⁰ Google Comments at 29 (quoting Letter from Brian M. Josef, Assistant Vice President, Regulatory Affairs, CTIA, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 15-319 et al., at 1 (filed Sept. 29, 2016); see Letter from Austin C. Schlick, Director, Communications Law, Google LLC, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-354 et al., Attach. at 15 (filed Oct. 16, 2017) (Google *Ex Parte*) (arguing that SAS providers and carriers have developed a mutually satisfactory legal agreement covering confidential data).

availability of information, and that Google incorrectly assumes that licensees plan network deployment based on activities of others rather than on internal objectives and consumer behavior.⁹¹

36. Charter, Federated Wireless, and NCTA encourage the Commission to seek comment on how it could ensure that prospective users of the band can obtain sufficient information to execute network deployments without disclosing detailed CBSD registration information to the public.⁹²

37. *Discussion:* We propose to amend the current rules to prohibit SASs from disclosing publicly CBSD registration information that may compromise the security of critical network deployments or be considered competitively sensitive.⁹³ We seek comment on the proposal and ask which specific information should be withheld from public disclosure to address the concerns raised by Petitioners and Commenters.⁹⁴ We ask commenters to address the potential competitive, security, or other forms of risk presented by the rule, as well as on specific and actionable suggestions to mitigate these risks. Nothing we propose here will affect SAS-to-SAS information sharing requirements.⁹⁵

38. We also note that some commenters claim that potential GAA and PAL users will use registration information to plan deployments.⁹⁶ As such, we seek comment on how to appropriately balance the potential competitive and security risks with potential users' need for information about CBSD deployment. Is there a mechanism—other than full public disclosure of CBSD registration information—for potential users to plan future GAA and/or PAL deployments? For example, could potential users communicate with an SAS on a confidential basis? We also seek comment on whether there is certain information that the SAS can publicly provide while balancing data sensitivity and security concerns.

5. Competitive Bidding Procedures for PALs

a. Assignment of PALs

39. *Background:* Section 309(j) of the Communications Act requires that the Commission assign licenses using competitive bidding when “mutually exclusive applications are accepted for any initial license,” subject to certain exemptions not applicable to this band.⁹⁷ Because of the “generic” nature of PAL frequency assignments, mutual exclusivity exists when multiple applicants apply to bid on more PALs than exist in a given census tract.⁹⁸ In the *First Report and Order*, the Commission decided that, when there are two or more applicants for PALs in a given census tract, it will make available one

⁹¹ See AT&T Reply Comments at 8-9. *But see* Google *Ex Parte*, Attach. at 15 (arguing that, outside of SAS operations, some level of information regarding CBRS deployments will be visible and beneficial to the public).

⁹² See Charter Comments at 4; Federated Wireless Comments at 8-10; Federated Reply Comments at 8-9; NCTA Comments at 2, 17.

⁹³ CBSD registration information includes “geographic location, antenna height above ground level (in meters), CBSD class (Category A/Category B), requested authorization status (Priority Access or General Authorized Access), FCC identification number, call sign, user contact information, air interface technology, unique manufacturer's serial number, sensing capabilities (if supported), and additional information on its deployment profile required by §§96.43 and 96.45.” 47 CFR § 96.39(c).

⁹⁴ See CTIA Petition at 11 and Appendix A at 2; T-Mobile Petition at 19-20; AT&T Comments at 11-12; AT&T Reply Comments at 8-9; Ericsson Comments at 3; 8-9; GSMA Reply Comments at 3-4; Nokia Comments at 8-9; Nokia Reply Comments at 2; Verizon Comments at 9.

⁹⁵ See 47 CFR § 96.55(a)(2) (“SAS Administrators must make all information necessary to effectively coordinate operations between and among CBSDs available to other SAS Administrators.”).

⁹⁶ Google Comments at 29; OTI/PK Comments at 32; WISPA Comments at 31.

⁹⁷ See 47 U.S.C. § 309(j)(1).

⁹⁸ *First Report and Order*, 30 FCC Rcd at 4002-4003, paras. 132, 134.

fewer PAL than the total number of PALs for which all applicants have applied in that license area, up to a maximum of seven PALs.⁹⁹ The Commission also concluded that assigning PALs on a non-auctioned basis would not result in the most efficient assignment of the spectrum. It therefore decided that, where there is only a single applicant for one or more PALs in a license area, it would not proceed to an auction or assign any PALs for that license area and there would only be shared GAA access to that spectrum until the next filing window for competitive bidding.¹⁰⁰ In its *Order on Reconsideration*, the Commission granted a limited exception for certain rural areas, finding it in the public interest to assign a PAL even if there is only a single applicant, given the likelihood of lower demand in rural areas.¹⁰¹

40. T-Mobile and several commenters, including 5G Americas, AT&T, Ericsson, GeoLinks, GSMA, Nokia, and USCC, ask the Commission to make all PALs available, regardless of the number of applications the Commission receives in any given license area.¹⁰² GeoLinks argues that, by prohibiting the assignment of PALs when there is only one interested carrier, the Commission will “surely create gaps in rural, sparsely populated parts of the country that could benefit from an interested service provider.”¹⁰³ Further, several commenters, like AT&T and Ericsson, argue that the Commission’s current policy will eventually phase out PAL licenses in a market with each subsequent auction if there is no renewal expectancy, rendering the auctions “essentially a game of musical chairs for PAL licensees.”¹⁰⁴ No commenter opposes T-Mobile’s mutual exclusivity proposal specifically.¹⁰⁵

41. USCC argues that the Commission should assign PALs in any given license area by subjecting all PALs to a minimum opening bid and the existing spectrum aggregation limit of four PALs. If the aggregate demand in a license area does not exceed seven PALs, USCC suggests that the applicant(s) would receive the number of PALs for which they applied, subject to the payment of the minimum opening bid for those PALs, and remaining spectrum would be available on a GAA basis.¹⁰⁶

42. *Discussion:* Consistent with our proposals to lengthen the PAL license term, make them renewable, and increase the PAL geographic license area, we also propose to employ our standard practice for finding mutual exclusivity among accepted applications. We propose to eliminate the rule

⁹⁹ 47 CFR § 96.29(c).

¹⁰⁰ *See id.* § 96.29(d); *First Report and Order*, 30 FCC Rcd at 4002-4003, paras. 132-137.

¹⁰¹ *Order on Reconsideration*, 31 FCC Rcd at 5023, para. 50.

¹⁰² T-Mobile Petition at 14; AT&T Comments at 11; Ericsson Comments at 7-8; GeoLinks Comments at 3; GSMA Reply Comments at 3; Nokia Comments at 8; USCC Reply Comments at 14. *See also* WISPA *Ex Parte* at 2 (indicating support for eliminating the rule limiting the number of PALs the Commission would make available for auction in a given census tract, and for adoption of a rule permitting assignment of PALs where there is only a single applicant).

¹⁰³ GeoLinks Comments at 3.

¹⁰⁴ AT&T Comments at 11.

¹⁰⁵ Several commenters, however, oppose all of T-Mobile’s proposals; they contend that collectively the proposals would represent a fundamental change to the spectrum access framework for the 3.5 GHz Band. *See, e.g.*, EWA Comments at 2-5; Federated Wireless Comments at 5 (“The cumulative effect of T-Mobile’s proposals would be to allow three PAL users to occupy the entire [Citizens Broadband Radio Service] spectrum in a given license area . . . to the detriment—and quite possibly the exclusion—of opportunistic use by GAA users.”); OTI/PK Comments at 28 (“T-Mobile effectively asks the Commission to reverse the [Citizens Broadband Radio Service] framework in its entirety”); Southern Linc Reply Comments at 9 (T-Mobile’s proposals “would effectively allow the entire [Citizens Broadband Radio Service] band to be placed under the control of three licensees with . . . licenses that would allow them to foreclose anything other than unprotected, opportunistic use of this spectrum.”); WISPA Comments at 26 (“T-Mobile makes additional proposals to deconstruct the three-tier [Citizens Broadband Radio Service] licensing model and convert it into a ‘5G-only’ band for three large mobile wireless carriers.”).

¹⁰⁶ *See* USCC Comments at 8-10.

that limited the number of PALs the Commission would make available. We also propose to assign PALs even when there is only one applicant in a given license area, assuming the applicant is otherwise qualified. We seek comment on these changes, which appear consistent with the broad opposition to the current requirements already in the record. The other proposed changes to PAL licensing discussed in this Notice—including longer, renewable license terms and a larger geographic area—would make PALs more similar to licenses offered in the Incentive Auction and other recent spectrum auctions, where there was no need for the requirements in Sections 96.29(c) 96.29(d) of our rules. We seek comment on this proposal. What are the costs and benefits of removing these requirements? Are these changes consistent with the statutory objectives of Section 309(j), including to “promot[e] economic opportunity and competition,” “ensur[e] that new and innovative technologies are readily accessible,” “avoid[] excessive concentration of licenses” and “disseminat[e] licenses among a wide variety of applicants”¹⁰⁷, “recover[] for the public of a portion of the value of the of the public spectrum”¹⁰⁸; and promote “efficient and intensive use of electromagnetic spectrum.”¹⁰⁹ Additionally, as fully described below, we also seek comment on whether a PAL for any given license area is mutually exclusive to GAA use in that area such that the Commission would have the authority to assign PALs by auction in those situations.

43. In the *First Report and Order*, the Commission adopted these two limitations on the assignment of PALs because it concluded that assigning PALs on a non-auctioned basis would not result in as efficient an assignment of the spectrum as licensing the spectrum for shared GAA use.¹¹⁰ The Commission found that ensuring widespread GAA use of spectrum in any geographic area for which it had not received mutually exclusive PAL applications was the best way to discharge its statutory obligation to “encourage the larger and more effective use of radio in the public interest.”¹¹¹ However, the Commission reached these conclusions regarding nonrenewable PALs that had substantially shorter license terms than we are now proposing to adopt for PALs. Under our current proposals, the use case for PALs could vary more significantly from GAA use than under our current rules. The Commission also noted in the *First Report and Order* that the determination of mutual exclusivity of PAL applications would not be a one-time event for this band, because PALs would be licensed for three-year, non-renewable terms and the Commission would periodically open application windows for new PALs, as well as interim filing windows to accept applications for unassigned PALs.¹¹² If we adopt our proposal to increase PAL license terms to 10 years, such frequent application or filing windows likely would not be necessary. We seek comment on whether the circumstances that will pertain if our proposals regarding license term, renewability, and geographic area are adopted warrant our elimination of the current limits on the number of PALs we make available.

44. Moreover, the record indicates that PALs will be more useful to a wide variety of potential licensees if PALs are renewable, longer term, and/or licensed for a larger geographic area. USCC suggests that, if the Commission adopts PEA-based license areas and a ten-year license period with a renewal expectancy, “it will be far less likely that the aggregate demand in any license area will be less than seven PALs.”¹¹³ We seek comment on whether our proposed changes in the term, renewability, and service area of PALs would make them more useful to a wider range of potential licensees and, if so, whether that would reduce the benefit of limiting the number of PALs available in a given license area or not assigning PALs in any area for which there is only one applicant.

¹⁰⁷ 47 U.S.C. § 309(j)(3)(B).

¹⁰⁸ *Id.* § 309(j)(3)(C).

¹⁰⁹ *Id.* § 309(j)(3)(D).

¹¹⁰ *First Report and Order*, 30 FCC Rcd at 4003, para. 137.

¹¹¹ *Id.* at 4003-4004, paras. 136-138. *See* 47 U.S.C. § 303(g).

¹¹² *Id.* at 4004, para. 139.

¹¹³ USCC Comments at 9; USCC Reply Comments at 13-14.

45. We note that, if we adopt the above proposal to make all of the PALs in a given license area available for assignment regardless of the number of applicants that have applied in that area, it would still be possible, albeit less likely, for the number of PALs being offered to exceed applicant demand in a given area. Similarly, if we were to assign PALs in a license area for which only a single applicant applied for a PAL, as some commenters advocate, in those instances we would not have accepted mutually exclusive PAL applications, which is the prerequisite for assigning PALs by auction. While the Commission has the authority in both situations to assign the PALs on a non-auctioned basis, we seek comment on whether it would be consistent with our statutory objectives to do so on a non-auctioned basis given the nature of the changes we propose to adopt for PALs.¹¹⁴ Such a circumstance raises questions of how to accommodate GAA use such that the sharing envisioned within this band could occur. To the extent necessary and as an alternative, we also seek comment on whether we nevertheless have authority to assign PALs by auction in these situations because a PAL for any given area is mutually exclusive to GAA use in that area.¹¹⁵ If we were to assign PALs by auction in these situations, applicants would be required to submit at least the minimum opening bid for each PAL consistent with the Commission's general competitive bidding procedures. Would such an approach be consistent with our statutory requirements and objectives under Section 309 of Act? Commenters that support this proposal should describe in detail the mechanism by which such a change would work, particularly within the sharing regime contemplated in the 3.5 GHz Band, and how it would fit within the Commission's statutory requirements.

b. Bidding on Specific PAL License Blocks

46. *Background:* Under the current rules, Priority Access licensees do not bid on specific spectrum blocks. Rather, SAS Administrators assign frequencies based on the amount of spectrum that the PAL licensee is authorized to use in a given license area. Licensees may request a particular channel or frequency range from the SAS, but are not guaranteed a particular assignment.¹¹⁶ The SAS will “assign geographically contiguous PALs held by the same Priority Access Licensee to the same channels in each geographic area” and “assign multiple channels held by the same Priority Access Licensee to contiguous frequencies within the same License Area” when it is feasible to do so.¹¹⁷ T-Mobile instead asks the Commission to allow applicants to bid on particular channels, rather than bidding solely on an amount of spectrum that will later be assigned by the SAS.¹¹⁸

47. A few commenters support T-Mobile's proposal. Ericsson argues that this approach would ensure a “stable and predictable” spectrum environment,¹¹⁹ while 5G Americas and GSMA argue

¹¹⁴ See 47 U.S.C. § 309(j)(3)(C).

¹¹⁵ See *Expanding the Economic and Innovation Opportunities of Spectrum through Incentive Auctions*, GN Docket No. 12-268, Report and Order, 29 FCC Rcd 6567, 6760-61, paras. 470-471 (2014) (concluding that the Commission has authority in the forward auction component of the broadcast incentive auction to conduct competitive bidding if it accepts any application(s) seeking to bid on initial 600 MHz flexible-use licenses, and any application(s) seeking to bid in the reverse auction).

¹¹⁶ 47 CFR § 96.25.

¹¹⁷ *Id.* § 96.59(b). The SAS thus assigns all channels and may change the frequencies if necessary, although SAS administrators are required to “maintain consistent and contiguous frequency assignments for licensees with multiple PALs in the same or adjacent license areas whenever feasible.” *First Report and Order*, 30 FCC Rcd at 3990, para. 93.

¹¹⁸ T-Mobile Petition at 15-16.

¹¹⁹ Ericsson Comments at 8.

that it would encourage robust use of the band for 5G and would align with what other countries have planned for the band.¹²⁰

48. Commenters opposing this proposal question how it would work given the need to protect incumbent rights. Vivint Wireless calls it “unnecessary and a bit confusing,” arguing that it “would seem to limit the available channels should a PAL licensee need to move to avoid interfering with a protected incumbent.”¹²¹ Google argues that, if the Commission permitted parties to manually select frequencies, an operator could position itself in the middle of the PAL spectrum, preventing other PAL holders from aggregating contiguous blocks. It argues that “the current SAS dynamic assignment framework allows protection of federal incumbent and Priority Access operations while enabling a seamless experience for end users of [Citizens Broadband Radio Service] services.”¹²²

49. *Discussion:* We seek comment on the feasibility and desirability of allowing PAL licensees to bid on specific channel assignments. How could the Commission accomplish this given the other constraints of the band, including the need to protect incumbents? Would having a separate voluntary channel assignment phase of the auction—as was done recently in the Incentive Auction—work in this context? For example, could we first allow applicants to bid on the amount of PAL spectrum they desire, then in a separate round, allow PAL bidders to value and bid on specific channel assignments? Would this allow PAL bidders to value their PAL spectrum more accurately by knowing their primary location vis-a-vis federal and other incumbents and adjacent band licensees? Would the Commission need to make changes to the assignment phase framework used in the Incentive Auction to accommodate interference protection of federal incumbents by PALs? And if so, what changes would it need to make? Should the Commission adopt rules to ensure that bidders are assigned to contiguous frequencies within a geographic area, where possible?¹²³ We also seek comment on what alternative auction methodologies might be appropriate to balance the SAS Administrator’s need to dynamically avoid interference with Priority Access licensees’ desire for certainty and the ability to aggregate contiguous spectrum. Are there other auction designs that could better balance interests in this context? We seek comment on the costs and benefits of any proposed approaches.

B. Emissions and Interference Limits

50. *Background.* In the *First Report and Order*, the Commission adopted the following emission limits:

- -13 dBm/MHz from 0 to 10 megahertz from the assigned channel edge;
- -25 dBm/MHz beyond 10 megahertz from the assigned channel edge down to 3530 megahertz and up to 3720 megahertz;
- -40 dBm/MHz below 3530 megahertz and above 3720 megahertz.¹²⁴

¹²⁰ 5G Americas Comments at 12 (“In addition to aligning with Commission policy in the most recent auction for mobile broadband spectrum, in 600 MHz, such an auction policy would align with other countries that are planning to auction portions of the band.”); GSMA Reply Comments at 3–4 (in connection with several other proposed rule changes in the Petitions, bidding on specific spectrum blocks will “further harmonize 3.5 GHz band 5G use in the United States with much of the 3 GHz band in other countries . . .”).

¹²¹ Vivint Wireless Comments at 8.

¹²² Google Comments at 28. Other commenters oppose T-Mobile’s proposed changes to the spectrum access framework as a whole. See WISPA Comments at 26; Federated Wireless Comments at 5; Southern Linc Reply Comments at 9; OTI/PK Comments at 30-31.

¹²³ SAS Administrators are required to “assign geographically contiguous PALs held by the same Priority Access Licensee to the same channels in each geographic area, where feasible. The SAS shall also assign multiple channels held by the same Priority Access Licensee to contiguous frequencies within the same License Area, where feasible.” See 47 CFR § 96.59 (b). See also 47 CFR § 96.25(b)(1)(i), (2)(i).

¹²⁴ 47 CFR § 96.41.

In the *Second Report and Order*, the Commission denied petitions for reconsideration that requested changes to these limits.¹²⁵

51. T-Mobile's Petition requests changes to the emission limits that it claims are necessary to support channels wider than 10 megahertz without power reduction.¹²⁶ Specifically, T-Mobile argues that the -13 dBm/MHz limit should apply from 0-20 megahertz outside the channel edge, and the -25 dBm/MHz requirement should be eliminated (or, alternatively, apply at least 20 megahertz from the channel edge). Outside of the 3550-3700 MHz band, T-Mobile contends that the -40 dBm/MHz limit should be eliminated (or, alternatively, the transition gap should be 40 megahertz instead of 20 megahertz).¹²⁷

52. Qualcomm agrees that the emission limits should be relaxed to facilitate wider channels without power reduction. Qualcomm argues that, for single or aggregated channels that are the channel bandwidth (B) megahertz wide (up to 40 megahertz), the -13 dBm/MHz requirement should apply from 0 to B megahertz above and below the channel edges, and the -25 dBm/MHz requirement should apply at frequencies beyond B megahertz.¹²⁸ Qualcomm does not request changes to the -40 dBm/MHz emission limit outside of the 3550-3700 megahertz band. Several other commenters also support relaxation of the emission limits.¹²⁹

53. Others, including Motorola Solutions and Vivint Wireless, support the current emissions limits. Motorola Solutions argues that no changes are necessary because current technologies can be utilized to meet the existing limits, and the existing rules allow higher power with wider bandwidth which helps counteract the need for power reduction.¹³⁰ Vivint Wireless asserts that relaxing the emissions limits will increase the risk of interference between adjacent channel operations.¹³¹

54. *Discussion:* Our current rules were designed to accommodate 10 megahertz and 20 megahertz channels. We propose to relax the emissions mask in a manner that will be scalable to accommodate wider bandwidth channels. Petitioners and commenters agree on the value of the first step of attenuation at -13 dBm/MHz—starting at the channel edge—and many of them agree on the value of the lowest attenuation in the band at -25 dBm/MHz. We believe that relaxation of the current emission limits, while enabling efficient frequency and power assignments, would promote innovation and investment in the band and allow operators to make use of wider channels without reducing their transmit power. However, we are not persuaded by T-Mobile's proposals to eliminate the -25 dBm/MHz limit or to eliminate the -40 dBm/MHz limit below 3530 megahertz and above 3720 megahertz. We also are not persuaded by T-Mobile's proposal to increase the transition bandwidth to 40 megahertz outside of the band, because of the impact these changes would have on protecting adjacent operations. Rather, we seek comment on two alternative proposals. First, we seek comment on Qualcomm's proposal to: (1) extend the -13 dBm/MHz limit from 0 to 100% of B; (2) apply the -25 dBm/MHz limit beyond 100% of B; and (3) not change the -40 dBm/MHz limit specified in Section 96.41(e)(2). Second, we seek comment on a more graduated reduction of the emission limits in Qualcomm's proposal, with the addition of an

¹²⁵ See *Second Report and Order*, 31 FCC Rcd at 5036-5038, paras. 91-98.

¹²⁶ T-Mobile Petition at 21-22.

¹²⁷ T-Mobile Petition at 21-22.

¹²⁸ Where B is the emission bandwidth of the assigned channel(s).

¹²⁹ See e.g., 5G Americas Comments at 2, 4, and 15; CTIA Comments at 3-5; Ericsson Comments at 9-10; TIA Comments 4; WISPA Comments at 33 and 69; CTIA *Ex Parte* at 2.

¹³⁰ Motorola Solutions Comments at 5-6.

¹³¹ Vivint Wireless Comments at 8-9.

attenuation step between the channel edge and a full channel bandwidth from the channel edge, as follows:

- -13 dBm/MHz from 0 to B/2 (i.e., 50% of B) megahertz from the assigned channel edge;
- -20 dBm/MHz from B/2 to B (i.e., 100% of B) megahertz from the assigned channel edge;
- -25 dBm/MHz beyond B megahertz from the assigned channel edge, down to 3530 megahertz and up to 3720 megahertz;
- -40 dBm/MHz below 3530 megahertz and above 3720 megahertz.¹³²

55. We seek comment on these two proposals and on the tradeoffs in the number and levels of the attenuation steps. A more relaxed mask gives more margin to accommodate bandwidths wider than 10 megahertz, although this could raise the potential for increased interference to users operating on adjacent channels. We seek quantitative analysis of these tradeoffs and we seek comment on whether alternative attenuation steps could balance these tradeoffs more effectively. What is the balance between vendor cost, radio performance, and spectrum efficiency? For example, are there tradeoffs in the design complexity of out-of-band signal reduction techniques, balanced with flexible and efficient spectrum sharing?¹³³ Will either or both of the proposed masks facilitate the use of wider channels in the band without requiring power reduction?

56. In the second proposal above, we seek comment on an attenuation step of -20 dBm/MHz between -13 dBm/MHz and -25 dBm/MHz, between one-half channel (50% of B) and one channel bandwidth (100% of B) from the channel edge. This additional attenuation step may enable more efficient SAS-based frequency and power assignments while facilitating wider channel bandwidths. Without this step, frequency separation between PAL channels (and other GAA/PAL channels) may be larger under some operational use cases. We seek comment on the capabilities of current and future CBSDs and end user devices to meet these masks,¹³⁴ and the attenuation steps used in other bands for other wireless services.¹³⁵ We also seek quantitative analysis of TDD interference scenarios to assess the tradeoff and balance between the emission mask and the statistical likelihood of interference between licensees.

57. We note that studies have shown that device output power and out-of-band emissions are likely to be lower than regulatory limits or industry standards. For instance, an Ofcom study describes a case where the actual out-of-band emissions is lower than the minimum requirements specified in 3GPP by ~8 dB in the first adjacent channel.¹³⁶ The study also shows the non-linear effect of out-of-band emissions at maximum power, and higher reduction in out-of-band emissions for every dB of reduction in

¹³² There is a typographic error in Section 96.41(e)(2), which incorrectly references paragraph (d)(1), and instead should reference paragraph (e)(1). See 47 CFR § 96.41(e)(2).

¹³³ *Improved Out-of-Band Emissions Reduction for OFDM Systems*, 2013 IEEE Military Communications Conference, Selim and Doyle.

¹³⁴ See 3GPP TR 36.744 v14.0.0, *CBRS 3.5 GHz band for LTE in the United States (Release 14)*, for analysis of transmitter characteristics under the existing Part 96 emission limits.

¹³⁵ A common mask specifies the first two steps of attenuation at 25 dB down at the channel edge, and 35 dB down at one-half of the channel bandwidth above and below the channel edge, as in the following Commission rules: Sections 25.202(f), 73.44, 73.317, 74.535(a), 80.211(b), 87.139(a), and 101.111(a). For an LTE user device at 23 dBm / 9 MHz bandwidth, the step at -13 dBm/MHz is an attenuation of at least 26.5 dB at the channel edge, and -20 dBm/MHz is an attenuation of at least 33.5 dB (more lax than 35 dB) at a frequency offset of one-half of the channel bandwidth from the channel edge.

¹³⁶ Ofcom, *On the impact of interference from TDD terminal stations to FDD terminal stations in the 2.6 GHz band*, figure 17 and para. A2.18, available at https://www.ofcom.gov.uk/__data/assets/pdf_file/0009/43002/714_on_the_impact_of_interf1.pdf.

fundamental transmit power.¹³⁷ Ofcom notes that the increased emission leakage that accompanies increasing fundamental power is due to the non-linear behavior of the power amplifier when it is driven into saturation. What are the likely effects of this behavior in devices that will be deployed in the 3.5 GHz Band? We seek comment and quantitative evidence that actual out-of-channel emissions in the 3.5 GHz Band will be substantially lower than worst case values. Are the margins found in the Ofcom study typical and representative of the margins that can be expected in 3.5 GHz?

58. We also seek comment on the tradeoffs inherent in any change to the emission mask(s) in the band. Specifically, what are the tradeoffs between the margins of actual emissions, and the spectral efficiency of frequency assignments in the 3.5 GHz Band? Will either or both of the proposed masks meet the more restrictive 3GPP Adjacent Channel Leakage Ratio (ACLR) emissions limit (i.e., 30 dBc for user devices and 45 dBc for base stations)?¹³⁸ Finally, given the existing OOB limits that apply above 3720 MHz and below 3530 MHz—which we do not propose to change—we seek comment on whether either of these proposals would facilitate the use of wider bandwidth channels at or near the band edges.

IV. ORDER TERMINATING PETITIONS (RM-11788 AND RM-11789)

59. The Petitions ask the Commission to initiate a rulemaking proceeding to examine several issues, arguing that certain changes are necessary to promote 5G network deployment in the Citizens Broadband Radio Service.¹³⁹ We grant the request and initiate the rulemaking proceeding to the extent discussed above.¹⁴⁰ T-Mobile's Petition, however, includes two additional proposals to modify the spectrum sharing framework.¹⁴¹

60. First, T-Mobile proposes to allow PAL use in the entire 3550-3700 MHz band and to eliminate the rule that reserves a maximum of 70 megahertz for PAL use in any given license area.¹⁴² T-Mobile essentially asks us to designate the entire band for PAL use and limit GAA to opportunistic use only.¹⁴³ We find several reasons for rejecting this proposal, each of which serves as an independent basis for our doing so. As to what T-Mobile originally submitted, no commenter filed in support of this change and there is extensive opposition to it in the record.¹⁴⁴ Indeed, many commenters stress that this change

¹³⁷ Figure 19 shows 1.5–2 dB or more of emission reduction for every dB reduction of fundamental power.

¹³⁸ See 3GPP TS 36.101 v14.3.0 *User Equipment (UE) radio transmission and reception (Release 14)*, and TS 36.104 v14.4.0, *Base Station (BS) radio transmission and reception (Release 14)*.

¹³⁹ See CTIA Petition at 3-6, T-Mobile Petition at 5-9.

¹⁴⁰ With this action we close GN Docket No. 12-354, and open a new docket, GN Docket No. 17-258, for the rulemaking proceeding and incorporate the records of GN Docket No. 12-354, RM-11788, and RM-11789 into the new rulemaking docket.

¹⁴¹ See T-Mobile Petition at 9-11, 22-23. See also Letter from Steve B. Sharkey, Vice President, Government Affairs, Technology and Engineering Policy, T-Mobile, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 17-258 et al., at 2-3 (filed Oct. 10, 2017) (reiterating T-Mobile's request that the Commission seek comment on these proposals).

¹⁴² See T-Mobile Petition at 9-11. See 47 CFR §§ 96.11(a)(1)-(3); 96.13(a)(1); *First Report and Order*, 30 FCC Rcd at 3978, 3981, paras. 54, 63.

¹⁴³ T-Mobile Petition at 9.

¹⁴⁴ See, e.g., DSA Comments at 15; EWS Comments at 1-2; Federated Comments at 5; Google Comments at 12-14; Google Reply Comments at 20; Motorola Solutions Comments at 4; NCTA Comments at 12-14; Viero Wireless Comments at 3; OTI/PK Comments at 28-31; OTI/PK Reply Comments at 16-19; RWA/NTCA at 6-7; Vivint Wireless Comments at 7; Wade Sarver Comments at 1-3; WISPA Comments at 27-30. See also Letter from Tom Struble, Technology Policy Manager, R Street Institute, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 17-258, at 2 (Oct. 18, 2017) ("R Street was encouraged that the Commission has proposed to reject attempts to fundamentally alter the structure of the band plan while also seeking comment on ways to potentially increase the utility and availability of CBRS for all potential users.").

would “eviscerate the GAA tier.”¹⁴⁵ Additionally, the Commission struck a balance in 2015 on the amount of spectrum as between PAL as GAA use, finding that ensuring the availability of a “stable and significant quantity of spectrum . . . for both Priority Access Licensees and GAA will foster innovation, encourage efficient use of the band, and create an environment conducive to a wide array of potential users and uses.”¹⁴⁶ T-Mobile presents no compelling evidence to conclude that this reasoning is no longer applicable and that we should reevaluate the basic apportionment of the band between PAL and GAA use. As to its most recent assessment in support of this proposal, this was submitted months after T-Mobile filed its Petition and well after the comment cycle closed, providing little to no opportunity for comment.¹⁴⁷ But independently and regardless of timing, the assessment provides no new and material information that the Commission has not already considered.¹⁴⁸ In any event, nothing in T-Mobile’s eleventh hour filing persuades us to revisit the finding that the current apportionment of the band continues to be in the public interest because it provides a stable sharing mechanism between PAL and GAA and ensures that GAA has a certain level of guaranteed access to the band to provide a wide range of services. Accordingly, we deny the T-Mobile Petition with respect to this rule change.

61. Second, T-Mobile requests that the Commission raise the power limits for non-rural Category A CBSDs and for non-rural and rural Category B CBSDs.¹⁴⁹ The Commission already modified power limits for CBSDs in the *Second Report and Order*,¹⁵⁰ but T-Mobile argues that the “EIRP limits are still not sufficiently high for robust deployment of 5G technologies.”¹⁵¹ We find several reasons for rejecting this proposal as well, each of which serves as an independent basis for our doing so. This T-Mobile request involves revisiting the balance the Commission struck in establishing the spectrum sharing framework between incumbent users, including federal radiolocation users,¹⁵² and the new users in the band. Integral to this balance was the Commission’s decision not to further increase the EIRP

¹⁴⁵ Federated Wireless Comments at 5; *see also* Google Reply Comments at 18.

¹⁴⁶ *First Report and Order*, 30 FCC Rcd at 3981, para. 63. Reserving 70 megahertz for PAL use was an increase from the proposal of reserving 50 percent of the spectrum for PAL use in *3.5 GHz FNPRM*. *See id.* at 3982, para 67 (“[W]e believe that reserving a maximum of 70 megahertz—i.e., seven channels—for Priority Access Licensees in any given license area appropriately balances the needs of these two types of access. Seven PAL channels represent an increase from the five PAL channels that would have been available under the baseline FNPRM proposal (i.e., 3550-3650 MHz) while providing a greater degree of certainty for potential licensees. This increase in Priority Access spectrum availability will likely encourage more licensees to enter the band in any given area or allow more licensees to pursue higher bandwidth applications (through channel aggregation).”). No party petitioned the Commission to reconsider the apportionment of PAL and GAA spectrum. *See generally Order on Reconsideration*, 31 FCC Rcd at 5011.

¹⁴⁷ *See* M. Birchler *et al.*, *CBRS Band Assessment: Enhancing PAL Opportunities to Optimize 5G Deployments* (Oct. 11, 2017). The assessment was submitted by T-Mobile with its October 13 *ex parte* notice—only a few days prior to the start of the Sunshine period applicable to its Petition—depriving others of a meaningful opportunity to respond to it. *See* Letter from Steve B. Sharkey, Vice President, Government Affairs, Technology and Engineering Policy, T-Mobile, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 17-258 *et al.*, at 2-3 (Oct. 13, 2017) (T-Mobile Oct. 13 *Ex Parte*).

¹⁴⁸ The assessment centers on the increased importance of 3.5 GHz spectrum for 5G and the need for global harmonization of the band—the same rationales provided in T-Mobile’s Petition, Comments, and Reply Comments.

¹⁴⁹ T-Mobile Petition at 22-23. Specifically, it asks to increase the limits by 6 dB (to 30 dBm/10MHz) for non-rural Category A CBSDs and by 2 dB (to 49 dBm/10MHz) and 9 dB (to 56 dBm/10 MHz) respectively for non-rural and rural Category B CBSDs. *Id.*

¹⁵⁰ The Commission retained the EIRP limit for CBSDs deployed outdoors at 30 dBm/10 MHz for Category A CBSDs but increased the limit for outdoor Category B CBSDs to 47 dBm/10 MHz. *See* 47 CFR § 96.41(b); *First Report and Order* at 4026, para. 213; *Second Report and Order* at 5031, para. 75.

¹⁵¹ T-Mobile Petition at 23.

¹⁵² *See supra* n.11.

limits beyond the modifications it made in 2016,¹⁵³ and we find no compelling reason to revisit those limits—or the balance struck in the sharing framework—here. Here, too, T-Mobile’s recent technical assessment supporting the increased EIRP limits¹⁵⁴—as with its assessment in support of its PAL/GAA apportionment proposal—was submitted with only days left before the start of the Sunshine period, such that the ability to comment on it would be limited.¹⁵⁵ Apart from that, the assessment offers nothing new and material to our analysis; rather, it relies on old information, assumptions, and arguments that the Commission already considered and rejected when it declined on reconsideration to raise the EIRP limits to the same levels T-Mobile requests here.¹⁵⁶ Additionally, T-Mobile’s proposals would upset the balance the Commission struck between stakeholders in the band, particularly with respect to federal incumbents. Finally, the record shows that there has been significant investment related to SAS and ESC certification in reliance on the current power levels to enable sharing.¹⁵⁷ We find that this progress provides evidence that the Commission’s approach has provided a workable framework for all stakeholders, and we conclude that T-Mobile’s proposal would undermine that progress by, for instance, requiring additional features in the SAS and ESC and requiring the Commission to reconsider the size of the exclusion zones.¹⁵⁸ Accordingly, we deny the T-Mobile Petition with respect to this rule change.¹⁵⁹

62. Finally, while not raised as part of a petition for rulemaking, the Wireless Innovation Forum (WInnForum) requests in its comments that the Commission adopt rules to protect CBSDs from

¹⁵³ *Order on Reconsideration*, 31 FCC Rcd at 5032 paras. 77-80.

¹⁵⁴ See M. Birchler *et al.*, *CBRS Technical Assessment: CBSD Power Ceiling Increase External to Protection Zones* (October 11, 2017).

¹⁵⁵ See T-Mobile Oct. 13 *Ex Parte*.

¹⁵⁶ See *Order on Reconsideration*, 31 FCC Rcd at 5032, para. 78 (“However, we do not agree that the maximum EIRP for Category B CBSDs should be increased to 49 dBm/10 MHz in non-rural areas and 56 dBm/10 MHz in rural areas as requested by several petitioners. While we see the merit in increasing the maximum power available to network operators using Category B CBSDs in non-rural areas, we believe that an increase to 47 dBm/10MHz to match the level permitted for rural CBSDs will adequately address the concerns raised by Petitioners without negative effects on the interference environment in the band. This change represents a significant increase in power for non-rural applications with a corresponding potential for more coverage area for each CBSD. This change will also simplify the rules by removing the distinction between rural and non-rural power levels, allowing for uniform development and deployment of Category B CBSDs.”); see also *First Report and Order*, 30 FCC Rcd at 4025, para. 211 (stating that the adopted approach of having Category A devices with lower EIRP and Category B devices with higher EIRP “addresses many of the concerns raised by commenters that support higher power operations in the band. . . . While we acknowledge that some commenters . . . requested higher maximum power levels for outdoor operations than we adopt in this Report and Order, we believe that the Category B criteria we adopt will allow a wide range of network deployments, including point-to-point and point-to-multipoint transmissions, while maximizing coexistence between and within different tiers of users.” (emphasis added)).

¹⁵⁷ See, e.g., Federated Wireless Comments at 3-4 (describing multi-stakeholder efforts toward, and industry readiness for, completion of SAS certification); Google Comments at 6-7 (describing collaborative efforts via WInnForum that will enable the Commission to move forward with certification of SAS and ESC systems); *id.* at 30 (arguing that making “fundamental alterations” to the power limits “at this late date would undo substantial standards-setting efforts by the WInnForum and disrupt deployments”); Sony Comments at 1 (arguing that changes that would result in new or different SAS certification obligations “would waste already invested resources, unnecessarily raise costs, and inevitably delay the SAS certification process”).

¹⁵⁸ See, e.g., WISPA Comments at 32.

¹⁵⁹ The Commission has broad authority to initiate a rulemaking proceeding. See 47 CFR §§ 1.407, 1.411; *WWHT, Inc. v. FCC*, 656 F.2d 807, 809 (D.C. Cir. 1981) (“[T]he decision to institute rulemaking is one that is largely committed to the discretion of the agency . . .”). We also reject RWA/NTCA’s argument that CTIA’s and T-Mobile’s Petitions are untimely petitions for reconsideration and we therefore should not consider any of the Petitions’ proposals. See RWA/NTCA Comments at 2-3. Under our rules, “any interested person may petition for the issuance, amendment or repeal of a rule or regulation.” 47 CFR § 1.401.

commercial weather radar systems that are licensed on a secondary basis in the adjacent band.¹⁶⁰ While a number of commenters support WInnForum's proposal to address this issue, it is outside of the scope of the rulemaking petitions and issues upon which we sought comment, and beyond the focus of this proceeding, which proposes amendments applicable to operations in the 3550-3700 MHz band. More specifically, WInnForum's request appears to be a new request for rulemaking involving operations and rules that are not part of the two petitions for rulemaking (RM-11788 and RM-11789) that we sought comment on, and, as a consequence, those potentially affected by WInnForum's request, including commercial weather radar systems, were not given a full opportunity to comment on the need for such further rule making. Accordingly, we dismiss WInnForum's request without prejudice.¹⁶¹

V. PROCEDURAL MATTERS

A. *Ex Parte* Rules

63. The proceeding this Notice of Proposed Rulemaking initiates shall be treated as a "permit-but-disclose" proceeding in accordance with the Commission's *ex parte* rules.¹⁶² Persons making *ex parte* presentations must file a copy of any written presentation or a memorandum summarizing any oral presentation within two business days after the presentation (unless a different deadline applicable to the Sunshine period applies). Persons making oral *ex parte* presentations are reminded that memoranda summarizing the presentation must (1) list all persons attending or otherwise participating in the meeting at which the *ex parte* presentation was made, and (2) summarize all data presented and arguments made during the presentation. If the presentation consisted in whole or in part of the presentation of data or arguments already reflected in the presenter's written comments, memoranda or other filings in the proceeding, the presenter may provide citations to such data or arguments in his or her prior comments, memoranda, or other filings (specifying the relevant page and/or paragraph numbers where such data or arguments can be found) in lieu of summarizing them in the memorandum. Documents shown or given to Commission staff during *ex parte* meetings are deemed to be written *ex parte* presentations and must be filed consistent with rule 1.1206(b). In proceedings governed by rule 1.49(f) or for which the Commission has made available a method of electronic filing, written *ex parte* presentations and memoranda summarizing oral *ex parte* presentations, and all attachments thereto, must be filed through the electronic comment filing system available for that proceeding, and must be filed in their native format (*e.g.*, .doc, .xml, .ppt, searchable .pdf). Participants in this proceeding should familiarize themselves with the Commission's *ex parte* rules. We find that all *ex parte* presentations made by NTIA or Department of Defense representatives are exempt under our exemption for presentations by federal agencies sharing jurisdiction with the Commission.¹⁶³

B. Filing Requirements

64. Pursuant to sections 1.415 and 1.419 of the Commission's rules, 47 CFR §§ 1.415, 1.419, interested parties may file comments and reply comments on or before the dates indicated on the first page of this document. Comments may be filed using the Commission's Electronic Comment Filing System (ECFS). *See Electronic Filing of Documents in Rulemaking Proceedings*, 63 FR 24121 (1998).

- Electronic Filers: Comments may be filed electronically using the Internet by accessing the ECFS: <http://apps.fcc.gov/ecfs/>.
- Paper Filers: Parties who choose to file by paper must file an original and one copy of each filing. If more than one docket or rulemaking number appears in the caption of this proceeding, filers must submit two additional copies for each additional docket or rulemaking number.

¹⁶⁰ See WInnForum Comments at 1-3.

¹⁶¹ See 47 CFR § 1.401.

¹⁶² 47 CFR § 1.1200 *et seq.*

¹⁶³ See *id.* §1.1204(a)(5).

Filings can be sent by hand or messenger delivery, by commercial overnight courier, or by first-class or overnight U.S. Postal Service mail. All filings must be addressed to the Commission's Secretary, Office of the Secretary, Federal Communications Commission.

- All hand-delivered or messenger-delivered paper filings for the Commission's Secretary must be delivered to FCC Headquarters at 445 12th St., SW, Room TW-A325, Washington, DC 20554. The filing hours are 8:00 a.m. to 7:00 p.m. All hand deliveries must be held together with rubber bands or fasteners. Any envelopes and boxes must be disposed of before entering the building.
- Commercial overnight mail (other than U.S. Postal Service Express Mail and Priority Mail) must be sent to 9050 Junction Drive, Annapolis Heights, MD 20701.
- U.S. Postal Service first-class, Express, and Priority mail must be addressed to 445 12th Street, SW, Washington DC 20554.

65. People with Disabilities: To request materials in accessible formats for people with disabilities (braille, large print, electronic files, audio format), send an e-mail to fcc504@fcc.gov or call the Consumer & Governmental Affairs Bureau at 202-418-0530 (voice), 202-418-0432 (tty).

C. Initial Regulatory Flexibility Analysis

66. As required by the Regulatory Flexibility Act of 1980 (RFA),¹⁶⁴ the Commission has prepared an Initial Regulatory Flexibility Analysis (IRFA) for this Notice of Proposed Rulemaking, of the possible significant economic impact on small entities of the policies and rules addressed in this document. The IRFA is set forth in Appendix B. Written public comments are requested on this IRFA. Comments must be identified as responses to the IRFA and must be filed on or before the dates on the first page of this Notice of Proposed Rulemaking. The Commission's Consumer and Governmental Affairs Bureau, Reference Information Center, will send a copy of this Notice of Proposed Rulemaking, including the IRFA, to the Chief Counsel for Advocacy of the Small Business Administration (SBA).¹⁶⁵

D. Initial Paperwork Reduction Analysis

67. This document contains proposed modified information collection requirements. The Commission, as part of its continuing effort to reduce paperwork burdens, invites the general public and the Office of Management and Budget ("OMB") to comment on the information collection requirements contained in this document, as required by the Paperwork Reduction Act of 1995, Public Law 104-13. In addition, pursuant to the Small Business Paperwork Relief Act of 2002, Public Law 107-198, see 44 U.S.C. § 3506(c)(4), we seek specific comment on how we might further reduce the information collection burden for small business concerns with fewer than 25 employees.

VI. ORDERING CLAUSES

68. Accordingly, IT IS ORDERED, pursuant to Sections 1, 2, 4(i), 4(j), 7, 301, 302(a), 303, 307(e), and 316 of the Communications Act of 1934, as amended, 47 U.S.C. §§ 151, 152, 154(i), 154(j), 157, 301, 302(a), 307(e), and 316, that this *Notice of Proposed Rulemaking* in GN Docket No. 17-258 is ADOPTED.

69. IT IS FURTHER ORDERED that, pursuant to applicable procedures set forth in Sections 1.415 and 1.419 of the Commission's rules, 47 CFR §§ 1.415, 1.419, interested parties may file comments on the *Notice of Proposed Rulemaking* on or before 30 days after publication in the *Federal Register* and reply comments on or before 60 days after publication in the *Federal Register*

¹⁶⁴ 5 U.S.C. § 603.

¹⁶⁵ 5 U.S.C. § 603(a).

70. IT IS FURTHER ORDERED that the Commission's Consumer & Governmental Affairs Bureau, Reference Information Center, SHALL SEND a copy of this Notice of Proposed Rulemaking, including the Initial Regulatory Flexibility Analysis, to the Chief Counsel for Advocacy of the Small Business Administration.

71. IT IS FURTHER ORDERED that, pursuant to Sections 4(i) and 405 of the Communications Act of 1934, 47 U.S.C. §§ 154(i), 405, and Section 1.407 of the Commission's rules, 47 CFR § 1.407, the Petitions for Rulemaking of CTIA, filed June 6, 2017, and of T-Mobile USA, Inc., filed June 19, 2017, are GRANTED IN PART, to the extent discussed above, AND ARE OTHERWISE DENIED, and, provided that no petitions for reconsideration are timely filed, RM-11788 and RM-11789 ARE TERMINATED.

72. IT IS FURTHER ORDERED that GN Docket No. 12-354 is TERMINATED.

FEDERAL COMMUNICATIONS COMMISSION

Marlene H. Dortch
Secretary

Appendix A

Proposed Rules

The Federal Communications Commission proposed to amend Part 96 of the Code of Federal Regulations as follows:

PART 96—CITIZENS BROADBAND RADIO SERVICE

1. The authority citation for part 96 continues to read as follows:
AUTHORITY: 47 U.S.C. 154(i), 303, and 307.
2. Amend Section 96.25 by revising paragraph (a) and paragraph (b)(3) to read as follows:

§96.25 Priority access licenses.

(a) An applicant must file an application for an initial authorization for all PALs desired. Initial authorizations shall be granted in accordance with Section 96.29. Priority Access Licensees must operate CBSDs consistent with the technical rules and interference protection requirements set for in this part.

(b) * * *

(3) *License term*: Each PAL has a ten-year license term. Licensees must file a renewal application in accordance with the provisions of Section 1.949.

* * * * *

3. Remove and reserve Section 96.27:

§96.27 [Reserved]

4. Amend Section 96.29 by removing paragraphs (b), (c), and (d), and revising paragraph (a) to read as follows:

§96.29 Competitive bidding procedures.

Mutually exclusive initial applications for Priority Access Licenses are subject to competitive bidding. The general competitive bidding procedures set forth in part 1, subpart Q of this chapter will apply unless otherwise provided in this subpart.

5. Amend Section 96.32 by revising paragraph (b) to read as follows:

§96.32 Priority access assignments of authorization, transfer of control, and leasing arrangements.

* * * * *

(b) Priority Access Licensees may partition or disaggregate their licenses and partially assign or transfer their licenses and may enter into de facto leasing arrangements for a portion of their licenses.

* * * * *

6. Amend Section 96.41 by correcting paragraph (e)(2) to read as follows:

§96.41 General radio requirements.

(e) * * *

(2) *Additional protection levels.* Notwithstanding paragraph (e)(1) of this section, the conducted power of any emissions below 3530 MHz or above 3720 MHz shall not exceed -40dBm/MHz.

* * * * *

7. Remove and reserve Section 96.55(a)(3):

§96.55 Information gathering and retention

(a) * * *

(3) [Reserved]

* * * * *

APPENDIX B

Initial Regulatory Flexibility Analysis

1. As required by the Regulatory Flexibility Act of 1980, as amended (RFA),¹ the Commission has prepared this Initial Regulatory Flexibility Analysis (IRFA) of the possible significant economic impact on a substantial number of small entities by the policies and rules proposed in this *Notice of Proposed Rulemaking (Notice)*. Written comments are requested on this IRFA. Comments must be identified as responses to the IRFA and must be filed by the deadlines for comments on the *Notice*. The Commission will send a copy of the *Notice*, including this IRFA, to the Chief Counsel for Advocacy of the Small Business Administration (SBA).² In addition, the *Notice* and IRFA (or summaries thereof) will be published in the Federal Register.³

A. Need for, and Objectives of, the Proposed Rules

2. In the Notice of Proposed Rulemaking (*Notice*), we seek comment on and propose changes to the rules governing Priority Access Licenses (PALs) that will be issued in 3550-3700 MHz band (3.5 GHz Band)—including longer license terms, renewability, larger geographic license areas, and auction methodology. These changes are consistent with the service rules and license assignment models that helped foster the development of 4G and LTE services in the United States. We anticipate that adopting similar rules for the 3.5 GHz Band will similarly encourage robust investment in network deployment. We also seek comment on changes to the technical rules that could facilitate operations over wider bandwidths while ensuring that current and future incumbent operations continue to be protected from interference. In addition, we seek changes to the information security requirements that would help safeguard private information and protect critical infrastructure.

3. Since the Commission established these rules, it has become increasingly apparent that the 3.5 GHz Band will play a significant role as one of the core mid-range bands for 5G network deployments throughout the world. In that time, several countries have moved forward with policies that would make this band available for 5G, global bodies have developed standards for next generation devices in the band, and new technologies have become available that more fully leverage the potential of this spectrum. In the two years since the Commission first adopted rules for this “innovation band,” it has authorized service in other bands that also will be critical to 5G deployment, and is currently evaluating additional bands for 5G use. To maintain U.S. leadership in the global race for 5G, we must ensure that the service rules governing bands that are critical for 5G network deployments—including the 3.5 GHz Band—keep up with technological advancements, create incentives for investment, encourage efficient spectrum use, support a variety of different use cases, and promote robust network deployments in both urban and rural communities.

4. In light of international attention and given the international focus on commercial deployments in the 3.5 GHz Band, global harmonization will promote innovation and investment by allowing for efficiency-promoting economies of scale. We anticipate that the targeted changes considered in this Notice will foster an investment environment for the band to flourish in the United States, as other nations target these frequencies for 5G and next-generation technologies.

¹ See 5 U.S.C. § 603. The RFA, see 5 U.S.C. §§ 601–612, has been amended by the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA), Pub. L. No. 104-121, Title II, 110 Stat. 857 (1996).

² See 5 U.S.C. § 603(a).

³ See *id.*

B. Legal Basis

5. The proposed action is taken under Sections 1, 2, 4(i), 4(j), 301, 302(a), 303, 307(e) and 316 of the Communications Act of 1934, as amended, 47 U.S.C. §§ 151, 152, 154(i), 154(j), 157, 301, 302(a), 303, 307(e), and 316.

C. Description and Estimate of the Number of Small Entities to Which the Proposed Rules Will Apply

6. The RFA directs agencies to provide a description of and, where feasible, an estimate of the number of small entities that may be affected by the rules, if adopted.⁴ The RFA generally defines the term “small entity” as having the same meaning as the terms “small business,” “small organization,” and “small governmental jurisdiction.”⁵ In addition, the term “small business” has the same meaning as the term “small business concern” under the Small Business Act.⁶ A small business concern is one which: (1) is independently owned and operated; (2) is not dominant in its field of operation; and (3) satisfies any additional criteria established by the SBA.⁷

7. *Small Businesses, Small Organizations, and Small Governmental Jurisdictions.* Our action may, over time, affect small entities that are not easily categorized at present. We therefore describe here, at the outset, three broad groups of small entities that could be directly affected herein.⁸ First, while there are industry specific size standards for small businesses that are used in the regulatory flexibility analysis, according to data from the SBA’s Office of Advocacy, in general a small business is an independent business having fewer than 500 employees.⁹ These types of small businesses represent 99.9 percent of all businesses in the United States, which translates to 28.8 million businesses.¹⁰

8. Next, the type of small entity described as a “small organization” is generally “any not-for-profit enterprise which is independently owned and operated and is not dominant in its field.”¹¹ Nationwide, as of Aug. 2016, there were approximately 356,494 small organizations based on registration and tax data filed by nonprofits with the Internal Revenue Service (IRS).¹²

⁴ 5 U.S.C. § 604(b)(3).

⁵ 5 U.S.C. § 601(6).

⁶ 5 U.S.C. § 601(3) (incorporating by reference the definition of “small business concern” in the Small Business Act, 15 U.S.C. § 632). Pursuant to 5 U.S.C. § 601(3), the statutory definition of a small business applies “unless an agency, after consultation with the Office of Advocacy of the Small Business Administration and after opportunity for public comment, establishes one or more definitions of such term which are appropriate to the activities of the agency and publishes such definition(s) in the Federal Register.”

⁷ 15 U.S.C. § 632.

⁸ See 5 U.S.C. § 601(3)-(6).

⁹ See SBA, Office of Advocacy, “Frequently Asked Questions, Question 1—What is a small business?,” https://www.sba.gov/sites/default/files/advocacy/SB-FAQ-2016_WEB.pdf (June 2016).

¹⁰ See SBA, Office of Advocacy, “Frequently Asked Questions, Question 2—How many small business are there in the U.S.?” https://www.sba.gov/sites/default/files/advocacy/SB-FAQ-2016_WEB.pdf (June 2016).

¹¹ 5 U.S.C. § 601(4).

¹² Data from the Urban Institute, National Center for Charitable Statistics (NCCS) reporting on nonprofit organizations registered with the IRS was used to estimate the number of small organizations. Reports generated using the NCCS online database indicated that as of August 2016 there were 356,494 registered nonprofits with total revenues of less than \$100,000. Of this number 326,897 entities filed tax returns with 65,113 registered nonprofits reporting total revenues of \$50,000 or less on the IRS Form 990-N for Small Exempt Organizations and 261,784 nonprofits reporting total revenues of \$100,000 or less on some other version of the IRS Form 990 within 24 months of the August 2016 data release date. See <http://nccsweb.urban.org/tablewiz/bmf.php> where the report showing this

(continued....)

9. Finally, the small entity described as a “small governmental jurisdiction” is defined generally as “governments of cities, counties, towns, townships, villages, school districts, or special districts, with a population of less than fifty thousand.”¹³ U.S. Census Bureau data from the 2012 Census of Governments¹⁴ indicates that there were 90,056 local governmental jurisdictions consisting of general purpose governments and special purpose governments in the United States.¹⁵ Of this number there were 37, 132 General purpose governments (county¹⁶, municipal and town or township¹⁷) with populations of less than 50,000 and 12,184 Special purpose governments (independent school districts¹⁸ and special districts¹⁹) with populations of less than 50,000. The 2012 U.S. Census Bureau data for most types of governments in the local government category shows that the majority of these governments have populations of less than 50,000.²⁰ Based on this data we estimate that at least 49,316 local government jurisdictions fall in the category of “small governmental jurisdictions.”²¹

(Continued from previous page)

data can be generated by selecting the following data fields: Show: “Registered Nonprofit Organizations”; By: “Total Revenue Level (years 1995, Aug to 2016, Aug)”; and For: “2016, Aug” then selecting “Show Results”.

¹³ 5 U.S.C. § 601(5).

¹⁴ See 13 U.S.C. § 161. The Census of Government is conducted every five (5) years compiling data for years ending with “2” and “7.” See also Program Description Census of Government <https://factfinder.census.gov/faces/affhelp/jsf/pages/metadata.xhtml?lang=en&type=program&id=program.en.CO G#>.

¹⁵ See U.S. Census Bureau, 2012 Census of Governments, Local Governments by Type and State: 2012 - United States-States. <https://factfinder.census.gov/bkmk/table/1.0/en/COG/2012/ORG02.US01>. Local governmental jurisdictions are classified in two categories - General purpose governments (county, municipal and town or township) and Special purpose governments (special districts and independent school districts).

¹⁶ See U.S. Census Bureau, 2012 Census of Governments, County Governments by Population-Size Group and State: 2012 - United States-States. <https://factfinder.census.gov/bkmk/table/1.0/en/COG/2012/ORG06.US01>. There were 2,114 county governments with populations less than 50,000.

¹⁷ See U.S. Census Bureau, 2012 Census of Governments, Subcounty General-Purpose Governments by Population-Size Group and State: 2012 - United States - States. <https://factfinder.census.gov/bkmk/table/1.0/en/COG/2012/ORG07.US01>. There were 18,811 municipal and 16,207 town and township governments with populations less than 50,000.

¹⁸ See U.S. Census Bureau, 2012 Census of Governments, Elementary and Secondary School Systems by Enrollment-Size Group and State: 2012 - United States-States. <https://factfinder.census.gov/bkmk/table/1.0/en/COG/2012/ORG11.US01>. There were 12,184 independent school districts with enrollment populations less than 50,000.

¹⁹ See U.S. Census Bureau, 2012 Census of Governments, Special District Governments by Function and State: 2012 - United States-States. <https://factfinder.census.gov/bkmk/table/1.0/en/COG/2012/ORG09.US01>. [The U.S. Census Bureau data did not provide a population breakout for special district governments.](https://www.census.gov/data/tables/2012/c2k12/govt/2012-09-01.html)

²⁰ See U.S. Census Bureau, 2012 Census of Governments, County Governments by Population-Size Group and State: 2012 - United States-States - <https://factfinder.census.gov/bkmk/table/1.0/en/COG/2012/ORG06.US01>; Subcounty General-Purpose Governments by Population-Size Group and State: 2012 - United States-States - <https://factfinder.census.gov/bkmk/table/1.0/en/COG/2012/ORG07.US01>; and Elementary and Secondary School Systems by Enrollment-Size Group and State: 2012 - United States-States. <https://factfinder.census.gov/bkmk/table/1.0/en/COG/2012/ORG11.US01>. [While U.S. Census Bureau data did not provide a population breakout for special district governments, if the population of less than 50,000 for this category of local government is consistent with the other types of local governments the majority of the 38, 266 special district governments have populations of less than 50,000.](https://www.census.gov/data/tables/2012/c2k12/govt/2012-09-01.html)

²¹ *Id.*

10. *Wireless Telecommunications Carriers (except Satellite)*. This industry comprises establishments engaged in operating and maintaining switching and transmission facilities to provide communications via the airwaves. Establishments in this industry have spectrum licenses and provide services using that spectrum, such as cellular services, paging services, wireless internet access, and wireless video services.²² The appropriate size standard under SBA rules is that such a business is small if it has 1,500 or fewer employees. For this industry, U.S. Census data for 2012 show that there were 967 firms that operated for the entire year. Of this total, 955 firms had employment of 999 or fewer employees and 12 had employment of 1000 employees or more.²³ Thus, under this category and the associated size standard, the Commission estimates that the majority of wireless telecommunications carriers (except satellite) are small entities.

11. *Satellite Telecommunications*. This category comprises firms “primarily engaged in providing telecommunications services to other establishments in the telecommunications and broadcasting industries by forwarding and receiving communications signals via a system of satellites or reselling satellite telecommunications.”²⁴ Satellite telecommunications service providers include satellite and earth station operators. The category has a small business size standard of \$32.5 million or less in average annual receipts, under SBA rules.²⁵ For this category, U.S. Census Bureau data for 2012 shows that there were a total of 333 firms that operated for the entire year.²⁶ Of this total, 299 firms had annual receipts of less than \$25 million.²⁷ Consequently, we estimate that the majority of satellite telecommunications providers are small entities.

12. *All Other Telecommunications*. The “All Other Telecommunications” category is comprised of establishments that are primarily engaged in providing specialized telecommunications services, such as satellite tracking, communications telemetry, and radar station operation.²⁸ This industry also includes establishments primarily engaged in providing satellite terminal stations and associated facilities connected with one or more terrestrial systems and capable of transmitting telecommunications to, and receiving telecommunications from, satellite systems.²⁹ Establishments providing Internet services or voice over Internet protocol (VoIP) services via client-supplied telecommunications connections are also included in this industry.³⁰ The SBA has developed a small business size standard for “All Other Telecommunications,” which consists of all such firms with gross annual receipts of \$32.5 million or less.³¹ For this category, U.S. Census Bureau data for 2012 shows that there were 1,442 firms

²² NAICS Code 517210. See <https://factfinder.census.gov/faces/affhelp/jsf/pages/metadata.xhtml?lang=en&type=ib&id=ib.en./ECN.NAICS2012.517210>.

²³ *Id.* Available census data do not provide a more precise estimate of the number of firms that have employment of 1,500 or fewer employees; the largest category provided is for firms with “1000 employees or more.”

²⁴ U.S. Census Bureau, 2012 NAICS Definitions, “517410 Satellite Telecommunications”; <https://factfinder.census.gov/faces/affhelp/jsf/pages/metadata.xhtml?lang=en&type=ib&id=ib.en./ECN.NAICS2012.517410#>.

²⁵ 13 CFR § 121.201, NAICS code 517410.

²⁶ U.S. Census Bureau, *2012 Economic Census of the United States*, Table EC1251SSSZ4, Information: Subject Series - Estab and Firm Size: Receipts Size of Firms for the United States: 2012, NAICS code 517410 https://factfinder.census.gov/bkmk/table/1.0/en/ECN/2012_US/51SSSZ4/naics~517410.

²⁷ *Id.*

²⁸ See U.S. Census Bureau, 2012 NAICS Definitions, NAICS Code “517919 All Other Telecommunications”, <https://factfinder.census.gov/faces/affhelp/jsf/pages/metadata.xhtml?lang=en&type=ib&id=ib.en./ECN.NAICS2012.517919#>

²⁹ *Id.*

³⁰ *Id.*

³¹ 13 CFR 121.201; NAICS Code 517919.

that operated for the entire year.³² Of these firms, a total of 1,400 had gross annual receipts of less than \$25 million and 42 firms had annual receipts of \$25 million to \$49,999,999.³³ Thus, the Commission estimates that a majority of “All Other Telecommunications” firms potentially affected by our action can be considered small.

13. We anticipate that some of these “All Other Telecommunications” firms which are small entities, are earth station applicants/licenses that might be affected by our rule changes. And while our rule changes may have an impact on both earth and space station applicants and licensees, space station applicants and licensees rarely qualify under the definition of a small entity. Generally, space stations cost hundreds of millions of dollars to construct, launch and operate. Consequently, we do not anticipate that any space station operators are small entities that would be affected by our actions.

14. *Radio and Television Broadcasting and Wireless Communications Equipment Manufacturing.* This industry comprises establishments primarily engaged in manufacturing radio and television broadcast and wireless communications equipment. Examples of products made by these establishments are: transmitting and receiving antennas, cable television equipment, GPS equipment, pagers, cellular phones, mobile communications equipment, and radio and television studio and broadcasting equipment.³⁴ The SBA has established a small business size standard for this industry of 1,250 employees or less.³⁵ U.S. Census Bureau data for 2012 shows that 841 establishments operated in this industry in that year.³⁶ Of that number, 828 establishments operated with fewer than 1,000 employees, 7 establishments operated with between 1,000 and 2,499 employees and 6 establishments operated with 2,500 or more employees.³⁷ Based on this data, we conclude that a majority of manufacturers in this industry are small.

D. Description of Projected Reporting, Recordkeeping, and Other Compliance Requirements for Small Entities

15. The proposed actions in the *Notice*, if adopted, may impose reporting, recordkeeping and other compliance requirements on small entities as well as other licensees. Therefore, we seek comment from the parties on the rule changes that have been proposed in the *Notice*. Specifically, in the *Notice*, the Commission seeks public comment on possible changes to PAL licensing rules, including (1) extending the PAL license term from three years to 10 years, and creating the possibility of PAL renewal; (2) expanding the PAL license area from a census tract to something larger, such as a Partial Economic Areas (PEA); (3) allowing licensees to disaggregate and partition PALs on the secondary market; (4) eliminating certain restrictions on when PALs can be assigned in a given area; and (5) allowing licensees to bid on specific channel blocks. We also seek comment on eliminating a requirement that Spectrum Access Systems (SASs) publicly disclose Citizen Broadband Service Device (CBSD) registration information in order to safeguard private information and protect critical infrastructure, and we seek

³² U.S. Census Bureau, *2012 Economic Census of the United States*, Table EC1251SSSZ4, Information: Subject Series - Estab and Firm Size: Receipts Size of Firms for the United States: 2012, NAICS code 517919, https://factfinder.census.gov/bkmk/table/1.0/en/ECN/2012_US/51SSSZ4/naics~517919.

³³ *Id.*

³⁴ The NAICS Code for this service is 334220. 13 CFR § 121.201. *See also* U.S. Census Bureau, 2012 NAICS Definitions, “334220 Radio and Television Broadcasting and Wireless Communications Equipment Manufacturing” <https://factfinder.census.gov/faces/affhelp/jsf/pages/metadata.xhtml?lang=en&type=ib&id=ib.en./ECN.NAICS2012.334220#>.

³⁵ 13 CFR § 121.201, NAICS Code 334220.

³⁶ U.S. Census Bureau, *2012 Economic Census of the United States*, Table EC1231SG2, Manufacturing: Summary Series: General Summary: Industry Statistics for Subsectors and Industries by Employment Size: 2012, NAICS Code 334220, https://factfinder.census.gov/bkmk/table/1.0/en/ECN/2012_US/31SG2/naics~334220.

³⁷ *Id.*

comment on possible changes to the emissions limits for CBSDs to facilitate operations over wider bandwidths.

16. The Commission has not yet auctioned PALs and there is not yet commercial deployment in the Citizens Broadband Radio Service. All entities—including small entities—that eventually obtain PALs would need to comply with any changes made to the PAL licensing or technical rules. In today’s *Notice*, we seek comment on potential costs and benefits of the proposed changes, including specific costs to or benefits for small entities.

17. As part of the *Notice*’s proposal to extend the PAL license term to 10 years with an option for renewal, we seek comment on whether we should adopt a renewal standard or performance requirements for PALs. If the Commission were eventually to adopt a renewal standard and/or performance requirements, entities may be subject to recordkeeping and reporting requirements necessary to make those showings. Such showings would be required of all Priority Access licensees, including those that are small entities. Similarly, if the Commission adopts modifications to the emissions limits applicable to CBSDs, all CBSD manufacturers would need to comply with the limits established, including small entities. Because the proposed changes to the emissions limits are intended to enable wider bandwidth operations, we seek comment in the *Notice* on whether that benefit outweighs potential tradeoffs.

E. Steps Taken to Minimize the Significant Economic Impact on Small Entities, and Significant Alternatives Considered

18. The RFA requires an agency to describe any significant, specifically small business, alternatives that it has considered in reaching its proposed approach, which may include the following four alternatives (among others): “(1) the establishment of differing compliance or reporting requirements or timetables that take into account the resources available to small entities; (2) the clarification, consolidation, or simplification of compliance and reporting requirements under the rule for small entities; (3) the use of performance rather than design standards; and (4) an exemption from coverage of the rule, or any part thereof for small entities.”³⁸

19. To evaluate options and alternatives should there be a significant economic impact on small entities as a result of actions that have been proposed in this *Notice*, the Commission has sought comment from the parties. In the *Notice*, we propose to increase the PAL license term from three years to ten years and provide an opportunity for renewal. To evaluate the impact on small entities, the Commission seeks comment on how this change would affect access to spectrum by small entities, including those seeking to serve rural areas. We ask what costs this change would impose on small and rural entities, and whether benefits outweigh those costs. We also seek comment on alternative approaches, including using a PAL license term shorter than ten years for some or all PALs in a given market, and seek comment on the effect these alternatives would have on small entities’ access to spectrum and on their current and future investment in the Citizens Broadband Radio Service.

20. We also seek comment on whether to increase the PAL geographic licensing area from census tracts to a larger area, such as PEAs, and seek comment on the effect this would have on small entities, including how it could affect small entities’ access to spectrum, particularly in rural areas. We ask about alternative approaches, including “hybrid” approaches of using a smaller geographic area (such as census tracts or counties) for rural areas and larger areas (such as PEAs) for urban areas, or offering PALs of different sizes within a geographic area, and whether alternative or hybrid approaches would help facilitate access to spectrum from small and rural entities.

21. Additionally, in the *Notice*, we propose to allow Priority Access licensees to partition or disaggregate their PALs. We seek comment on whether this would facilitate access to spectrum by small entities for targeted, local deployments, particularly if the Commission also were to make the proposed

³⁸ 5 U.S.C. § 603(c)(1)-(4).

changes to the PAL licensing area and/or license term. We also seek comment on whether to allow partitioning and disaggregation of PALs if the Commission does not adopt the other proposed changes in the *Notice*. We seek comment on what types of performance requirements might be necessary to encourage a robust secondary market that promotes service to rural and underserved areas.

22. With respect to these specific proposals on which the Commission seeks comment in the *Notice*, the Commission has not at this time excluded any alternative proposal, but would do so in this proceeding if the record indicates that a particular proposal would have a significant and unjustifiable adverse economic impact on small entities. Additionally, in the companion *Order*, the Commission has declined to seek comment on additional proposals on different topics than those raised in the *Notice*, in part on the basis that they would discourage diverse use of the spectrum at issue, a decision which is more inclusive of small entities such as smaller carriers.

F. Federal Rules that May Duplicate, Overlap, or Conflict with the Proposed Rules

23. None.

**STATEMENT OF
CHAIRMAN AJIT PAI**

Re: *Promoting Investment in the 3550-3700 MHz Band*, GN Docket No. 17-258; *Petitions for Rulemaking Regarding the Citizens Broadband Radio Service*, RM-11788 (Terminated), RM-11789 (Terminated)

Shortly after becoming Chairman, I asked Commissioner O’Rielly to take the lead in examining whether the Commission’s 3.5 GHz rules struck the right balance for encouraging investment and innovation in the band. Today’s *Notice* is the direct result of his efforts. I am grateful to Commissioner O’Rielly for his outstanding leadership on this issue and am pleased to support this *Notice*.

Many thanks also go to the staff who worked on this item. In particular, thanks to Charles Eberle, Kamran Etemad, Jessica Greffenius, Neşe Guendelsberger, Jonathan McCormack, Aalok Mehta, Gary Michaels, Roger Noel, Matthew Pearl, Paul Powell, Kelly Quinn, Becky Schwartz, Dana Shaffer, Don Stockdale, Joel Taubenblatt, Margie Wiener and Mary Claire York from the Wireless Telecommunications Bureau; Navid Golshahi, Julie Knapp, Bob Pavlak, and Ron Repasi from the Office of Engineering and Technology; Chana Wilkerson from the Office of Communications Business Opportunities; and, David Horowitz, Bill Richardson, and Anjali Singh from the Office of General Counsel.

**CONCURRING STATEMENT OF
COMMISSIONER MIGNON L. CLYBURN**

Re: *Promoting Investment in the 3550-3700 MHz Band*, GN Docket No. 17-258; *Petitions for Rulemaking Regarding the Citizens Broadband Radio Service*, RM-11788 (Terminated), RM-11789 (Terminated)

Nearly five years ago, this Commission embarked on a process to explore the viability of using the 3.5 GHz spectrum band for commercial wireless broadband services. Each step along the way, I have voiced my support for using this band on a shared basis because of the tremendous opportunities it presents for new entrants and smaller providers.

So yes, I would have preferred that the majority not launch this NPRM because it sets the Commission down a path to undo rule provisions for the band that already are fueling investment in innovative wireless services that promise to bring broadband to unserved areas and more competition to the commercial wireless market.

In 2015, the rules we adopted for the Priority Access Licenses, or PALs were designed not just to benefit commercial wireless companies, but attract investment and innovation from manufacturers, utilities, hotels, office complexes, shopping malls, commercial real estate companies, and universities. These are entities that want to build wireless networks that require some measure of interference protection yet are not appropriately outsourced to a commercial cellular network.

Instead of designing traditional wireless licenses with large geographic areas, 10-year license terms, and the expectation of renewal, we took a more creative regulatory approach. Recognizing that Internet-of-things and 5G services would require the use of small cells that serve more targeted areas, the Commission properly determined that a census tract was the more appropriate license size for PALs, with a shorter license term, and no expectation of renewability. Those characteristics also make the PALs affordable for small school systems and rural hospitals, located in underserved areas that are desperate for cost effective broadband services.

The overwhelming evidence demonstrates that those rules are working. Wireless Internet service providers (or “WISPs”) that tend to serve rural areas, equipment manufacturers, tech companies, and heavy industries, have raced to invest millions of dollars to unlock the potential of mid-band spectrum in the Citizens Broadband Radio Service band. To-date, fifty-five entities – including chipmakers, mobile carriers, cable companies, equipment manufacturers and more – have joined the Citizens Broadband Radio Service or CBRS Alliance. Forty-seven companies participating in the Wireless Innovation Forum, have spent tens of thousands of hours developing technical standards to implement CBRS. At least a dozen firms have obtained experimental authorizations to trial equipment and technology in the band. They are developing private networks to support an open architecture operating system for the Industrial Internet as well as smart grid, rural broadband, small cell back haul, and other point-to-multipoint networks.

So why, despite my support for the 2015 rules for PALs, and the clear evidence that they are working, am I voting to concur with this NPRM? The reason is that I negotiated with my majority colleagues to improve the discussion about the geographic size of the PALs. The initial draft publicly, released earlier this month, “proposed” to increase the geographic size of the license area for PALs.

My colleagues agreed to back away from proposing to increase the geographic area size of the PALs and just seek comment on that idea. At my request, the NPRM now includes new language, asking about offering, in urban and rural areas, a mix of larger PALs and PALs at the census tract levels. These changes improve the possibility that the Commission will continue to offer PALs at the census tract size.

They improve the possibility that a rural wireless broadband service provider, the smallest of school systems, the most budget constrained small town or a single hospital system, each have a fair shot to obtain a PAL. And they improve the possibility that utility companies and large companies who are working on private wireless networks will be able to bring the most innovative Internet-of-Things, big data analytics, and other 5G solutions to market. The current posture of the NPRM is better for consumers and competition and it would not have happened unless I voted to concur.

So, I concur, and thank Don Stockdale and his staff of the Wireless Telecommunications Bureau, Julie Knapp and his Office of Engineering and Technology for their work on this proceeding and their ongoing efforts, to unleash the next generation of wireless innovation.

**STATEMENT OF
COMMISSIONER MICHAEL O'RIELLY**

Re: *Promoting Investment in the 3550-3700 MHz Band*, GN Docket No. 17-258; *Petitions for Rulemaking Regarding the Citizens Broadband Radio Service*, RM-11788 (Terminated), RM-11789 (Terminated)

I am pleased to support today's notice that formally initiates a review of the priority access license, or PAL, rules for the 3.5 GHz Band. When the Commission first considered the rules implementing the three-tiered structure of protected incumbents, PALs, and general authorized access (GAA), it was readily apparent that the PALs structure was seriously flawed. In fact, I likened it to a three-legged stool with a broken leg. Therefore, I am looking to fix the previous Commission's missteps.

From the beginning, I have expressed concerns, as have many stakeholders, that the short license terms and lack of renewability would hamper investment in the PALs. The record in response to the petitions received shows that many entities looking at larger scale deployments require certainty that their investment will not be stranded. And, the Commission's short-sighted decision to potentially limit the number of PALs available at auction heightened these concerns. If an entity seeks the priority and protection PALs offer, then they should be able to obtain this spectrum, even if they are the only entity interested in a market. So, today the Commission proposes to reverse these poor decisions.

The Commission is also seeking comment on increasing the size of the PAL geographic areas. I would like to address some misinformation that seems to surround this proceeding. Regardless of the outrage and hyperbole found in some ex parte letters and press articles, the item does not tentatively conclude that PALs will be auctioned exclusively by Partial Economic Areas. Instead, we are seeking comment on a myriad of options. I am personally supportive of increasing the market sizes from census tracts, which will reduce auction complexity, administrative burdens, and interference concerns. But, I recognize that there are many different views, so I look forward to hearing from all interested parties on this issue. Here is an issue where good, old fashioned cooperation and negotiation occurred with my friend from South Carolina. While I would have preferred we keep the NPRM's proposed text, our staffs worked together to find and agree to language on an acceptable compromise that most parties can live with.

Generally, the role of the Commission in executing spectrum policy is to ensure that investment and innovation is promoted, that flexible use is permitted, and that the spectrum is attractive to as many users as possible. If the Commission succeeds in this task, the marketplace – through our auctions process – will determine the best use for this spectrum. Today's NPRM puts us on this path.

While investment in the PALs has always been a concern, it has been amplified because of the emergence of this band as a focal point for future 5G networks. Internationally, many countries are looking to the 3.5 GHz band for next-generation services that will be fully licensed. If we were to go back in time, I may have preferred that approach, but I recognize the work and investment that has gone into GAA and the databases. In fact, today's item preserves GAA and does not seek any modifications to those rules.

Opponents have stated that the proposed changes are intended to turn this into a 5G-only band for large nationwide providers. That is ridiculous. The Commission implements flexible use policies, meaning a winner at auction can deploy whatever service or innovation they choose. The Commission does not and should not make any decisions regarding what can or cannot be deployed in a band, beyond setting technical rules to prevent harmful interference to incumbents and adjacent users. I fervently believe that this spectrum should be available for all purposes, and, yes, that includes 5G. What the

Commission won't do here is adopt artificial restrictions through license and auction structure to dissuade some uses or users while promoting others. Such preferences are not in the public interest.

In this same vein, I was alarmed that some are under the impression that these licenses were promised to rural providers and other potential users, in part because of a sentiment that big providers warehouse spectrum in smaller markets. Both concepts are wrong. First, the Commission should never promise or provide handouts to any class of entities that may be favored at the time. I don't know if it was actually that explicit or not, but it is a categorical mistake to have allowed the perception that it was the case. Second, while I don't believe licensees are warehousing spectrum, to the extent that we need to fix wireless licenses to ensure broadband buildout in rural markets, the solution is stricter construction obligations going forward and facilitating the partition of licenses.

I have also heard that the proposed changes are just relics of policies past. I disagree again. We have wireless networks that are the envy of the world because of our tried and true auction procedures and rules that promote investment. Travel internationally, as I do, and you will get repeated questions about how other countries can duplicate the FCC's auction rules. These are the very things, including renewability and longer license terms, that has made the U.S. the leader in wireless technologies.

Some opponents say these changes are not necessary, citing the work and investment that has already occurred under the current rules. However, many of the entities that have invested in the research and development stage of this band are the same ones seeking rule changes or would benefit from having PAL certainty. Similarly, many of these entities are also interested in GAA, so they were going to be active in the process to create the databases, standards, and equipment. However, for large scale investments in PALs, they expressed that changes would have to be made.

Other opponents have argued that the Commission should not review these rules at all. They seem to argue that, once the rules are set, there can be no further modifications. The Commission, however, often repurposes spectrum and changes licensing and technical rules, when necessary. While the Commission doesn't take such changes lightly, we are still in the initial stages of this band's deployment. If tweaks need to be made, this is the ideal time to do it. It is better than going through years of proceedings after the fact, like in WCS.

I have also heard that our action today will delay putting this spectrum to use. Again, ridiculous. Equipment is being developed, trials are being conducted, and work on the databases continue. This review will occur parallel to the completion of those tasks. While we may not make my initial goal of completing this proceeding by December, early next year is doable and, in fact, that timing should work well with the other efforts on the ESCs and SASs that are underway.

Finally, some opponents seem to be engaging in revisionist history by stating that the Commission's decisions on the 3.5 GHz band were unanimous. Although – I think it is safe to say – that all Commissioners unanimously agreed that bringing new spectrum to the marketplace was beneficial and that reasonable protection mechanisms for incumbents were needed, that is where the consensus ended. I clearly expressed concerns, when I concurred in part to the initial order, about the PALs structure, knowing that it would be revisited in the future. Further, I dissented to these very issues on reconsideration. That is not unanimity.

As we go forward, I will keep an open mind. I will look at the substance of the arguments made, not overbroad statements or some artificial tally of how many comments were filed saying x, y or z. I would like to thank Chairman Pai for asking me to head up this review; Commissioner Clyburn who was willing to work with us, in the spirit of compromise, to get the document in a good place for her; and the staff for the speedy and good work they have done so far and the work that is yet to come.

**STATEMENT OF
COMMISSIONER BRENDAN CARR**

Re: *Promoting Investment in the 3550-3700 MHz Band*, GN Docket No. 17-258; *Petitions for Rulemaking Regarding the Citizens Broadband Radio Service*, RM-11788 (Terminated), RM-11789 (Terminated)

We have come a long way since 2012 when the Commission first sought comment on creative ways to open up the 3.5 GHz band. A broad cross-section of stakeholders now view this 150 MHz block as playing a key role in 5G and other next-generation deployments.

From my perspective, the 3.5 GHz band is about creating something different. We have licensing regimes that favor traditional, exclusive use deployments. And we have unlicensed bands where Wi-Fi and other technologies have flourished. We need a new tool in the spectrum tool kit, and the 3.5 GHz band presents us with that opportunity. So it is incumbent on the Commission to ensure that our rules are going to support and incentivize a wide variety of use cases and deployments. Today's Notice of Proposed Rulemaking does that by asking whether our licensing, auction, and technical rules have struck the right balance or whether we need to adopt some targeted changes. The Notice has my support, and I look forward to reviewing the record as it develops.

I also want to recognize and thank the staffs of the Wireless Telecommunications Bureau and the Office of Engineering and Technology that have worked for years with the goal of making this 3.5 GHz theory a reality.

**STATEMENT OF
COMMISSIONER JESSICA ROSENWORCEL,
DISSENTING**

Re: *Promoting Investment in the 3550-3700 MHz Band*, GN Docket No. 17-258; *Petitions for Rulemaking Regarding the Citizens Broadband Radio Service*, RM-11788 (Terminated), RM-11789 (Terminated)

It is hard to overstate the audacity of United States spectrum policy. Over history we have done the kooky and the unconventional. We have seen the future and done it differently before anyone else. In the process, we have changed the way that wireless systems are developed and distributed not just domestically—but worldwide.

After all, more than two decades ago we took the academic ideas of Ronald Coase and reimagined how we distribute our airwaves. Instead of doling out specific licenses for specific uses based on political cues, we ushered in a new era of spectrum auctions—selling access to bidders and allowing them to use it however they choose. It's difficult to remember now, but these ideas were once mocked by experts, opposed by industry, and dismissed by policymakers. However, in the rear-view mirror, they have been a resounding success. The Commission has held more than 85 auctions, issued more than 44,000 licenses and raised more than \$140 billion in revenue. As a result, our efforts have been a model for regulators worldwide.

We also pioneered the use of unlicensed spectrum. We took a handful of underused frequencies known as “garbage bands” in the 900 MHz, 2.4 GHz, and 5.8 GHz bands and decided to test a new model. Instead of dismissing these airwaves as junk we put in place a new model that set technical parameters and then did something radical—gave the public access to these airwaves. This was edgy stuff. It was a move away from command and control spectrum policy. But this experiment was a wild success. Because in time a standard was developed known as 802.11—and this is the spectrum where Wi-Fi was born.

More recently, we blazed a trail for incentive auctions. The two-sided broadcast incentive auction that the Commission just held was the first of its kind worldwide. We tested the proposition that existing spectrum licensees might voluntarily relinquish their rights in exchange for a portion of the proceeds from the subsequent reauction of their airwaves for new flexible use. And so far, so good—the auction concluded successfully earlier this year. Regulators globally are taking note.

The same audacity fueled our initial plans for the 3.5 GHz band. But I fear that with today's rulemaking this agency has lost its daring. Instead of continuing in the innovative spirit of United States spectrum policy, we are in retreat. We are slowing access to these airwaves and falling back on stale spectrum policy ideas that may have worked in the past but will by no means guarantee success in the future.

The 3.5 GHz band framework the Commission put in place two years ago was creative. Instead of relying on the traditional binary choice between licensed and unlicensed, the agency adopted an unprecedented three-tiered model for spectrum sharing and management. Under this three-tiered system, incumbent government users have a primary and preemptive right. But we know they do not need access all the time, everywhere, so we created a secondary license opportunity, custom-built for small cells. Then, to the extent the demand for licenses is limited, opportunistic use is permitted by rule. To coordinate this grand effort, we proposed dynamic spectrum access systems.

Elements of this 3.5 GHz model remain in place. But this rulemaking seeks to gut what was most visionary about this framework. It seeks comment on extended license terms. It asks about putting in

place larger geographic licenses. It offers up same-old, same-old instead of what could be creative and different.

To put a finer point on it, this rulemaking takes what was most innovative about our existing 3.5 GHz model and casts it aside in favor of existing business models. This is short sighted. The success of our future auctions depends on growing a new class of spectrum interests—who can innovate and join the ranks of those who bid on airwaves and support the Internet of Things. This is important. Because as our national providers grow bigger and fewer in number, the power of using auctions as a tool for distribution is compromised. Simply put, we need more entities interested in opportunities in our airwaves.

Moreover, our 3.5 GHz framework was ready to go. Millions of dollars have been invested. More than 200 experimental authorizations have been granted. Protocols regarding operations, interoperability, security, and device testing are well underway. Product certification programs have already begun.

All of that, however, stops short with this rulemaking. We can hem and haw about how we are making changes to foster deployment, to increase investment, and speed the way to 5G. I don't buy it. We are impeding real progress. We are betraying our hard-won spectrum tradition of leading the pack and changing the paradigm. I dissent.