

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

In the Matter of)
)
Use of Spectrum Bands Above 24 GHz For) GN Docket No. 14-177
Mobile Radio Services)

FOURTH FURTHER NOTICE OF PROPOSED RULEMAKING

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I. INTRODUCTION

1. Today, we seek comment on how best to transition existing spectrum holdings in the 39 GHz band (38.6-40 GHz) to the new flexible-use band plan, in a manner that will promote the efficient use of this spectrum by incumbents and new licensees for fifth-generation (5G) wireless, Internet of Things, and other advanced services. The 39 GHz band, combined with the Upper 37 GHz band (37.6-38.6 GHz), offers a critical opportunity for 5G deployment, as it represents the largest amount of contiguous spectrum available for flexible-use wireless service in the millimeter wave (mmW) bands.

2. Our goal is to facilitate the reconfiguration of existing 39 GHz spectrum holdings—currently licensed in small spectrum block sizes and mismatched geographic areas—into more contiguous swathes of spectrum that are conducive to wireless broadband deployment, including 5G services. The reconfiguration of incumbent 39 GHz holdings would protect and enhance incumbents’ existing spectrum usage rights, and would increase opportunities for the Commission to offer new licenses for contiguous spectrum blocks at auction. To accomplish this goal, we propose two key steps. First, we propose to

modify the 39 GHz block size to 100 megahertz in order to simplify the transition from existing license holdings to reconfigured holdings. Similarly, we propose to modify the Upper 37 GHz and 47 GHz (47.2-48.2 GHz) band plans from 200 megahertz to 100 megahertz channels to facilitate the auctioning of all three bands at the same time. Second, we propose an incentive auction to reduce encumbrances and create contiguous blocks of spectrum throughout the 39 GHz and Upper 37 GHz bands, thereby maximizing the bidding options for incumbents and potential new entrants. We anticipate that these steps can enable us to auction much of the combined 2400 megahertz in the Upper 37 GHz and 39 GHz bands as near-nationwide contiguous spectrum in a single generic-block, clock auction.

II. BACKGROUND

3. The 39 GHz band consists of 1,400 megahertz of contiguous, millimeter-wave spectrum from 38.6-40 GHz.¹ Existing licenses in the 39 GHz band consist of unpaired 50 megahertz blocks licensed by Partial Economic Area (PEA) or by Rectangular Service Area (RSA), which can cross PEA boundaries or be enveloped by them.² Currently, a number of licenses do not fit cleanly into the proposed 39 GHz band plan of 100 megahertz licenses by PEA, which results in encumbered licenses. There are two types of encumbered licenses: (1) RSA licenses that do not conform to PEA boundaries; and (2) PEA licenses that are not authorized to provide service in the entire PEA, i.e., licenses that overlap geographically with pre-existing RSA licenses whose frequency assignment they must protect.³ The 39 GHz band is adjacent to the Upper 37 GHz band, which consists of 1,000 megahertz of contiguous, millimeter-wave spectrum from 37.6-38.6 GHz and currently has no commercial terrestrial wireless incumbent licensees.

4. In 2016, the Commission adopted a new band plan and Upper Microwave Flexible Use Service (UMFUS) rules for the Upper 37 GHz and 39 GHz bands that provided for 200 megahertz channels licensed by PEA.⁴ Measured in terms of “MHz-pops”—the product of spectrum bandwidth and covered population, 32 percent of the 39 GHz band is held in FCC inventory and is not authorized for use by any existing license. Commission records show 11 unique incumbent licensees hold about 5,880 active licenses (5,590 PEA licenses and 290 RSA licenses). Out of all 416 PEAs, 53 (13 percent) have only one incumbent licensee, with licenses covering between 100 megahertz and 600 megahertz of the

¹ See *Use of Spectrum Bands Above 24 GHz For Mobile Radio Services, et al.*, Report and Order and Further Notice of Proposed Rulemaking, 31 FCC Rcd 8014, 8044, para. 76 (2016) (*Spectrum Frontiers R&O*).

² See *Spectrum Frontiers R&O*, 31 FCC Rcd at 8043-44, 8046, 8052-53, paras. 74, 82, 94-96. For administrative efficiency, existing 39 GHz Economic Area licenses and leases were converted into unpaired 50 megahertz blocks licensed on a PEA basis. RSA licenses retain their previous geographic boundaries. *Wireless Telecommunications Bureau Announces Conversion of Incumbent 28 GHz and 39 GHz Licenses to the Upper Microwave Flexible Use Service*, GN Docket No. 14-177, Public Notice, DA 18-550, at 3 (WTB, rel. May 25, 2018).

³ See *Spectrum Frontiers R&O*, 31 FCC Rcd at 8055, para. 99. An RSA license, because it can overlap multiple PEAs, can encumber multiple PEA licenses. See *Wireless Telecommunications Bureau Accepting Applications to Modify Existing Licenses in the 39 GHz Band Pursuant to Voluntary Rebanding Process*, GN Docket No. 14-177, Public Notice, DA 18-619, at 5 (WTB, rel. Jun. 14, 2018) (*Voluntary Rebanding PN*).

⁴ See *Spectrum Frontiers R&O*, 31 FCC Rcd at 8047, 8053, 8061, paras. 82, 95, 121, 123. Since that time, the Commission has adopted subsequent orders and further notices relating to the Spectrum Frontiers proceeding. See *Use of Spectrum Bands Above 24 GHz For Mobile Radio Services, et al.*, Second Report and Order, Second Further Notice of Proposed Rulemaking, Order on Reconsideration, and Memorandum Opinion and Order, 32 FCC Rcd 10988 (2017) (*Spectrum Frontiers 2nd R&O*); *Use of Spectrum Bands Above 24 GHz For Mobile Radio Services, et al.*, GN Docket No. 14-177, WT Docket No. 10-112, Third Report and Order, Memorandum Opinion and Order, Third Further Notice of Proposed Rulemaking, FCC 18-73 (rel. Jun. 8, 2018) (*Spectrum Frontiers 3rd R&O* or *Spectrum Frontiers 3rd FNPRM*). Comments on the *Third Further Notice of Proposed Rulemaking* are due on September 10, 2018 and reply comments are due on September 28, 2018. We will consider those comments and any other outstanding issues in future Commission items.

band in those PEAs. A total of 735 of the 5,590 PEA licenses⁵ are partially encumbered by RSA licenses.

⁶ In addition, there are 1056 PEA channel blocks⁷ of the 6058 channel blocks within the FCC inventory that are partially encumbered by co-channel RSA licenses.⁸ AT&T⁹ and Verizon¹⁰ hold the majority of encumbered PEA licenses. Consolidated Communications, PVT Networks, and T-Mobile hold the remaining encumbered PEA licenses. Six incumbent licensees hold RSA licenses: AT&T¹¹ (the majority holder), GEC Partners, Mountain Microwave, Ronna Sauro, Spectrum Communications, and Video Multipoint. We consider both partial PEA licenses and RSA licenses as geographically encumbered relative to the geographic bounds of the present band plan.

5. In 2016, the Commission recognized that “[h]olding any auction based on this fragmented band would likely be inefficient, as bidders would reasonably expect to incur significant transaction costs in assembling contiguous spectrum post-auction.”¹² To clear the band of encumbrances and enable licensees to aggregate licenses for contiguous frequencies, the Commission adopted a voluntary rebanding framework to allow incumbent licenses to be reconfigured to the new band plan.¹³ Since 2016, very few rebanding transactions have occurred—and for incumbent licensees with only one pair of 50 megahertz licenses in a particular area, one 50 megahertz block in a particular area,¹⁴ or an RSA license, conforming existing licenses to the new band plan may be infeasible.

6. In June 2018, the Wireless Telecommunications Bureau (Bureau) issued a Public Notice announcing that it was accepting license modification applications pursuant to the Commission’s voluntary rebanding process adopted in the *Spectrum Frontiers R&O*.¹⁵ In the *Voluntary Rebanding PN*, the Bureau endeavored to meet the Commission’s goals set forth in the *Spectrum Frontiers R&O* by only accepting any license swap application if it increased the contiguity of existing licensees’ holdings within the 39 GHz band.¹⁶ Under this process, to obtain contiguous spectrum blocks in the 39 GHz band, licensees could modify their frequencies pursuant to a voluntary agreement among the relevant licensees, or they could apply for a license modification unilaterally under certain circumstances. By so doing, incumbent licensees could obtain contiguous spectrum in 100 megahertz or 200 megahertz increments.¹⁷ Due to the overlap of RSA licenses in PEA license areas, co-channel licensees have more limited options.¹⁸

⁵ Existing licenses are authorized for individual 50 megahertz blocks.

⁶ For 18 of those 735 PEA licenses, the encumbered area does not contain any population.

⁷ For these purposes, channel blocks are 50 megahertz blocks.

⁸ For 41 PEA out of 1056 PEA channel blocks, the encumbered area does not contain any population.

⁹ Licenses held by FiberTower Spectrum Holdings LLC, a subsidiary of AT&T, are attributed to AT&T.

¹⁰ Licenses held by Straight Path Spectrum LLC and Nextlink Wireless LLC, subsidiaries of Verizon, are attributed to Verizon.

¹¹ Licenses held by FiberTower Spectrum Holdings LLC, Alascom Inc., and Teleport Communications America LLC, subsidiaries of AT&T, are attributed to AT&T.

¹² *Spectrum Frontiers R&O*, 31 FCC Rcd at 8054, para. 97.

¹³ *Id.* at 8053-56, paras. 97-100.

¹⁴ About 20 RSA licenses were originally authorized for only a single 50 megahertz block.

¹⁵ *Voluntary Rebanding PN* at 1.

¹⁶ *Voluntary Rebanding PN* at 3. The Bureau also announced it was accepting applications to cancel RSA licenses that fall wholly within a PEA in block(s) held by the same incumbent in that PEA, resulting in an unencumbered PEA license block(s). *Id.* at 2.

¹⁷ *See id.* at 2-4.

¹⁸ *See id.* at 4-5. Specifically, PEA licensees with licenses encumbered by an RSA license could only swap to contiguous adjacent channels with equal or greater encumbrances. *Id.* at 4. Similarly, RSA licensees co-channel

7. To make existing licenses compatible with the current 39 GHz band plan, AT&T has proposed that each current licensee be given its choice between two options before an auction. Each current PEA or RSA licensee would choose either to have its licenses: (a) modified to contiguous frequencies at the upper edge of the band; or (b) exchanged for a financial voucher based on the spectrum usage rights provided by its licenses.¹⁹ The Commission then would conduct an auction for new licenses for all spectrum in the band that was not needed for licenses moved to the upper edge of the band. Under AT&T's proposal, bidders in the first phase of the auction would bid for generic blocks in each PEA, with a uniform clock price for the generic blocks in any given PEA.²⁰ All winning bidders from the first phase would receive contiguous licenses within each PEA, regardless of their bids for specific frequencies. After the first phase identifies winning bidders for the number of blocks offered in a PEA, the Commission would conduct a second phase of the auction to assign licenses for specific frequencies. The second phase would consist of a single sealed-bid round of bidding for licenses for specific contiguous frequencies within a PEA.²¹

8. Verizon objects to three key features of AT&T's proposal.²² First, Verizon objects to being required to bid to obtain a new license in order to "retain" spectrum, i.e., not move.²³ Second, Verizon objects to the possibility that it might have to make an additional payment to retain an amount of spectrum at least as great as its existing license holdings in a PEA.²⁴ Third, Verizon asserts that modifying licenses if a licensee does not participate in the auction of new licenses disrupts the rights of current licensees.²⁵

III. BAND PLAN

9. We propose to modify the 39 GHz band plan from seven 200 megahertz channels to fourteen 100 megahertz channels. This change should better accommodate the repacking of incumbents, which in the vast majority of cases, hold two non-contiguous 50 megahertz license blocks for each original paired license (now unpaired). Given the natural fit between incumbents' existing 100 megahertz holdings and the proposed 100 megahertz channels, the resulting realignment process for incumbents would be less complex than using 200 megahertz channels, because it would result in far fewer partially-filled channels.²⁶ This change therefore would further our goals of maximizing efficient use of this band

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with a PEA licensee could not move off of a channel unilaterally if it resulted in the PEA license becoming less encumbered as a result of the move. *Id.* at 4-5.

¹⁹ See Letter from Alex Starr, Assistant Vice President, AT&T, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 14-177 *et al.*, at 2, Attach. at 3-5 (filed Dec. 12, 2017) (AT&T Dec. 12, 2017 *Ex Parte*).

²⁰ AT&T Dec. 12, 2017 *Ex Parte* at 1-2, Attach. at 2. After a clock auction sets the price for new licenses in that PEA, the value of an incumbent's voucher holdings in each PEA would be the product of the number of vouchers held and the final PEA clock price. *Id.*, Attach. at 4. As such, a licensee holding a voucher equal to a whole number of new licenses could bid knowing that that the voucher would entitle them to a payment sufficient to pay their winning clock phase bid regardless of the final clock phase price.

²¹ *Id.* at 2, Attach. at 2.

²² See Letter from Charla M. Rath, Vice President, Verizon, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 14-177, Attach. 2 at 2-3 (filed Apr. 24, 2018) (Verizon Apr. 24, 2018 *Ex Parte*).

²³ *Id.*, Attach. 2 at 2-3, 5. Verizon focuses its objection on circumstances where the licensee has a fractional voucher. Its objection in part is based on the fact that current licenses are 100 megahertz (50 x 50) and the current 39 GHz band plan is in 200 megahertz channels. See *id.*, Attach. 2 at 3. We note that we propose to modify the band plan to 100 megahertz blocks, which should allay this concern to some degree. Its objection, however, would apply as well to other circumstances where an incumbent holds a fractional voucher.

²⁴ *Id.*, Attach. 2 at 5.

²⁵ *Id.* at 1, Attach. 2 at 3. We note that under Section 316, the Commission has the authority to modify a license (including the frequencies on which it may operate) when it finds it to be in the public interest. See 47 U.S.C. § 316.

²⁶ See Letter from Gregory M. Romano, Vice President & Associate General Counsel, Verizon, to Marlene H.

and allowing this spectrum to be put to use as soon as possible.

10. Further, changing the band plan from 200 megahertz channels to 100 megahertz channels should not limit this spectrum's potential use for 5G services. The 100 megahertz channels are consistent with 3GPP standards,²⁷ and licensees can aggregate to larger channel sizes (such as 200 megahertz, 300 megahertz, etc.), should they prefer to do so. Given that 100 megahertz is the baseline to provide 5G services, the Commission has adopted 100 megahertz channels for other UMFUS bands, including the 24 GHz band²⁸ and Lower 37 GHz (37.0-37.6) band,²⁹ and we have proposed to adopt 100 megahertz channels for the 42 GHz band.³⁰ Adopting 100 megahertz channels in the 39 GHz band is consistent with our approach in other mmW spectrum bands to support 5G services.

11. We similarly propose to modify the band plan in the Upper 37 GHz band (37.6-38.6 GHz) from 200 megahertz to 100 megahertz channels. The Upper 37 GHz band is adjacent to the 39 GHz band, and both bands are under the same licensing framework.³¹ In aligning the regulatory regimes of these bands—including implementing the same service rules and an operability requirement³²—the Commission has effectively treated the two bands as one contiguous 2,400 megahertz band of spectrum.³³ We further note that a difference in channel size between the two bands could create strategic challenges and impede bidding flexibility should the Commission auction the two bands together.³⁴

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Dortch, Secretary, FCC, GN Docket No. 14-177, at 1-2 (filed Jan. 25, 2018) (Verizon Jan. 25, 2018 *Ex Parte*) (“In markets where an incumbent holds an amount of spectrum not divisible by 200 MHz, under the [voucher] proposal . . . the incumbent would be faced with two equally unattractive outcomes: it could either bid for more spectrum than it currently holds, paying additional monies beyond its original investment, or it could accept less spectrum than it held going into the auction.”).

²⁷ 100 megahertz channels are supported in the 3GPP's 5G specifications for the 39 GHz band. See 3GPP Release 15: 3GPP TS 38.101-2 V15.1.0 (2018-03), Section 5.3.5, *available at* http://www.3gpp.org/ftp/Specs/archive/38_series/38.101-2/38101-2-f10.zip (last checked July 18, 2018).

²⁸ *Spectrum Frontiers 2nd R&O*, 32 FCC Rcd at 11000, paras. 34-35 (noting that 100 megahertz channels are “a size consistent with developing industry standards. This arrangement will maximize efficiency of spectrum use. . . . [and] will still allow licensees to aggregate to larger channels if they prefer 200 megahertz blocks.”).

²⁹ *Spectrum Frontiers 3rd FNPRM* at 12, para. 28 (“We believe that 100 megahertz channels will be sufficient for a licensee to provide the type of high rate data services, and other innovative uses and applications, contemplated for this spectrum.”).

³⁰ *Id.* at 25, para. 57 (“We propose to license the 42 GHz band as 100 megahertz channels because this size would be consistent with developing industry standards that maximize spectral efficiency, all the while permitting interested parties to aggregate these channels should they desire larger bands.”).

³¹ Like the 39 GHz band, the Commission adopted geographic licensing of 200 megahertz channels on a PEA basis for the Upper 37 GHz band. *Spectrum Frontiers R&O*, 31 FCC Rcd at 8062, paras. 122-124.

³² See 47 CFR § 30.208 (“Mobile and transportable stations that operate on any portion of frequencies within the 27.5-28.35 GHz or the 37-40 GHz bands must be capable of operating on all frequencies within those particular bands.”); *Spectrum Frontiers R&O*, 31 FCC Rcd at 8060, para. 114 (adopting technical rules consistent with the 39 GHz band and an operability requirement “that will ensure equipment developed for the 37 and 39 GHz bands is able to operate across the entire 37-40 GHz band”).

³³ *Spectrum Frontiers R&O*, 31 FCC Rcd at 8062, paras. 122-124. In the *Spectrum Frontiers R&O*, the Commission noted that “several commenters recommend that the Commission combine the 37 GHz and 39 GHz bands under one licensing framework.” *Id.* at 8062, para. 122. Since that time, some commenters have proposed that the Commission conduct an auction of the Upper 37 GHz band with the 39 GHz band. See, e.g., AT&T Dec. 12, 2017 *Ex Parte* at Attach. at 2.

³⁴ With respect to auctioning the Upper 37 GHz band, we note that the *Spectrum Frontiers 3rd FNPRM* is seeking comment on how best to accommodate coordination zones in the 37 GHz band for future Federal operations at a limited number of additional sites, and whether the coordination zones previously established in Section 30.205 might be reduced to better accommodate nearby non-Federal operations without adversely impacting Federal

12. We also propose to modify the band plan for the portion of the 47 GHz band licensed under the UMFUS rules, 47.2-48.2 GHz (47 GHz band), from 200 to 100 megahertz channels.³⁵ Modifying the band plan for the 47 GHz band to 100 megahertz blocks would provide consistency across the remaining UMFUS bands not yet designated for auction, and licensees can aggregate spectrum licenses, should they desire larger bandwidth. If we auction the 47 GHz band at the same time as we auction the 39 GHz and Upper 37 GHz bands, should all band plans be consistent 100 megahertz blocks?

13. We seek comment on these proposals. Commenters proposing alternative band plans, including retaining the current 200 megahertz channels, should specify the benefits of such a plan, particularly with respect to how it would further our goal of making contiguous spectrum blocks available for both incumbents and new entrants.

IV. REDUCING ENCUMBRANCES IN THE 39 GHZ BAND

14. We recognize that the existing framework is unlikely to clear all encumbrances from the 39 GHz band because incumbent licensees may all too often not have the ability to swap licenses to aggregate up to licenses that fit the existing band plan. For example, if an incumbent licensee has a pair of 50 megahertz RSA licenses where the RSA is wholly enveloped by a PEA—and yet no licensee has the partial PEA license in those spectrum blocks—then the licensee cannot create a conforming PEA license through any number of transactions. Or similarly, if a licensee holds a single 50 megahertz license in an area and all other licensees have 50 megahertz pairs, at least one licensee in that area will be left with a non-conforming license no matter the number of swaps performed.

15. Accordingly, we propose a new framework to supplement existing efforts, to reduce encumbrances in the 39 GHz band. Specifically, we propose to use our incentive auction authority to pay incumbent licensees who choose to vacate encumbered spectrum and facilitate consolidation of their holdings. We further propose to precede that incentive auction with an optional voucher exchange to allow incumbent licensees to consolidate their holdings across regions. We also propose mandatory repacking for incumbents that choose not to participate in the auction. We expect these three steps will enable us to auction much of the combined 2400 megahertz in the Upper 37 GHz and 39 GHz bands as near-nationwide contiguous spectrum in a single generic-block, clock auction.

A. An Incentive Auction

16. We propose to reconfigure and auction together licenses for all the available spectrum in the Upper 37 GHz and 39 GHz bands using an incentive auction. We propose to run a clock auction, in which incumbents and others may participate, to set both the price of new licenses and the amounts for which incumbents will relinquish their spectrum usage rights. This clock auction would simultaneously serve as the reverse and forward components of the incentive auction. At the end of the auction, participating incumbent licensees would receive an incentive payment based on their cancelled incumbent licenses. The amount of the incentive payment could be used as a credit toward the licensees' winning bids for any new licenses in any of the bands offered in the auction. Because the Commission has not previously conducted an incentive auction in this way, we walk through each step in turn.

17. As an initial matter, we propose to use a two-phase auction procedure. In the first phase, participants would bid to win generic spectrum blocks using an ascending clock auction that would determine a uniform price in each PEA—this encompasses the simultaneous forward-and-reverse auction. The second phase would assign specific-frequency licenses by PEA that would aim to ensure contiguity within each PEA. Because unencumbered spectrum blocks in the Upper 37 GHz and 39 GHz bands can be treated as largely interchangeable within a PEA, we propose to offer these blocks as one category of generic blocks in a clock auction. We expect that using a clock auction format with bidding for generic

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operations at those sites. See *Spectrum Frontiers 3rd FNPRM* at 30, para. 74; *Spectrum Frontiers R&O*, 31 FCC Rcd at 8070-71, para. 149.

³⁵ See *Spectrum Frontiers 2nd R&O*, 32 FCC Rcd at 11006, paras. 57-59.

blocks followed by an assignment phase will speed up the auction considerably relative to a typical FCC simultaneous multiple-round auction.

18. Specifically, we propose to use a clock auction design with rules similar to those used for the forward auction in the broadcast incentive auction and the planned 24 GHz auction.³⁶ Our proposed clock auction format would proceed in a series of rounds, with bidding being conducted simultaneously for all generic spectrum blocks available in the auction. During the clock phase, the auction would announce prices for generic blocks in each PEA, and qualified bidders would submit quantity bids for the number of blocks they seek in the PEA at that clock price. Bidding rounds would be open for predetermined periods of time, during which bidders would indicate their demands for blocks at the clock prices associated with the current round. Bidders would be subject to activity and eligibility rules that govern the pace at which they participate in the auction. In each PEA, the clock price for licenses would increase from round to round if bidders indicate total demand that exceeds the number of blocks available in the category. Bidders would be held to their bids, as in the forward phase of the broadcast incentive auction, with the system only allowing a bidder to reduce demand if aggregate demand would not fall below the available supply of blocks in that PEA. The clock rounds would continue until, for all generic blocks in all geographic areas, the number of blocks demanded does not exceed the supply of available blocks. At that point, those bidders indicating demand for a block in a category at the final clock phase price would be deemed winning bidders.

19. Next, winning bidders from the clock phase would have an opportunity to submit sealed bids by PEA for particular frequency blocks in a separate assignment phase. We propose that this assignment phase be voluntary: Winning bidders need not bid in the assignment phase. Regardless of its participation in the assignment phase, the assignment phase would aim to assign contiguous frequency blocks within a PEA to a bidder that wins multiple blocks.

20. To encourage participation in the reverse auction, we propose to offer incumbents an incentive payment—using what we term here a “voucher”—in exchange for the cancellation of certain incumbent licenses at the end of the auction. Each voucher would have a dollar value equal to the final clock phase price (for a single generic block under the new band plan) in the PEA times the ratio of the incumbent’s MHz-pops to the MHz-pops in a full generic block.³⁷ We note that, by this definition, a participating incumbent licensee with a license for 100 megahertz of unencumbered spectrum in a PEA could receive a voucher precisely equal to the cost of paying a winning bid for a license for the same spectrum in the forward auction. Accordingly, participation in the clock auction by incumbent licensees will simultaneously be participation in the forward and reverse auction: The bids for new blocks in the forward auction automatically set the price of vouchers that participating incumbent licensees may receive as vouchers in the reverse auction. As the auction proceeds, the incumbent licensee can elect whether to pursue new licenses by placing new bids in the forward auction or to accept the voucher by requesting a reduction in its demand. Thus, the auction to determine the amount of the winning bid for the new blocks also serves as the reverse auction that determines the incentive payment a licensee would receive for voluntarily relinquishing spectrum usage rights.

³⁶ See *Auctions of Upper Microwave Flexible Use Licenses for Next-Generation Wireless Services; Comment Sought on Competitive Bidding Procedures for Auctions 101 (28 GHz) and 102 (24 GHz); Bidding in Auction 101 Scheduled to Begin November 14, 2018*, Public Notice, FCC 18-43 (WTB Apr. 17, 2018). As in those auctions we would implement our Part 1 general competitive bidding rules to develop detailed final auction procedures in advance of the start of bidding, through a “pre-auction process,” which includes soliciting public input on proposed procedures in a “Comment Public Notice” and resolving those issues in a “Procedures Public Notice.” See *Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions*, GN Docket No. 12-268, Report and Order, 29 FCC Rcd 6567, 6574, para. 15 (2014) (*Incentive Auction R&O*).

³⁷ This proposal is similar to the AT&T proposal, in that a licensee exchanging its licenses would receive a voucher for each PEA in which it holds a license. Under AT&T’s proposal, the voucher would reflect the licensee’s current licenses in terms of the equivalent number of 200 megahertz blocks in that PEA. See AT&T Dec. 12, 2017 *Ex Parte* at 2, Attach. at 3-5.

21. Although incumbent licensees bidding in the auction would be free to request a reduction in their demand at any time during the auction based on their expectations regarding the value of their vouchers, the Commission itself would not process vouchers until after the clock auction is over. Provided that the total auction proceeds exceed the total incentive payments to be shared with licensees relinquishing spectrum usage rights, we can close the incentive auction regardless of the proceeds or relinquishments in a particular PEA. Then, the Commission would process vouchers for each incumbent licensee in each PEA in two steps, depending on whether all the spectrum made available in the reverse auction was needed for the forward auction. First, the Commission would determine whether demand at the end of the forward auction equaled supply in any given PEA; in those PEAs, the Commission would cancel the participating incumbents' licenses and make payments based on the vouchers.³⁸

22. In the event that demand by bidders in the forward auction in a PEA is less than the total supply of blocks offered, we need to address how to prioritize the blocks supplied by incumbent licensees relative to the supply of blocks that are held by the FCC in order to determine whether all incumbent-supplied blocks can be relinquished. That is, if bidders are interested in obtaining fewer new licenses than the total number of available blocks, which block or blocks will remain unsold—those partial or full blocks that an incumbent wishes to relinquish or those held by the FCC? For example, we could attempt to minimize payments to incumbent licensees by first satisfying demand with FCC-held blocks, and then, to the extent possible, with incumbent-offered blocks. If only some incumbent-held blocks can be used to satisfy demand, how should we prioritize among incumbent-held blocks? Should we use a pseudo-random number to break such ties, or should we prioritize blocks offered by incumbents in a different manner, such as allowing any incumbents with partial-PEA spectrum usage rights to relinquish before holders of full-PEA rights, so as to result in a repacked spectrum blocks that are more consistent with the new band plan? Alternatively, if we prioritized the reconfiguration of the band by first satisfying demand with incumbent-held supply, how should we prioritize which incumbent-held blocks to supply first? We note that, in situations where the demand for blocks does not exceed the total supply of blocks, the final clock phase price, at which incentive payments will be calculated, is likely to be equal to the minimum opening bid.

23. As a further encouragement for participation in the auction, we propose to condition bidding for new licenses in the auction on incumbents' offering their existing spectrum usage rights in the auction. In other words, an incumbent licensee seeking new licenses in the forward auction must be a participant in the simultaneous reverse auction. Such a requirement would ensure that incumbent licensees are not given a one-way option—purchasing new unencumbered spectrum at auction while keeping a different set of blocks encumbered and thus unavailable for an efficient auction.

24. One advantage of this approach is it maximizes the ability of incumbent licensees to maintain and consolidate their holdings (or to rationalize their holdings by relinquishing spectrum usage rights in some areas to acquire rights in other areas) while jointly maximizing the amount of clear, unencumbered spectrum for auction. Such an incentive auction appears to be the most efficient path forward to rationalize the Upper 37 GHz and 39 GHz bands for mobile 5G and high-speed fixed wireless service. It promotes a rapid transition of the currently fragmented band while at the same time respecting incumbent spectrum rights and providing opportunities for entry into the band by other wireless providers. We seek comment on these proposals and on alternative approaches to conducting, in a timely manner, an auction of licenses in the Upper 37 GHz and 39 GHz bands. We also seek comment on additional incentives we could provide for incumbent licensees to participate in the reverse auction.

25. A potential concern with the proposed auction is that incumbents with vouchers may have an incentive to engage in insincere bidding in markets where they want to be net suppliers of

³⁸ For example, if an incumbent licensee had 150 megahertz of pre-auction spectrum throughout a PEA before the clock auction and won bids for two 100-megahertz blocks at \$10,000 a block in a PEA where demand equaled supply at the end of the clock auction, that licensee's pre-auction spectrum licenses would be cancelled, it would receive a voucher of \$15,000 (1.5 x \$10,000) and it would owe \$20,000 for the two winning bids (i.e., it would be required to pay \$5,000 net).

spectrum to inflate the value of their voucher payments.³⁹ We seek comment on the validity of such concerns. We also note that these concerns should be mitigated by our no withdrawal rule, which we used in the forward phase of the broadcast incentive auction. We seek comment on any other potential safeguards that could be implemented against insincere bidding incentives or other strategic behavior in the proposed incentive auction.

26. Another potential concern is the interaction of vouchers and bidding credits. For example, given existing rural and small business bidding credits, bidders for new licenses may be eligible to receive up to a 25 percent credit toward their winning bid if they qualify.⁴⁰ If that bidding credit were applied across their gross winning bids, an incumbent licensee could feasibly retain its existing holdings in the auction while simultaneously receiving an incentive payment.⁴¹ To avoid that result, we propose to limit the application of bidding credits to cash payments for winning bids in the auction, after the winning bidder has used any vouchers it has to satisfy winning bids. We seek comment on this proposal and any other scenarios where the use of an incentive auction with vouchers may create arbitrage opportunities given our normal bidding rules. For example, should we address winning bidders that default on their payments differently here?

27. Given that non-incumbent licensees also may qualify for bidding credits, how should we address the theoretical possibility that auction proceeds could total less than the incentive payments owed to incumbents?⁴² Should we adopt a rule that would preclude the auction from closing in the event proceeds from winning bids will be insufficient, analogous to the final stage rule we adopted in the broadcast television spectrum incentive auction? Alternatively, should we adopt a rule to recalculate the amount of incentive payments, so that the payments do not exceed the available auction proceeds? We seek comment on these potential possibilities and how to address them. Are there other particular scenarios in which the auction proceeds might fall short of the amount needed to pay the face value of vouchers? Or other methods of addressing such possibilities?

28. We also seek comment on two alternative proposals. First, incumbents would receive license(s) for all vouchers that are equivalent to a whole number of new license(s) without bidding at all in the clock phase. The specific frequencies for these licenses would be assigned in the assignment round. Under this alternative, incumbent licenses that are not encumbered would not be able to relinquish spectrum, and in those PEAs, the total number of blocks offered in the clock phase would be reduced by the number of 100 megahertz licenses held by incumbents. In the assignment phase, all blocks won by winning bidders and all incumbent licenses would be assigned (or in the case of incumbent licenses, reassigned) frequencies.

29. A second, more narrowly tailored alternative would be to exchange automatically for vouchers only encumbered PEA and RSA licenses. Unencumbered PEA licenses would have the option of converting their unencumbered generic PEA blocks to vouchers if they so choose. All encumbered licenses would still be required to be converted to vouchers, since, were these licensees to hold out, this would leave spectrum that could not fit into the new band plan and thereby reduce the efficiency of the auction.

30. Under all these approaches, unencumbered PEA licensees can obtain new licenses without additional license payments. Under our proposed approach, however, licensees would have to

³⁹ See Verizon Apr. 24, 2018 *Ex Parte* at Attach. 2 at 3-4; AT&T Dec. 12, 2017 *Ex Parte* at Attach. at 4-5.

⁴⁰ See 47 CFR §§ 1.2110, 30.302(b).

⁴¹ For example, if a small business incumbent with one 100 megahertz PEA license before the auction won a single license in that same PEA for \$10,000, its voucher would be \$10,000 while its required payment on the one purchased license would be \$7,500 (\$10,000 times 75 percent).

⁴² Given the substantial amount of FCC-held spectrum offered in the auction, this scenario may be unlikely. In addition, we can adopt caps on available bidding credits as part of our pre-auction process. Nevertheless, we cannot rule out such a scenario entirely.

bid to obtain a new license, making more licenses available for bidding and increasing the number of bidders. Making unencumbered PEA licensees bid may increase the efficiency of the assignment of licenses by having incumbents face the market price of holding onto their licenses. At a high enough price, some may relinquish their spectrum to other bidders who value it more highly. We seek comment on these proposals, particularly from any current licensee that would choose not to participate in the incentive auction using one of these three approaches described above or any other similar approach.

B. A Pre-Auction Voucher Exchange

31. To address concerns raised with respect to incumbent licensees whose licenses involve RSAs or encumbered PEAs, and thus do not cover the entire population of a PEA, we propose a pre-auction voucher exchange.⁴³ Much as vouchers in the incentive auction allow incumbent licensees to consolidate and rationalize their holdings during the auction, a voucher exchange could allow incumbents to consolidate and rationalize their holdings before the auction—although in a somewhat more limited manner. Specifically, it could aid incumbent licensees in minimizing the number of PEAs going into the auction in which they would have only fractional vouchers—and thus no ability to assure themselves that they could exit the auction with a whole number of new licenses without making net payments to secure their spectrum holdings.

32. The design of the voucher exchange should allow incumbents to exchange their fractional vouchers in one or more PEAs, caused by holding an RSA or encumbered PEA license, to create full vouchers in another PEA subject to certain restrictions. The first step in a voucher exchange is to aggregate the vouchers for all encumbered blocks within a PEA, which is likely to leave a fractional voucher in each PEA.

33. Next, the Commission would specify exchange rates (expressed on a per MHz-pop basis) that would allow incumbent licensees to exchange these fractional vouchers with the Commission. We seek comment on how to establish the relative exchange rates needed for a voucher exchange. Should we calculate those exchange rates based on the relative value of PEA licenses estimated from previous auctions?⁴⁴ If so, which prior FCC auctions should be used to calculate the exchange rates between PEAs?

34. Incumbents would then be allowed to exchange their vouchers subject to the condition that net trades for each incumbent over all PEAs be revenue neutral, i.e., aggregate trades up and down will balance given the FCC-specified exchange rates.⁴⁵ Vouchers could only be exchanged up or down to no more than the nearest integer above or no less than the nearest integer below their current fractional

⁴³ For encumbered PEA licenses (i.e., licenses that are co-channel with an RSA license), the licensee's voucher would cover only the population where it is authorized to operate prior to the start of the exchange—that is, the area outside of the overlapping RSA license.

⁴⁴ We note that even if the values of spectrum licenses are very different across auctions, the relative values of licenses between geographic areas are likely substantially more similar.

⁴⁵ If all of an incumbent's licenses within PEA #1 in the aggregate cover 20% of the MHz-pops of an unencumbered 100 megahertz block in PEA #1, the license(s) are represented by a voucher denominated as 0.2. If all of an incumbent's licenses within a PEA #2 in the aggregate cover 40 percent of the MHz-pops of an unencumbered 100 megahertz block in PEA #2, that incumbent's voucher in PEA #2 would be 0.4. Note that the incumbent's license(s) in PEA #2 might cover 80 percent of the population in the PEA with only 50 megahertz of bandwidth, or 40 percent of the population with 100 megahertz, or 20 percent of the population with 200 megahertz. A voucher representing any of these combinations in PEA #2 would be denominated 0.4. If the exchange rate between PEA #1 and #2 was such that a voucher in PEA #2 can be exchanged for a voucher of two times its amount in PEA #1, then the incumbent could exchange its 0.4 voucher in PEA #2 for a PEA #1 voucher for 0.8 (0.4 times two). The incumbent would then combine its original 0.2 voucher in PEA #1 with the 0.8 voucher received in the exchange and have a 1.0 voucher in PEA #1. The incumbent's voucher in PEA #2 would then be 0.0.

voucher holdings.⁴⁶ If there exists a PEA in which it is not feasible for all incumbent licensees to “trade up” within the 39 GHz band, we propose that incumbent licensees would only be permitted to “trade down.” All voucher trades with the Commission would be completed prior to the clock auction phase of the incentive auction. We propose that, before initiating the voucher exchange, we would educate all potential participants so that they can understand the process and consequences of participating in the exchange. We find that this should promote an efficient process for both the Commission and participants.

35. We seek comment on this framework for implementing a pre-auction voucher exchange to serve the public interest, including how best to address concerns raised in the record with respect to prior proposals.⁴⁷ To establish the framework, we seek comment on the best methods for achieving our goals. How could a voucher exchange best facilitate a low cost rapid rationalization of spectrum holdings by allowing incumbent licensees to aggregate fractional holdings across PEAs and to retain all their equivalent spectrum usage rights in PEAs of their choosing to the extent permitted by their fractional holdings and the exchange rates? Are there any other limits or restrictions that should be imposed on exchanges that incumbents can make? Separate from the voucher exchange and building on the *Voluntary Rebanding PN*, should we expand the process by which incumbent licensees can modify their licenses prior to the auction, for example, by allowing for inter-market swaps using the same exchange rates as the voucher exchange?

36. One restriction we may impose on any exchange that will result in modified licenses (rather than cancelled licenses and vouchers for the auction) is to require that any such exchange result in less geographically encumbered spectrum. Would that serve the public interest? How should encumbrances be measured? Furthermore, after exchanging across a number of markets, it is likely that a licensee will not be able to have full PEA licenses in all markets. One approach to this remainder would be to set it to zero in that market. Would this be appropriate, given the opportunity afforded by the exchanges to minimize such holdings? What other approaches could be taken regarding such remainders? For example, should an incumbent be permitted to maintain one fractional license in one PEA?

37. We also seek comment on how the voucher exchange should interact with existing licenses and the incentive auction. For example, should we cancel or modify the affected licenses of exchange participants before the auction in exchange for vouchers? Should we leave such licenses untouched until after the auction? Should only incentive auction participants be allowed to participate in the voucher exchange? Further, should we consider holding this type of voucher exchange independent of whether we hold an incentive auction to allow incumbent licensees to combine their fractional licenses into whole licenses under the new band plan?

C. Mandatory Repacking

38. We propose to repack incumbent licensees that choose not to participate in the incentive auction. Just as the Commission repacked television broadcasters that chose not to participate in the broadcast incentive auction, the Commission has the authority to modify the holdings of existing licensees “if in the judgment of the Commission such action will promote the public interest, convenience, and necessity.”⁴⁸ Repacking the holdings of non-participating incumbent licensees will ensure that we can minimize encumbrances in the band and maximize the amount of clean spectrum

⁴⁶ Using our prior example, the limitation that incumbents cannot increase vouchers to more than the nearest integer above its initial holdings means that an incumbent with 0.2 in PEA #1 and 0.9 in PEA #2 cannot exchange its PEA #2 voucher for a PEA #1 voucher of 1.8 (0.9 times the exchange rate of two) because the result would increase the incumbent’s holdings in PEA #1 from 0.2 to 2.0, which is more than the nearest integer above, or 1.0.

⁴⁷ See Verizon Apr. 24, 2018 *Ex Parte* at Attach. 2.

⁴⁸ See 47 U.S.C. § 316.

available for auction, while preserving existing usage rights for incumbents.⁴⁹

39. We seek comment on all aspects of this proposal. We also seek comment on what criteria to apply when repacking encumbered licenses. How can the Commission best make modified frequency assignments to maximize the contiguous spectrum for auction participants while preserving to the greatest extent possible each incumbent license's bandwidth, previous geography, and existing contiguity?

40. For example, must or should we maintain frequency contiguity for RSA licenses that overlap PEAs? Given the requirement of operability throughout the band, how significant is such contiguity? We note that partitioning RSAs that overlap multiple PEAs into their respective PEAs might make it possible to repack more efficiently and even enable repacked frequencies to be assigned in the auction's assignment phase.

41. One approach to repacking non-participating incumbents would involve a two-step calculation. The first step would entail reconfiguring those incumbent licenses that do not align with PEA boundaries (e.g., RSA licenses or partial PEA licenses) into full PEA licenses with an equivalent amount of spectrum in each PEA, as measured in MHz-pop. The second step would be to restate the incumbent's fractional holdings of 100 MHz PEA blocks as mostly integer numbers of 100 MHz PEA blocks, in a way that the repacked spectrum maintains the same value as evaluated with respect to FCC-specified exchange rates (i.e., those set for the voucher exchange). In all but one of their PEAs, the fractional holdings of a repacked incumbent would be replaced by either the nearest integer above or the nearest integer below the fractional holdings. The one PEA left with fractional holdings would be the PEA with the smallest possible value. We note that an incumbent could avoid the effects of such repacking by entering into the incentive auction.

42. Other efficiencies might be realized by other means. For example, converting MHz-pops in a geographic area that is less than a full PEA (i.e., an RSA license or an encumbered PEA license) into the same MHz-pops in a portion of a 100 megahertz block across the whole PEA could facilitate more efficient repacking. We note that, depending on how many and which current licensees choose not to participate in the incentive auction, there may be some left-over segments, i.e., when less than a whole 100 megahertz PEA block remains. We seek comment on whether we should attempt to consolidate such holdout segments in this manner, and if so whether to auction overlay licenses on them or otherwise maximize their value for the American public.⁵⁰

43. We seek comment on the options presented above, including possible variations, and on the costs and benefits of mandatory repacking for non-participants. Should there be a *de minimis* spectrum holdings threshold to qualify for repacking and how should this level be set? How and when should the frequency reassignment be done in order to minimize the spectrum required to repack holdout licenses? How should the adjacent spectrum blocks to the holdout segment be auctioned, given that they may be less than 100 megahertz?

D. Incentive Auction Legal Authority

44. Congress expressly authorized the Commission to conduct incentive auctions beyond the broadcast television spectrum incentive auction.⁵¹ Using this authority, the Commission can offer incentive payments to licensees that choose to relinquish existing spectrum usage rights provided by incumbent licenses instead of retaining such rights pursuant to new licenses. More specifically, the "Commission may encourage a licensee to relinquish voluntarily some or all of its licensed spectrum usage rights in order to permit the assignment of new initial licenses subject to flexible-use service rules

⁴⁹ This alternative is a variant of AT&T's auction proposal, which would repack incumbents at the upper end of the 39 GHz band. See AT&T Dec. 12, 2017 *Ex Parte* at 2, Attach. at 5-11.

⁵⁰ See, e.g., *id.* at Attach. at 5-6.

⁵¹ See 47 U.S.C. § 309(j)(8)(G).

by sharing with such licensee a portion . . . of the proceeds (including deposits and upfront payments from successful bidders) from the use of a competitive bidding system under this subsection.”⁵² To do so, the Commission must determine “the value of the relinquished rights . . . in the reverse auction”⁵³ and that reverse auction must have “at least two competing licensees participate.”⁵⁴

45. As explained above, we propose to use the clock phase winning bids for new licenses to determine the incentive payment that participating incumbent licensees may receive.⁵⁵ A participating incumbent licensee will have a choice between competing in bidding for new licenses and offering spectrum usage rights or relinquishing spectrum usage rights under existing licenses in exchange for an incentive payment.

46. Under the auction design proposed above, any relinquishment of spectrum usage rights for an incentive payment would be “voluntary” within the meaning of the statute.⁵⁶ All incumbent licensees may decline to participate in the incentive auction and instead receive new licenses that provide spectrum usage rights equivalent to their existing licenses. Modifying existing licenses in this way does not, however, require the use of our incentive auction authority. Rather, we rely on our clear authority to modify license frequencies pursuant to the public interest.⁵⁷ Given that incumbent licensees will participate in the incentive auction by choice, we conclude that any subsequent decision an incumbent doing so makes to relinquish spectrum usage rights should be considered voluntary. We seek comment on our conclusion.

47. We propose above that incumbent licensees that choose not to participate in the reverse auction may not participate in the auction of new licenses. Could that additional consequence of choosing not to participate affect whether a subsequent relinquishment is voluntary? An incumbent licensee that chooses between relinquishing spectrum usage rights for an incentive payment or instead receiving new licenses for equivalent spectrum usage rights at no additional cost presumably does so voluntarily, regardless of whether it chose to participate because of some collateral consequence of non-participation. Nothing compels such a licensee to make the relinquishment instead of retaining its spectrum usage rights under new licenses.

48. We also conclude that our proposal that incumbent licensees that choose not to participate in the reverse auction may not participate in the forward auction of new licenses is consistent with our authority to determine qualifications that auction participants must satisfy.⁵⁸ More specifically, we conclude that the proposed consequence of an incumbent’s choice would constitute a rule of general applicability regarding auction participation. We seek comment on these conclusions.⁵⁹

49. Our proposal satisfies additional statutory requirements for our incentive auction authority. The “reverse” nature of the auction required by the statute is one in which those rights are relinquished by licensees to the Commission, reversing the typical flow of rights assigned based on spectrum license auctions. Although auctions in other contexts—such as the Connect America Fund Phase II Auction to distribute universal service support for high-speed broadband deployment in rural America—are sometimes called reverse auctions because the price declines over the course of bidding, nothing in the statute requires that a reverse auction to relinquish spectrum usage rights use descending

⁵² 47 U.S.C. § 309(j)(8)(G)(i).

⁵³ 47 U.S.C. § 309(j)(8)(G)(i).

⁵⁴ 47 U.S.C. § 309(j)(8)(G)(ii)(II).

⁵⁵ *Cf.* 47 U.S.C. § 309(j)(8)(G)(ii)(I).

⁵⁶ 47 U.S.C. § 309(j)(8)(G)(i).

⁵⁷ *See* 47 U.S.C. § 316.

⁵⁸ *See* 47 U.S.C. § 309(j)(5).

⁵⁹ *See* 47 U.S.C. § 309(j)(17)(B).

bidding. We note that in the broadcast television spectrum incentive auction, the Commission chose to use a descending clock price auction for the reverse auction component because a descending clock auction design involved several features that were particularly helpful in that context, not because it was statutorily required.⁶⁰

50. We also conclude that, so long as at least two incumbent licensees with licenses in the same PEA choose to participate in the incentive auction, the reverse auction will meet the statutory requirement to have at least “two competing licensees participat[ing]” in the reverse auction.⁶¹ In the broadcast television spectrum incentive auction, the Commission concluded that at least two licensees participate in the reverse auction so long as more than one non-commonly controlled party qualifies as an applicant to participate in the auction.⁶² This is so because any qualified applicant that bids in the auction must take into account the presence of another qualified applicant that has the opportunity to bid, regardless of whether the second applicant in fact bids.⁶³ We find that same conclusion should apply here, too. Incumbents seeking to relinquish spectrum usage rights in the proposed auction must take into account the demand for new licenses by other qualified applicants, as they only will be able to relinquish rights so long as demand for new licenses exceeds supply. We seek comment on this analysis.

51. Further, we seek comment generally on whether our proposal to conduct an auction with the elements described above or any of our alternative scenarios for conducting an incentive auction would be consistent with our statutory authority to conduct an incentive auction. To the extent that commenters assert that these scenarios are not consistent with our incentive auction authority, commenters should discuss any changes that could more fully satisfy that authority.

52. As noted above in our proposal, we have authority to modify the holdings of existing licensees based on our judgment of the public interest. We conclude that the potential modifications considered above are within our authority. We ask that commenters proposing further modifications to address whether their proposals are within our authority.

53. *Legal Authority for Alternative Auction Mechanisms.* We seek comment on alternative legal authority should we decide not to conduct an incentive auction. For example, we seek comment on whether we might conduct an auction as described above while providing current licensees with bidding offset credits in place of vouchers and incentive payments.⁶⁴ We seek comment on whether issuing bidding offset credits in order to protect existing spectrum uses—and past Commission public interest judgments reflected in prior licensing decisions—while clearing existing spectrum assignments is necessary to the management of spectrum in the public interest and not inconsistent with the Communications Act.⁶⁵ Effectively clearing prior spectrum assignments so that new licenses for this spectrum may be assigned by competitive bidding will promote statutory objectives. Issuing bidding offset credits is within the Commission’s statutory authority regarding the design of competitive bidding

⁶⁰ *Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions*, Report and Order, 29 FCC Rcd 6567, 6752-54, paras. 446-50 (2014) (*Incentive Auction Report and Order*) (“The record to date demonstrates several important advantages of a descending clock auction format.”).

⁶¹ See *Incentive Auction Report and Order*, 29 FCC Rcd at 6742, para. 413. The Commission took care to note that it might “apply [the two competing participants] requirement differently in other reverse auctions, depending upon the particular eligibility criteria, auction design and other circumstances.” *Id.* at 6743, para. 414 n.1224. Accordingly, while we find the discussion regarding this requirement helpful, it is not controlling.

⁶² *Incentive Auction Report and Order*, 29 FCC Rcd at 6742, para. 413.

⁶³ *Id.*

⁶⁴ See *Amendment of Parts 1, 21, 73, 74, and 101 of the Commission’s Rules to Facilitate the Provision of Fixed and Mobile Broadband Access, Educational and Other Advance Services in the 2150-2162 and 2500-2690 MHz Bands*, Report and Order and Further Notice of Proposed Rulemaking, 19 FCC Rcd 14165, 14276-80, paras. 303-312 (2004).

⁶⁵ 47 U.S.C. §§ 154(i), 303(r), 309.

systems. Section 309(j)(4) of the Communications Act grants the Commission authority to consider a variety of methods of helping entities pay for licenses that are offered at auction, including alternative payment schedules, tax credits, and bidding preferences.⁶⁶

54. We ask commenters to address the differences, if any, in incentives provided to current licensees by providing them with a bidding offset credit without an opportunity to receive an incentive payment. Commenters should address the likely differences in the outcome of the auction resulting from such different incentives, and whether providing incentive payments would better serve the public interest, notwithstanding the need to share a portion of the auction proceeds. Would the amount of repurposed spectrum be affected? We also seek comment on any other approaches that might achieve the purposes of the proposal without sharing proceeds from the auction of new licenses with existing licensees.

V. PROCEDURAL MATTERS

55. *Ex Parte Rules – Permit-But-Disclose.* Pursuant to Section 1.1200(a) of the Commission’s rules,⁶⁷ this 4th FNPRM shall be treated as a “permit-but-disclose” proceeding in accordance with the Commission’s *ex parte* rules.⁶⁸ 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.

56. *Comment Period and Procedures.* 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: <https://www.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.

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,

⁶⁶ See 47 U.S.C. § 309(j)(4)(A).

⁶⁷ 47 CFR § 1.1200(a).

⁶⁸ 47 CFR §§ 1.1200 *et seq.*

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 Junction, MD 20701.
- U.S. Postal Service first-class, Express, and Priority mail must be addressed to 445 12th Street, SW, Washington DC 20554.

57. **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).

58. *Regulatory Flexibility Analysis.* As required by the Regulatory Flexibility Act of 1980 (RFA),⁶⁹ the Commission has prepared an Initial Regulatory Flexibility Analysis (IRFA) regarding the significant economic impact on small entities of the policies and rules adopted in the *Fourth Further Notice of Proposed Rulemaking*, which is found in Appendix B. We request written public comment on the IRFA. Comments must be filed in accordance with the same deadlines as comments filed in response to the *4th FNPRM* and must have a separate and distinct heading designating them as responses to the IRFA.

59. *Paperwork Reduction Analysis.* This document contains potential new or revised information collection requirements. Therefore, we seek comment on potential new or revised information collection requirements. If the Commission adopts any new or revised information collection requirements, the Commission will publish a notice in the Federal Register inviting the general public and the Office of Management and Budget to comment on the information collection requirements, 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.

60. *Further Information.* For further information, contact Erik Salovaara of the Wireless Telecommunications Bureau, Auctions Division, at 202-418-0660 or Erik.Salovaara@fcc.gov; or Simon Banyai of the Wireless Telecommunications Bureau, Broadband Division, at 202-418-1443 or Simon.Banyai@fcc.gov.

VI. ORDERING CLAUSES

61. IT IS ORDERED, pursuant to the authority found in Sections 1, 2, 3, 4, 5, 7, 301, 302, 303, 304, 307, 309, 310, and 316 of the Communications Act of 1934, 47 U.S.C. §§ 151, 152, 153, 154, 155, 157, 301, 302, 303, 304, 307, 309, 310, and 316, and Section 1.411 of the Commission's Rules, 47 C.F.R. § 1.411, that this *Fourth Further Notice of Proposed Rulemaking* IS HEREBY ADOPTED.

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

⁶⁹ See 5 U.S.C. § 603.

FEDERAL COMMUNICATIONS COMMISSION

Marlene H. Dortch
Secretary

APPENDIX A

Proposed Rules

For the reasons discussed in the preamble, the Federal Communications Commission proposes to amend 47 CFR part 30 as follows:

PART 30 – UPPER MICROWAVE FLEXIBLE USE SERVICE

5. The authority citation for part 30 continues to read as follows:

Authority: 47 U.S.C. 151, 152, 153, 154, 301, 303, 304, 307, 309, 310, 316, 332, 1302.

6. Amend § 30.4 by redesignating paragraphs (b), (c), (d), and (e) as paragraphs (c), (d), (f), and (g) respectively, adding and reserving new paragraphs (b) and (e), and revising redesignated paragraphs (d)(1), (f), and (g) to read as follows:

§ 30.4 Frequencies.

* * * * *

(b) [reserved]

* * * * *

(d) * * *

(1) New channel plan:

Channel No.	Frequency band limits (MHz)
1	38,600-38,700
2	38,700-38,800
3	38,800-38,900
4	38,900-39,000
5	39,000-39,100
6	39,100-39,200
7	39,200-39,300
8	39,300-39,400
9	39,400-39,500
10	39,500-39,600
11	39,600-39,700
12	39,700-39,800
13	39,800-39,900
14	39,900-40,000

(2) * * *

* * * * *

(e) [reserved]

(f) 37-38.6 GHz band: 37,600-37,700; 37,700-37,800 MHz; 37,800-37,900 MHz; 37,900-38,000 MHz; 38,000-38,100 MHz; 38,100-38,200 MHz; 38,200-38,300 MHz; 38,300-38,400 MHz; 38,400-38,500 MHz, and 38,500-38,600 MHz. The 37,000-37,600 MHz band segment shall be available on a site-specific, coordinated shared basis with eligible Federal entities.

(g) 47.2-48.2 GHz band—47.2-47.3 GHz; 47.3-47.4 GHz; 47.4-47.5 GHz; 47.5-47.6 GHz; 47.6-47.7 GHz; 47.7-47.8 GHz; 47.8-47.9 GHz; 47.9-48.0 GHz; 48.0-48.1 GHz; and 48.1-48.2 GHz.

APPENDIX B

Initial Regulatory Flexibility Analysis

1. As required by the Regulatory Flexibility Act of 1980, as amended (RFA),⁷⁰ the Commission has prepared this present 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 the attached *Fourth Further Notice of Proposed Rulemaking*. Written public comments are requested on this IRFA. Comments must be identified as responses to the IRFA and must be filed by the deadlines for comments as specified in the *Fourth Further Notice of Proposed Rulemaking*. The Commission will send a copy of this *Fourth Further Notice of Proposed Rulemaking*, including this IRFA, to the Chief Counsel for Advocacy of the Small Business Administration (SBA).⁷¹ In addition, the *Fourth Further Notice of Proposed Rulemaking* and IRFA (or summaries thereof) will be published in the Federal Register.⁷²

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

2. In the *Fourth Further Notice of Proposed Rulemaking*, we propose to modify the band plan for the 38.6-40 GHz (39 GHz) band to 100 megahertz channels for the Part 30 Upper Microwave Flexible Use Service (UMFUS), and propose to similarly modify the 37.6-38.6 GHz (Upper 37 GHz) and 47.2-48.2 GHz (47 GHz) bands to 100 megahertz channels if we adopt the 100 megahertz channel plan for the 39 GHz band. The *Fourth Further Notice of Proposed Rulemaking* also seeks comment on which auction mechanism to use to realign existing 39 GHz licenses.

3. First, we propose to modify the 39 GHz band plan from seven 200 megahertz to fourteen 100 megahertz channels to allow for better consolidation of existing license holdings. We propose modifying the Upper 37 GHz band plan from 200 megahertz to 100 megahertz channels, given that the two bands are adjacent and have the same service rules and an operability requirement. Further, in the *Fourth Further Notice of Proposed Rulemaking* we propose to auction the 39 GHz and Upper 37 bands together. In addition we propose to modify the 47 GHz band plan from 200 to 100 megahertz channels if we auction all three bands at the same time and seek comment on that proposal.

4. Second, we propose to use a two-phase incentive auction. In the first phase, participants would bid to win generic spectrum blocks using an ascending clock auction that would determine a uniform price in each PEA—this encompasses the simultaneous forward-and-reverse auction. The second phase would assign specific-frequency licenses by PEA that would aim to ensure contiguity within each PEA. Because the spectrum blocks in the Upper 37 GHz and 39 GHz bands can be treated as largely interchangeable within a PEA, we propose to offer unencumbered blocks as one category of generic blocks in a clock auction. Specifically, we propose to use a clock auction design with rules similar to those used for the forward auction in the broadcast incentive auction and the planned 24 GHz auction. Next, winning bidders from the clock phase would have an opportunity to submit sealed bids by PEA for particular frequency blocks in a separate assignment phase. We propose that this assignment phase be voluntary: Winning bidders need not bid in the assignment phase. Regardless of its participation in the assignment phase, the assignment phase would aim to assign contiguous frequency blocks within a PEA to a bidder that wins multiple blocks.

5. We propose to encourage incumbent licensees to participate in the reverse auction by offering them an incentive payment—using what we term here a “voucher”—in exchange for the

⁷⁰ 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).

⁷¹ See 5 U.S.C. § 603(a).

⁷² See *id.*

cancellation of certain incumbent licenses at the end of the auction. Each voucher would have a dollar value equal to the final clock phase price (for a single generic block under the new band plan) in the PEA in which the incumbent license is located times the ratio of bandwidth provided by the incumbent's license and the population that can be reached using that license within a given PEA (expressed in MHz-pops) divided by the bandwidth and population reached by a generic block (expressed in MHz-pops). We propose to further encourage incumbent licensees to participate in the reverse auction by requiring such participation if the incumbent licensee seeks to participate in the accompanying forward auction. In addition, we seek comment on two alternative auction proposals. First, incumbents would receive license(s) for all vouchers that are equivalent to a whole number of new license(s) without bidding at all in the clock phase. In the assignment phase, all blocks won by winning bidders and all incumbent licenses would be assigned (or in the case of incumbent licenses, reassigned) frequencies. We seek comment on a second alternative in which we would exchange automatically for vouchers only encumbered PEA and RSA licenses.

6. Third, we propose a pre-auction voucher exchange process in which incumbents can trade fractional license holdings for full license holdings—including across markets in some circumstances— under the new band plan, with these trades reflected as full vouchers in the auction. The exchange would allow incumbents to aggregate fractional holdings across PEAs and to retain all their equivalent spectrum usage rights in PEAs of their choosing to the extent permitted by their fractional holdings and the exchange rates. We seek comment on establishing the relative exchange rates needed for a voucher exchange. We seek comment on a framework for implementing a pre-auction voucher exchange to serve the public interest, including how best to address concerns raised in the record with respect to prior proposals.

7. Fourth, we propose to repack incumbent licensees that choose not to participate in reverse auction portion of the incentive auction. Repacking the holdings of non-participating incumbent licensees will ensure that we can minimize encumbrances in the band, maximizing the amount of clean spectrum available for auction, while preserving existing usage rights for incumbents. We propose that licensees that choose to repack encumbered licenses in lieu of exchanging for vouchers should not be allowed to bid on new licenses in either the clock phase of the auction or be allowed to bid on frequency assignments during the assignment round. Prohibiting auction participation for such licensees would create a strong incentive for incumbents to choose to exchange all of their licenses for vouchers.

8. Lastly, we propose to auction together all licenses in the Upper 37 GHz and 39 GHz, using the Commission's incentive auction authority, where existing 39 GHz license holders could relinquish their spectrum usage rights in return for an incentive payment, and/or acquire new rights. We conclude that the auction design we propose would satisfy the requirement to conduct a reverse auction to determine the amount of compensation licensees would accept for voluntarily relinquishing spectrum usage rights. All incumbent licensees may decline to participate in the incentive auction and instead receive new licenses that provide spectrum usage rights equivalent to their existing licenses. We seek comment on our proposal to condition bidding for new licenses in the auction on incumbents' offering their existing spectrum usage rights in the auction. Such a requirement would ensure that incumbent licensees are not given a one-way option—purchasing new unencumbered spectrum at auction while keeping a different set of blocks encumbered and thus unavailable for an efficient auction. Furthermore, in case we were to conclude that the auction design proposed above would not satisfy the statutory requirements for an incentive auction, we seek comment on alternatives in which auction proceeds are not shared with incumbents, such as providing current licensees with bidding offset credits in place of vouchers.

9. Overall, the proposals in the *Fourth Further Notice of Proposed Rulemaking* are designed to facilitate broadband deployment, including 5G services, by providing opportunities to make it easier for licensees in the band to rationalize their existing holdings into contiguous swathes of spectrum, and by offering new licenses of contiguous spectrum at auction while protecting incumbents' existing spectrum usage rights. This will ensure that this spectrum is efficiently used and will foster the development of

new and innovative technologies and services, as well as encourage the growth and development of a wide variety of services, ultimately leading to greater benefits to consumers.

B. Legal Basis

10. The proposed action is authorized pursuant to Sections 1, 2, 3, 4, 5, 7, 301, 302, 302a, 303, 304, 307, 309, and 310 of the Communications Act of 1934, as amended, 47 U.S.C. §§ 151, 152, 153, 154, 155, 157, 301, 302, 302a, 303, 304, 307, 309, and 310, Section 706 of the Telecommunications Act of 1996, as amended, 47 U.S.C. § 1302.

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

11. 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 proposed rules, if adopted.⁷³ The RFA generally defines the term “small entity” as having the same meaning as the terms “small business,” “small organization,” and “small governmental jurisdiction.”⁷⁴ In addition, the term “small business” has the same meaning as the term “small business concern” under the Small Business Act.⁷⁵ 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.⁷⁶

12. *Small Businesses, Small Organizations, Small Governmental Jurisdictions.* Our actions, over time, may 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.⁷⁷ 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.⁷⁸ These types of small businesses represent 99.9% of all businesses in the United States which translates to 28.8 million businesses.⁷⁹

13. 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.”⁸⁰ Nationwide, as of August 2016, there were approximately 356,494 small organizations based on registration and tax data filed by nonprofits with the Internal Revenue Service (IRS).⁸¹

⁷³ 5 U.S.C. § 603(b)(3).

⁷⁴ 5 U.S.C. § 601(6).

⁷⁵ 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.”

⁷⁶ 15 U.S.C. § 632.

⁷⁷ See 5 U.S.C. § 601(3)-(6).

⁷⁸ 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.pdfhttps://www.sba.gov/sites/default/files/advocacy/SB-FAQ-2016_WEB.pdf (June 2016)

⁷⁹ See SBA, Office of Advocacy, “Frequently Asked Questions, Question 2- How many small businesses are there in the U.S.?” https://www.sba.gov/sites/default/files/advocacy/SB-FAQ-2016_WEB.pdfhttps://www.sba.gov/sites/default/files/advocacy/SB-FAQ-2016_WEB.pdf (June 2016).

⁸⁰ 5 U.S.C. § 601(4).

⁸¹ 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

14. 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.”⁸² U.S. Census Bureau data from the 2012 Census of Governments⁸³ indicate that there were 90,056 local governmental jurisdictions consisting of general purpose governments and special purpose governments in the United States.⁸⁴ Of this number there were 37,132 General purpose governments (county⁸⁵, municipal and town or township⁸⁶) with populations of less than 50,000 and 12,184 Special purpose governments (independent school districts⁸⁷ and special districts⁸⁸) with populations of less than 50,000. The 2012 U.S. Census Bureau data for most types of governments in the local government category show that the majority of these governments have populations of less than 50,000.⁸⁹ Based on this data we estimate that at least 49,316 local government jurisdictions fall in the category of “small governmental jurisdictions.”⁹⁰

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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://nccs.urban.org/sites/all/nccs-archive/html/tablewiz/tw.php> See <http://nccs.urban.org/sites/all/nccs-archive/html/tablewiz/tw.php> where the report showing this data can be generated by selecting the following data fields: Report: “The Number and Finances of All Registered 501(c) Nonprofits”; Show: “Registered Nonprofits”; By: “Total Revenue Level (years 1995, Aug to 2016, Aug)”; and For: “2016, Aug” then selecting “Show Results”.

⁸² 5 U.S.C. § 601(5).

⁸³ 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.COG#>.

⁸⁴ 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).

⁸⁵ 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.

⁸⁶ 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.

⁸⁷ 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.

⁸⁸ 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.

⁸⁹ 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.

15. *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.⁹¹ The appropriate size standard under SBA rules is that such a business is small if it has 1,500 or fewer employees.⁹² For this industry, U.S. Census Bureau data for 2012 show that there were 967 firms that operated for the entire year.⁹³ Of this total, 955 firms had employment of 999 or fewer employees and 12 had employment of 1,000 employees or more.⁹⁴ Thus under this category and the associated size standard, the Commission estimates that the majority of wireless telecommunications carriers (except satellite) are small entities.

16. *Fixed Microwave Services*. Microwave services include common carrier,⁹⁵ private-operational fixed,⁹⁶ and broadcast auxiliary radio services.⁹⁷ They also include the Upper Microwave Flexible Use Service,⁹⁸ the Millimeter Wave Service,⁹⁹ Local Multipoint Distribution Service (LMDS),¹⁰⁰ the Digital Electronic Message Service (DEMS),¹⁰¹ and the 24 GHz Service,¹⁰² where licensees can choose between common carrier and non-common carrier status.¹⁰³ At present, there are approximately 66,680 common carrier fixed licensees, 69,360 private and public safety operational-fixed licensees, 20,150 broadcast auxiliary radio licensees, 411 LMDS licenses, 33 24 GHz DEMS licenses, 777 39 GHz licenses, and five 24 GHz licensees, and 467 Millimeter Wave licenses in the microwave services.¹⁰⁴ The Commission has not yet defined a small business with respect to microwave services. The closest

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⁹⁰ *Id.*

⁹¹ U.S. Census Bureau, 2012 NAICS Definitions, “517210 Wireless Telecommunications Carriers (Except Satellite),” See <https://factfinder.census.gov/faces/affhelp/jsf/pages/metadata.xhtml?lang=en&type=ib&id=ib.en/ECN.NAICS2012.517210>. NAICS Code 517210.

⁹² 13 CFR § 121.201, NAICS code 517210.

⁹³ U.S. Census Bureau, *2012 Economic Census of the United States*, Table EC1251SSSZ5, Information: Subject Series: Estab and Firm Size: Employment Size of Firms for the U.S.: 2012 NAICS Code 517210 (rel. Jan. 8, 2016). https://factfinder.census.gov/bkmk/table/1.0/en/ECN/2012_US/51SSSZ5//naics~517210.

⁹⁴ *Id.* Available census data does 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.”

⁹⁵ See 47 CFR Part 10, Subpart I.

⁹⁶ Persons eligible under Parts 80 and 90 of the Commission’s rules can use Private-Operational Fixed Microwave services. See 47 CFR Parts 80 and 90. Stations in this service are called operational-fixed to distinguish them from common carrier and public fixed stations. Only the licensee may use the operational-fixed station, and only for communications related to the licensee’s commercial, industrial, or safety operations.

⁹⁷ Auxiliary Microwave Service is governed by Part 74 and Part 78 of Title 47 of the Commission’s rules. Available to licensees of broadcast stations, cable operators, and to broadcast and cable network entities. Auxiliary microwave stations are used for relaying broadcast television signals from the studio to the transmitter, or between two points such as a main studio and an auxiliary studio. The service also includes TV pickup and CARS pickup, which relay signals from a remote location back to the studio.

⁹⁸ See 47 CFR Part 30.

⁹⁹ See 47 CFR Part 101, Subpart Q.

¹⁰⁰ See 47 CFR Part 101, Subpart L.

¹⁰¹ See 47 CFR Part 101, Subpart G.

¹⁰² See *id.*

¹⁰³ See 47 CFR §§ 30.6, 101.1017.

¹⁰⁴ These statistics are based on a review of the Universal Licensing System on September 22, 2015.

applicable SBA category is Wireless Telecommunications Carriers (except Satellite) and the appropriate size standard for this category under SBA rules is that such a business is small if it has 1,500 or fewer employees.¹⁰⁵ For this industry, U.S. Census Bureau data for 2012 shows that there were 967 firms that operated for the entire year.¹⁰⁶ Of this total, 955 had employment of 999 or fewer, and 12 firms had employment of 1,000 employees or more.¹⁰⁷ Thus under this SBA category and the associated standard, the Commission estimates that the majority of fixed microwave service licensees can be considered small.

17. The Commission does not have data specifying the number of these licensees that have more than 1,500 employees, and thus is unable at this time to estimate with greater precision the number of fixed microwave service licensees that would qualify as small business concerns under the SBA's small business size standard. Consequently, the Commission estimates that there are up to 36,708 common carrier fixed licensees and up to 59,291 private operational-fixed licensees and broadcast auxiliary radio licensees in the microwave services that may be small and may be affected by the rules and policies proposed herein. We note, however, that both the common carrier microwave fixed and the private operational microwave fixed licensee categories includes some large entities.

18. *All Other Telecommunications.* The "All Other Telecommunications" category is comprised of establishments primarily engaged in providing specialized telecommunications services, such as satellite tracking, communications telemetry, and radar station operation.¹⁰⁸ 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.¹⁰⁹ Establishments providing Internet services or voice over Internet protocol (VoIP) services via client-supplied telecommunications connections are also included in this industry.¹¹⁰ 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.¹¹¹ For this category, U.S. Census Bureau data for 2012 shows that there were a total of 1,442 firms that operated for the entire year.¹¹² Of these firms, a total of 1400 firms had gross annual receipts of under \$25 million and 42 firms had gross annual receipts of \$25 million to \$49,999,999.¹¹³ Thus, the Commission estimates that a majority of "All Other Telecommunications" firms potentially affected by our actions can be considered small.

19. *Radio and Television Broadcasting and Wireless Communications Equipment Manufacturing.* This industry comprises establishments primarily engaged in manufacturing radio and

¹⁰⁵ 13 CFR § 121.201, NAICS code 517210.

¹⁰⁶ U.S. Census Bureau, *2012 Economic Census of the United States*, Table EC1251SSSZ5, Information: Subject Series, "Estab and Firm Size: Employment Size of Firms for the U.S.: 2012 NAICS Code 517210" (rel. Jan. 8, 2016). https://factfinder.census.gov/bkmk/table/1.0/en/ECN/2012_US/51SSSZ5//naics~517210.

¹⁰⁷ *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."

¹⁰⁸ 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#>.

¹⁰⁹ *Id.*

¹¹⁰ *Id.*

¹¹¹ 13 CFR § 121.201, NAICS Code 517919.

¹¹² 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.

¹¹³ *Id.*

television broadcast and wireless communications equipment.¹¹⁴ 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.”¹¹⁵ The SBA has established a size standard for this industry of 1,250 employees or less.¹¹⁶ U.S. Census Bureau data for 2012 shows that 841 establishments operated in this industry in that year.¹¹⁷ 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.¹¹⁸ Based on this data, we conclude that a majority of manufacturers in this industry is small.

D. Description of Projected Reporting, Recordkeeping, and other Compliance Requirements

20. We expect the rules and procedures proposed in the *Fourth Further Notice of Proposed Rulemaking* will impose new or additional reporting or recordkeeping and/or other compliance obligations on small entities as well as other licensees with licenses in the 39 GHz band issued prior to the auction of new licenses proposed in the *Fourth Further Notice of Proposed Rulemaking*. The proposed rules and procedures would require parties with licenses in the 39 GHz band issued prior to the auction of new licenses proposed in the *Fourth Further Notice of Proposed Rulemaking* to provide certain information following the auction of the new licenses. Depending upon the licensee’s individual circumstances, the information required may include directions regarding the cancellation of pre-existing licenses, directions regarding a choice between satisfying winning bids for new licenses and receiving incentive payments, and directions regarding how any incentive payments are to be made.

21. The projected reporting, recordkeeping, and other compliance requirements resulting from this proceeding would apply to all such licensees in the same manner. The Commission believes that applying the same rules equally to all entities in this context would promote fairness. We note that eight of the existing fourteen such licensees may be considered small entities. The Commission does not believe that the costs and/or administrative burdens associated with the rules would unduly burden small entities. Moreover, the proposed reverse auction would benefit any affected small entities by providing an opportunity to receive an incentive payment in exchange for spectrum usage rights.

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

22. The RFA requires an agency to describe any significant alternatives for small businesses 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 such small entities; (3) the use of performance rather than design standards; and (4) an exemption from coverage of

¹¹⁴ 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#>.

¹¹⁵ *See* U.S. Census Bureau, 2012 NAICS Definitions, NAICS Code 334220, available at <https://factfinder.census.gov/faces/affhelp/jsf/pages/metadata.xhtml?lang=en&type=ib&id=ib.en./ECN.NAICS2012.334220#>.

¹¹⁶ 13 CFR § 121.201, NAICS Code 334220.

¹¹⁷ 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.

¹¹⁸ *Id.*

the rule, or any part thereof, for such small entities.¹¹⁹

23. The Commission does not believe that its proposed changes will have a significant economic impact on small entities. We believe that modifying the band plan from 200 megahertz to 100 megahertz channels in the 39 GHz, Upper 37 GHz, and 47 GHz bands will help small entities by making spectrum available in smaller license sizes that may be more attractive to small entities. We also believe the proposed mechanism for auctioning the 39 GHz and Upper 37 GHz bands would facilitate access to spectrum by small businesses and a wide variety of other entities, while preserving incumbent licensees' spectrum rights. However, to get a better understanding of costs and any burdens, we seek comment on whether any of the burdens associated with the proposed rules and policies can be minimized for small businesses. The Commission expects to more fully consider the economic impact and alternatives for small entities following the review of comments filed in response to the *Fourth Further Notice of Proposed Rulemaking*.

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

24. None

¹¹⁹ 5 U.S.C. § 603(c)(1)-(4).

**STATEMENT OF
CHAIRMAN AJIT PAI**

Re: *Use of Spectrum Bands Above 24 GHz For Mobile Radio Services*, GN Docket No. 14-177

As part of our strategy to extend U.S. leadership in 5G, we intend to hold a single auction of the upper 37 GHz, 39 GHz, and 47 GHz spectrum bands in the second half of 2019. This auction will make available 3.4 gigahertz of millimeter-wave spectrum for the commercial marketplace, including 2.4 gigahertz of contiguous spectrum.

But not all of this spectrum is ready to be auctioned. In particular, there are too many incumbent interests in the 39 GHz band, and efforts to resolve these encumbrances voluntarily haven't solved the problem. This calls us to act.

And act we will. Specifically, we propose today to hold an incentive auction to resolve the encumbrances in the 39 GHz band. Incumbent 39 GHz licensees will be able to sell their old licenses and receive vouchers that they can use to purchase new licenses in the upper 37 GHz, 39 GHz, and 47 GHz band auction. This market mechanism will eliminate encumbrances while maximizing bidding options for incumbents and new entrants alike. Moreover, we propose to reconfigure the band plan for the upper 37 GHz and 39 GHz bands from 200 MHz blocks to 100 MHz blocks, which will make it easier for us to hold a simultaneous auction of upper 37 GHz, 39 GHz, and 47 GHz spectrum. This elegant solution may seem as novel as the bands to which it's applied, but it has a distinguished pedigree, dating back to the famous 1959 paper in which Ronald Coase proposed that the FCC allocate spectrum through competitive bidding.

Many thanks to the staff who have contributed to this much-needed item. From the Wireless Telecommunications Bureau: Simon Banyai, Steve Buenzow, Jonathan Campbell, Rita Cookmeyer, Eliot Maenner, Erik Salovaara, John Schauble, Catherine Schroeder, Blaise Scinto, Martha Stancill, Joel Taubenblatt, Jennifer Tomchin, and Margaret Wiener; from the Office of General Counsel: David Horowitz, Doug Klein, Bill Richardson, and Max Staloff; and from the Office of Strategic Planning & Policy Analysis: Evan Kwerel and Paul LaFontaine.

**STATEMENT OF
COMMISSIONER MICHAEL O'RIELLY**

Re: *Use of Spectrum Bands Above 24 GHz For Mobile Radio Services*, GN Docket No. 14-177

When conversations started about expanding use of the millimeter waves for next generation wireless technologies, related industry expressed the greatest interest in three bands: 28, 37, and 39 GHz. Therefore, I was disappointed when the initial announcement was made that the first millimeter wave auctions – starting this November – would not include the much sought after 37 and 39 GHz bands. While I would have preferred this auction to happen sooner, I am pleased with the Chairman's announcement that the 37, 39, and 47 GHz bands will be auctioned in the second half of 2019. This should provide potential bidders the opportunity to plan ahead for this auction.

Today's Notice of Proposed Rulemaking (NPRM) makes some rule tweaks to harmonize licensing across these three bands, but the majority of the item will facilitate discussion about the best means to rationalize – or reduce encumbrances in – the 39 GHz band. The NPRM proposes a mechanism using an incentive auction, vouchers, and a repacking process to enable the greatest amount of clean, contiguous spectrum to be auctioned for 5G networks. Of course, if it were only as easy as it sounds.

Some of the possible voucher and repacking concepts are novel, complex, or just a tad confusing. To analogize, this effort is a little like trying to trade Monopoly properties. Here, it is not only trading with your co-players, but also with the bank. And, to make things even more complicated, an entity may currently hold only a portion of some of these properties, because current licensees do not hold their licenses in 100 MHz blocks, as proposed in this item, in Partial Economic Area market sizes. So, if an entity tries to trade 25 percent interest in St. James Place, half of New York Avenue, and 75 percent of Illinois Avenue, does that equate to all of Boardwalk? While this is very simplified, these are the types of questions that confront the Commission. Obviously, we still have a lot of work to do to solidify all of the necessary details.

As we figure out the specifics, we must ensure that incumbents are made whole, the maximum amount of contiguous spectrum is available for auction, and the process is as simple as possible so that we can finish this review, obtain any required software, and take the necessary pre-auction steps in time to meet the 2019 timeline.

I approve of this item and look forward to discussing these issues with interested parties in the coming months.

**STATEMENT OF
COMMISSIONER BRENDAN CARR**

Re: *Use of Spectrum Bands Above 24 GHz For Mobile Radio Services*, GN Docket No. 14-177

Millimeter wave spectrum can give our country a boost towards winning the race to 5G. Particularly when it's allocated in wide channels, this spectrum is well-suited to the high throughput and low latency that are the hallmarks of next-gen networks. Taken together, two of the millimeter wave bands that are the focus of this item offer 2,400 MHz of spectrum. In one (the 37 GHz band), there is no commercial wireless, and in the other (the 39 GHz band) the Commission has about one third of the spectrum sitting unused in our inventory.

So, what's holding us up? The short answer is that the 39 GHz band is messy. It's fragmented in terms of geography and frequency. And that's due to its history. In the 1990s, companies sought licenses in the band for what was known as wireless local loop service. The wireless companies defined their own license geographies using Rectangular Service Areas, or RSAs.

By the late 1990s, the wireless local loop business wasn't panning out, and so the Commission announced an auction to encourage more intensive use of the band. But this only added more complications. To start, the FCC auctioned 50 MHz pairs of non-contiguous spectrum. It then licensed this spectrum over large Economic Areas, or EAs, on the condition that winning bidders would protect the existing RSA licenses that were nested inside the EAs. And so it remains today, with 50 MHz pairs scattered across the band and a Swiss cheese map of overlapping geographies—including more than 700 licenses that are partially encumbered.

Through this Notice, we take steps to clean up the mess to reflect changes in technology. We propose to do so by clearing and auctioning the spectrum, modeled on our broadcast incentive auction. We start by giving incumbents vouchers equal in value to their existing licenses. If bidding drives up the price of spectrum, incumbents can take the opportunity to sell. Incumbents that choose not to sell will be guaranteed contiguous spectrum in the band. This process will maximize the number of 100 MHz channels in the band, return revenue to the Treasury, and help the United States win the race to 5G.

I want to thank the Wireless Bureau for its work on the Notice. It has my support.

**STATEMENT OF
COMMISSIONER JESSICA ROSENWORCEL**

Re: *Use of Spectrum Bands Above 24 GHz For Mobile Radio Services*, GN Docket No. 14-177

Oklahoma City, Atlanta, and Raleigh are just a few of the cities that will see the start of 5G wireless this year—powered by the 39 GHz spectrum that is the subject of this rulemaking.

But before we can realize the full potential of these airwaves, we have some cleaning up to do. To ensure big swaths of this spectrum are available for auction in the not-too-distant future, we need a framework to address existing encumbrances. Accordingly, today's rulemaking proposes an incentive auction in which incumbents would receive vouchers in exchange for current licenses. This approach is critical, because holding an auction with the existing fragmented band would result in higher costs and deployment delays.

I appreciate that here my colleagues have agreed to auction the revamped 39 GHz band along with spectrum in the 37 and 47 GHz bands. This is the right way to go. Going forward, we should put a premium on auctioning 5G bands together, instead of offering them one-by-one.

I also appreciate that the Chairman has agreed to my request to permit incumbents in the 39 GHz band to use their vouchers to acquire new spectrum rights in any of the millimeter wave bands we will auction here. By granting bidders greater flexibility, we can generate more interest in the auction and allow bidders the ability to assess which bands work best for them. In other words, a more thoughtful auction will result.

This rulemaking has my full support.