

**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)	
)	
Amendment of the Commission's Rules with)	GN Docket No. 12-354
Regard to Commercial Operations in the)	
3550-3650 Band)	

REPLY COMMENTS OF VERIZON

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TABLE OF CONTENTS

I.	INTRODUCTION	3
II.	LARGER GEOGRAPHIC LICENSE AREAS, LONGER LICENSE TERMS, AND LICENSE RENEWABILITY WILL PROMOTE INVESTMENT IN THE 3.5 GHZ BAND.	4
A.	Licensing by Partial Economic Area aligns the 3.5 GHz band with other 5G bands and enables more efficient deployment and sharing.....	4
B.	Longer license terms and renewability will provide the certainty and stability necessary for substantial investments in the band	10
III.	RELAXATION OF OUT OF BAND EMISSIONS LIMITS WILL ENABLE GREATER UTILIZATION OF THE BAND.....	13
IV.	CONCLUSION.....	14

I. INTRODUCTION

The Commission, recognizing that the 3550-3700 MHz band (“3.5 GHz Band”) has been identified as the only mid-band spectrum available for 5G services, concluded that it is now appropriate to revisit prior decisions regarding the Priority Access License (“PAL”) rules so as to maximize investment and innovation in the 3.5 GHz Band.

Verizon appreciates the value of harmonizing PAL licensing with the licensing rules that apply to other key 5G bands as well as other adjustments to increase future investment in the band and facilitate faster and more efficient deployment. Verizon believes that moderate, well-crafted, and quickly-executed rule changes will open the door to greater opportunities for both PAL and General Authorized Access (“GAA”) users, as well as a more fluid and robust secondary market. Verizon believes the Commission asked the right questions and struck the right balance in its proposals in its Notice of Proposed Rulemaking (“NPRM” or “Notice”),¹ and continues to support the proposed changes to the rules governing PALs.

The record in this proceeding reflects a wide range of perspectives on most of the significant issues raised in the Notice. However, when evaluated on the merits rather than simply the volume of comments filed, the record clearly supports extending PAL terms to ten years, with an expectation of renewal; auctioning PALs on a Partial Economic Area (“PEA”) basis; allowing partitioning and disaggregation of PALs with “light-touch” leasing, to better facilitate a robust secondary market; and revising out-of-band emission limits to allow for optimal operation with wide channel bandwidths.

¹ *Promoting Investment in the 3550-3700 MHz Band*, Notice of Proposed Rulemaking and Order Terminating Petitions, GN Docket No. 17-258 (2017).

Indeed, commenters opposing changes to the licensing regime have failed to demonstrate how maintaining the *status quo* will yield greater benefits than the increased investment that longer license terms and larger licensing areas will generate.

II. LARGER GEOGRAPHIC LICENSE AREAS, LONGER LICENSE TERMS, AND LICENSE RENEWABILITY WILL PROMOTE INVESTMENT IN THE 3.5 GHZ BAND.

The Commission's proposed changes to the licensing regime for PALs will stimulate investment, promote innovation, and encourage efficient use of spectrum resources.

A. Licensing by Partial Economic Area aligns the 3.5 GHz band with other 5G bands and enables more efficient deployment and sharing

The record supports adopting PEAs as the geographic license area for PALs. The 3.5 GHz band will play a crucial role in tomorrow's integrated 5G networks, and licensing by PEA best aligns the band with other 5G bands. Furthermore, licensing at the PEA level enables notable technical and economic efficiency, as it would allow deployments that are less encumbered by multiple arbitrary boundaries. Such an approach would also better facilitate secondary market transactions based on actual deployments, and not geographies.

The parties opposing PEA licensing in the 3.5 GHz band generally echo the same arguments they have made for the last five years,² while the technology, plans for deployment, and economic potential for the band have now moved far past them.

² See Comments of Google LLC, GN Docket No. 17-258 (filed Dec. 28, 2017), at 5-14 ("Google Comments"); Comments of Microsoft Corporation, GN Docket No. 17-258 (filed Dec. 28, 2017), at 4-6 ("Microsoft Comments"); Comments of the Wireless Internet Service Providers Association, GN Docket No. 17-258 (filed Dec. 28, 2017), at 23-24; Comments of the Dynamic Spectrum Alliance, GN Docket No. 17-258 (filed Dec. 28, 2017), at 5 ("DSA Comments"); Comments of Open Technology Institute at New America and Public Knowledge, GN Docket No. 17-258 (filed Dec. 28, 2017), at 19-26 ("OTI-PK Comments").

Although it was considered as such in its infancy, the 3.5 GHz band is no longer an esoteric experiment in the upper reaches of wireless broadband viability, useful only for indoor, fixed, or small cell deployment. Since the Commission first launched this proceeding, technological developments in beam forming and multiple-input, multiple-output (“MIMO”) antennas, coupled with declining costs for equipment and components, have transformed millimeter wave bands well above 3.5 GHz into commercially viable options for mobile broadband. In fact, the 3.5 GHz band is no longer considered a “high band.” The 3.5 GHz band is at the core of industry plans for 5G deployments, offering the only large swath of spectrum currently available in the mid-band range. Meanwhile, PEAs have become the license area of choice for 5G deployment, as the Commission has decided to license by PEA many other key bands in the 5G ecosystem.³ With the integration of the 3.5 GHz band into the broader, multi-band 5G ecosystem, licensing the band by PEA is the most consistent and rational choice.

The Commission has concluded time and again that licensing at the PEA level is flexible enough to support both large and small geographic license area sizes: small enough to permit entry by providers that wish to offer localized wireless broadband service, and large and scalable enough to suit providers seeking to serve customers on a larger geographic scale.⁴ The Commission first adopted PEAs for the 600 MHz band in 2014;⁵ again for the 37 GHz⁶ and 39 GHz⁷ bands in 2016; and most recently, adopted

³ The 600 MHz band and all Upper Microwave Flexible Use (“UMFU”) bands – 24 GHz, 37 GHz, 39 GHz, and 48 GHz bands are all slated for 5G deployment as PEAs. The 28 GHz band is licensed by county.

⁴ Comments of Verizon, GN Docket No. 17-258 (filed Dec. 28, 2017) at 8-9 (“Verizon Comments”).

⁵ See *Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions*, Report and Order, 29 FCC Rcd 6567, 6575 ¶ 18 (2014).

PEAs for the 24 GHz⁸ and 48 GHz⁹ bands in 2017. Indeed, as the Commission stated just three months ago, PEA licensing “strikes an 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.”¹⁰

Adopting PEAs as the geographic area for PALs will also provide greater flexibility to meet deployment needs. Under the current spectrum sharing framework, there is a distinction between the geographic area boundaries of a PAL and the PAL Protection Area (“PPA”), as managed by the Spectrum Access System (“SAS”) administrators. The PPAs are established by Priority Access Licensees to guarantee the exclusive use of their licensed channels. While Priority Access Licensees are presumptively entitled to protection from interference from other users within their geographic license areas—whether PEAs, counties, or census tracts—they are only able to establish and maintain protection for what the spectrum they “use.” This use is defined by the contours of a specified PPA that is registered with a SAS.

⁶ *Id.* at 6622 ¶ 121.

⁷ *Id.* at 6601-02 ¶ 77.

⁸ *See Use of Spectrum Bands Above 24 GHz For Mobile Radio Services*, Second Report and Order, Order on Reconsideration, and Memorandum Opinion and Order, FCC 17-152 ¶ 28 (2017) (“Second R&O”).

⁹ *Id.* at ¶ 50.

¹⁰ *Id.*

In defining “use” under the 3.5 GHz rules, the Commission adopted a two-pronged approach.¹¹ First, Priority Access Licensees may self-report their PPAs based on their actual network deployments.¹² Second, to ensure that licensees do not overstate the size of their PPAs, the Commission stipulated that SAs would establish an objective maximum PPA based on the Citizens Broadband Service Devices (CBSDs) that are operating within the PPA, which would be determined using a consistent model to define a default -96 dBm/10 MHz protection contour around each CBSD.¹³

Unfortunately, under this approach, smaller geographic license areas may sacrifice technical and economic efficiency with no apparent benefits. Most census tracts only cover a small land area,¹⁴ and a PPA may not, by rule, extend beyond the border of a census tract or beyond the aggregation of multiple adjacent commonly-licensed tracts.¹⁵ Accordingly, licensing by census tract at best adds tremendous administrative overhead to the process of acquiring PALs and building networks to align with areas where licensees actually want to operate, and at worst, arbitrarily limits the ability of licensees to deploy CBSDs. PEAs, on the other hand, would reduce deployment and management costs and allow licensees to provide coverage without worry of impacting operations in nearby census tracts.

¹¹ *Amendment of the Commission’s Rules with regard to Commercial Operations in the 3550-3650 MHz Band*, Order on Reconsiderations and Second Report and Order, 31 FCC Red 5011, 5060 ¶ 174 (2016).

¹² *Id.*

¹³ *Id.*

¹⁴ For example, in New York City, each census tract only covers a few city blocks. *See* Figure 1.

¹⁵ *See* 47 C.F.R. § 96.25(c).

Moreover, as shown in Figure 1 below, having many census tracts in close proximity may result in a shortage of PAL spectrum for a licensee entitled to such protection. For example, Manhattan census tract #119 (shown in red) abuts seven other census tracts (shown in black), none of which are more than a few city blocks wide. With only ten channels available in each census tract to accommodate seven PALs, SASs will be challenged to accommodate all seven PALs with the protection guaranteed by the rules without requiring CBSDs to drastically reduce power and cover a far smaller range than ideal conditions would permit. In the case of Manhattan census tract #119, adequately accommodating all PALs may even be impossible at times, as proximity to the Atlantic Ocean and naval operations could potentially reduce the number of available channels to protect naval radars. In other scenarios, protection of incumbent FSS stations could reduce the number of available channels, as well as create unmanageable congestion.¹⁶

By contrast, PEAs avoid this problem and simplify the task of the SAS by eliminating the vast majority of boundary conditions. In turn, PEAs provide flexibility for all PAL licensees within such an area to more easily locate and operate CBSDs at optimal power levels and desired coverage areas, while still providing the required PPA protection. Moreover, PEAs would allow PAL licensees to cover larger areas with less infrastructure, thereby reducing site acquisition, infrastructure, backhaul, and other costs, and enabling licensees to begin providing service sooner. Likewise, under a PEA regime, GAA users should also find it easier to identify and use available spectrum.

¹⁶ Two incumbent FSS licensees, each operating within the 3625-3700 MHz band, are located in Hauppauge, NY approximately 65 km from Manhattan, well within the 150 km distance within which SASs must consider co-channel interference protection from CBSDs. *See* International Bureau call signs E970361 and E950436. *See also* 47 C.F.R. § 96.17(a)(2).



Figure 1: Census Tracts in Mid-Town Manhattan

By not imposing artificial statistical boundaries like census tract borders, the CBRS will also improve efficient use of spectrum by establishing areas in which licensees may use the secondary market to subdivide areas freely to create an exchange for PAL subleases. Smaller geographic license areas with rigid census tract borders, which may bear no relevance to network deployment or spectrum use, would otherwise render this potentially fluid exchange impossible. Some commenters claim that smaller license areas “allow better matching between potential user needs and the assets that are licensed for their use.”¹⁷ But it is to the contrary: the closest alignment between potential user needs and assets would be a function of actual deployment, not arbitrary statistical county subdivisions.¹⁸

¹⁷ Comments of William Lehr, GN Docket No. 17-258 (filed Dec. 28, 2017) at 11 (“William Lehr Comments”).

¹⁸ Census tracts are small, relatively permanent statistical subdivisions of a county or equivalent entity. A census tract usually covers a contiguous area; however, the spatial size

As Daniel Vincent opines in his comments, larger license areas coupled with a robust secondary market can better encourage flexible use of spectrum, as operators with highly localized needs would gain spectrum access in only the areas where they need it.¹⁹ An efficient secondary market would allow for an optimal mix between the use of a larger license to accommodate a carrier's need and narrower focused uses within that footprint.²⁰

B. Longer license terms and renewability will provide the certainty and stability necessary for substantial investments in the band

Verizon joins numerous parties from across the industry in support of the Commission's proposal to extend the priority access license term and provide an expectation of renewal.²¹ That support reflects the real-world challenges of deploying in a new band and the importance of preserving operational stability.

Longer license terms recognize basic structural and business realities, including the substantial transaction, regulatory, and capital costs of deploying dense networks in

of census tracts varies widely depending on the density of settlement. *See* Census Bureau, "Geographic Terms and Concepts - Census Tract," at https://www.census.gov/geo/reference/gtc/gtc_ct.html (last visited Jan. 29, 2018).

¹⁹ Comments of Daniel R. Vincent, GN Docket No. 17-258 (filed Dec. 29, 2017), at 2 ("Daniel Vincent Comments").

²⁰ *Id.*

²¹ Comments of CTIA, GN Docket No. 17-258 (filed Dec. 28, 2017), at 4-8; Comments of Ericsson, GN Docket No. 17-258 (filed Dec. 28, 2017), at 5; Comments of Nokia, GN Docket No. 17-258 (filed Dec. 28, 2017), at 2-3; Comments of Mobile Future, GN Docket No. 17-258 (filed Dec. 28, 2017), at 5-7; Joint Comments of the National Rural Telecommunications Cooperative and the National Rural Electric Cooperative Association, GN Docket No. 17-258 (filed Dec. 28, 2017), at 3-5; Comments of the NTCA-The Rural Broadband Association, GN Docket No. 17-258 (filed Dec. 28, 2017), at 9-10; Comments of T-Mobile USA, Inc., GN Docket No. 17-258 (filed Dec. 28, 2017), at 4-6; Comments of the Telecommunications Industry Association, GN Docket No. 17-258 (filed Dec. 28, 2017), at 2; Comments of United States Cellular Corporation, GN Docket No. 17-258 (filed Dec. 28, 2017), at 9-12.

urban environments. As we noted in our comments, these same expenses and deployment challenges led the Commission to adopt ten-year license terms in the UMFUS bands.²²

In order to justify large-scale deployment in the 3.5 GHz band, longer license terms must be available. Opponents of longer license terms contend that the length of the PAL term should be tied to the time necessary for a return on investment.²³ Verizon believes that these opponents likely underestimate the time and cost associated with successfully building a robust 3.5 GHz network that is fully integrated into the broader 5G network. Verizon believes that tying license terms to return on investment would further support a ten-year license term for PAL licenses.

Opponents of longer terms also claim that the Commission's proposed changes could decrease auction participation by smaller, localized, or specialized potential participants.²⁴ For example, Google opines that longer license terms "would significantly increase the cost of licenses and require prospective licensees to acquire spectrum for a longer period than they need, thereby causing potential licensees not to participate in PAL auctions."²⁵ Verizon disagrees and believes that longer license terms would, in fact, increase overall investment in the band, and, together with a robust secondary market, create opportunities for access by smaller prospective users.

²² Verizon Comments at 4.

²³ *See, e.g.*, DSA Comments at 4; Microsoft Comments at 3; Comments of NCTA, GN Docket No. 17-258 (filed Dec. 28, 2017) at 11.

²⁴ Google Comments at 14. *See also, e.g.* Comments of the General Electric Company, GN Docket No. 17-258 (filed Dec. 28, 2017), at 39; William Lehr Comments at 13-16; Microsoft Comments, at 39-40; OTI-PK Comments at 31.

²⁵ Comments of Google at 14.

As outlined by Mr. Vincent in his comments, longer license terms, coupled with an active and fluid secondary market, would better enable the efficient allocation of spectrum over time.²⁶ Per Vincent, “[i]n the presence of efficient and liquid secondary markets, incumbent owners who are no longer the most efficient users are able to resell the licenses to emerging alternative users who have better uses for the asset.”²⁷ Vincent argues that short license terms create a forced resale market that may draw participants away from the spontaneous secondary markets, ultimately reducing the liquidity of these markets and diminishing their effectiveness.²⁸

Further, based on Vincent’s assessment, a robust secondary market will give bidders the assurance that they can more easily resell licenses to higher value users in the future. This assurance could better help smaller, liquidity-constrained bidders secure financial backing for auction participation because a license that can be resold in an efficient secondary market presents less of a capital risk to financial backers.²⁹

The Commission adopted a “light-touch” leasing approach in the 3.5 GHz band to “allow Priority Access Licensees to leverage the secondary market to provide access to any qualified lessee with minimal administrative requirements or transaction costs.”³⁰ In its previous comments, Verizon encouraged the Commission to consider other mechanisms to help ensure a well-functioning secondary market.³¹ These mechanisms

²⁶ Daniel Vincent Comments at 2.

²⁷ *Id.*

²⁸ *Id.* at 2-4.

²⁹ *Id.* at 2

³⁰ Second R&O at ¶ 8.

³¹ Verizon Comments at 15.

included the Commission “precertification” of licensees to use PAL spectrum³² and streamlined leasing through fast electronic consent and verification processes within the SAS.³³ By further reducing transaction costs to PAL subleasing, the Commission can facilitate the development of a robust secondary market in the 3.5 GHz band. The low-cost, low-barrier-to-entry, SAS-administered secondary market would provide small-scale 3.5 GHz users a powerful mechanism for acquiring exclusive spectrum access that might prove even faster, more flexible, and less costly than doing so through an auction design.

III. RELAXATION OF OUT OF BAND EMISSIONS LIMITS WILL ENABLE GREATER UTILIZATION OF THE BAND

As we endorsed in our previous comments,³⁴ relaxation of the current out-of-band emissions (“OOBE”) limits in the 3.5 GHz band would enable greater utilization of the band by not compromising signal coverage, quality of service, or general utility of the band when using bandwidths larger than 10 megahertz.³⁵ Verizon reiterates its support for Qualcomm’s proposal to revise the 3.5 GHz band emission limits to enable use of 20 megahertz- and 40 megahertz-wide channels in the band at the same transmit power levels at which 10 megahertz LTE operations are currently permitted. Verizon also continues to support preserving the current adjacent band protection limit below 3550 MHz and above 3700 MHz. Verizon believes that slight adjustments to the OOBE

³² *Id.* (Licensee “precertification” would involve the Commission formally certifying lessees to use PAL spectrum in advance and such lessees could then later enter leasing arrangements by simply notifying the SAS).

³³ *Id.*

³⁴ Verizon Comments at 17-18.

³⁵ *See e.g.*, Comments of Qualcomm, GN Docket No. 17-258 (filed Dec. 28, 2017) at 3-4. *See also* Petition for Reconsideration by CTIA, GN Docket 12-354 (filed Jul. 23, 2015), at 4.

requirements in the 3.5 GHz band will greatly improve the utility of the band for both PAL and GAA users alike by while continuing to protect adjacent band users from harmful interference.

IV. CONCLUSION

Prompt Commission action on these proposed changes can help ensure the success of the 3.5 GHz band as an integrated piece of the 5G ecosystem. The Commission should act quickly in making the proposed changes so that any necessary adjustments to the SASs can be made as they are still being developed. Verizon urges the Commission to make the band available for GAA use as quickly as practicable and to move expeditiously to auction PALs.

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