

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 REPORT AND ORDER

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By the Commission: Chairman Pai and Commissioners O’Rielly, Carr, and Rosenworcel issuing separate statements.

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I. INTRODUCTION

1. Today, we take significant steps to make spectrum available for fifth-generation (5G) wireless, Internet of Things, and other advanced services in the Upper 37 GHz (37.6 - 38.6 GHz), 39 GHz (38.6 - 40 GHz), and 47 GHz (47.2 - 48.2 GHz) bands. We establish an incentive auction that promotes the flexible-use wireless service rules that the Commission has adopted for these bands. Under the incentive auction approach and consistent with our statutory authority to conduct incentive auctions, an incumbent 39 GHz licensee may choose to relinquish the spectrum usage rights provided by its existing

licenses in exchange for a share of the proceeds from the auction of new licenses. Alternatively, the incumbent may choose to receive modified licenses after the auction that are consistent with the new band plan and service rules and equivalent to its existing authorizations to operate in the 39 GHz band. Ultimately, the incentive auction approach that we adopt today will enhance the opportunity for incumbents and new licensees in the Upper 37 GHz and 39 GHz bands to provide valuable next-generation services.

2. Our decisions today, along with specific procedures to be adopted in the forthcoming Auction Comment and Auction Procedures Public Notices, will enable the Commission to move forward with an auction of the Upper 37 GHz, 39 GHz, and 47 GHz bands by the end of 2019. In combination, the Upper 37 GHz and the 39 GHz bands offer the largest amount of contiguous spectrum in the millimeter wave bands for flexible-use wireless services—a total of 2,400 megahertz—and the 47 GHz band will provide an additional 1,000 megahertz of millimeter wave spectrum for such services. Together with the pending auctions of licenses in the 28 GHz (27.5 - 28.35 GHz) and 24 GHz (24.25 - 24.45 GHz, 24.75 - 25.25 GHz) bands, we are making substantial progress in assigning high-band spectrum for innovative services, and we will continue to work towards assigning additional spectrum in the mid-band range for the benefit of American consumers.

II. BACKGROUND

3. In 2016, the Commission adopted Upper Microwave Flexible Use Service (UMFUS) rules for the 28 GHz, Upper 37 GHz, and 39 GHz bands, to make available millimeter wave spectrum for 5G.¹ In 2017, the Commission expanded the UMFUS rules to cover the 24 GHz and 47 GHz bands.² In addition to the licensed use opportunities in these bands, the Commission made the Lower 37 GHz (37 - 37.6 GHz) band available for non-Federal users through a coordination mechanism with Federal users, which we will develop more fully with government and industry collaboration.³ Earlier this year, we sought further comment on a proposed coordination mechanism and alternatives.⁴ We recognize the importance of the Lower 37 GHz band and commit to working with the National Telecommunications and Information Administration and other federal agencies to develop a sharing approach in 2019.

4. Existing licenses in the 39 GHz band consist of unpaired 50 megahertz blocks licensed by Partial Economic Area (PEA)⁵ or by Rectangular Service Area (RSA), which can cross PEA boundaries or be enveloped by them.⁶ Commission records show 11 unique incumbent licensees hold about 5,880

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 (2016) (*Spectrum Frontiers R&O*).

² 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 10,988 (2017) (*Spectrum Frontiers 2nd R&O*).

³ *Spectrum Frontiers R&O*, 31 FCC Rcd at 8056-8062, paras. 101-124 (adopting service rules for the 37 GHz band), and at 8067-8071, paras. 138-151 (concluding that Federal and non-Federal users can share access to the 37 GHz band).

⁴ *Use of Spectrum Bands Above 24 GHz For Mobile Radio Services, et al.*, Third Report and Order, Memorandum Opinion and Order, and Third Further Notice of Proposed Rulemaking, 33 FCC Rcd 5576, 5600-05, paras. 58-74 (2018) (*Spectrum Frontiers 3rd FNPRM*).

⁵ 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*, Public Notice, GN Docket No. 14-177, DA 18-550 (WTB, rel. May 25, 2018).

⁶ *Spectrum Frontiers R&O*, 31 FCC Rcd at 8043-44, para. 74.

active licenses in the 39 GHz band (5,590 PEA licenses and 290 RSA licenses).⁷ Measured in terms of “MHz-pops”—the product of spectrum bandwidth and covered population, only approximately one-third of the 39 GHz band is held in Commission inventory and is not authorized for use by any existing license.⁸ Currently, a number of licenses do not fit geographically 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 due to an overlapping RSA license, i.e., PEA licenses that overlap geographically with pre-existing RSA licenses whose frequency assignment they must protect.⁹ The Upper 37 GHz and 47 GHz bands currently have no commercial terrestrial wireless incumbent licensees.

5. The Commission has recognized that, with respect to the 39 GHz band, “[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.”¹⁰ To address this issue, the 2016 *Spectrum Frontiers R&O* adopted a voluntary rebanding framework to allow incumbent licenses to be reconfigured to the new band plan and service areas in an effort to clear the band of encumbrances and enable licensees to aggregate licenses for contiguous frequencies.¹¹ In June 2018, the Wireless Telecommunications Bureau (Bureau) issued a Public Notice announcing that it was accepting license modification applications pursuant to this voluntary rebanding process.¹² Since that time, however, no applications to authorize such swaps have been received. Moreover, conforming existing licenses to the new band plan and service areas may be infeasible for incumbent licensees with only one pair of 50 megahertz licenses in a particular area, one 50 megahertz block in a particular area, or an RSA license.¹³

6. Earlier this year, in the *4th FNPRM*, we proposed an incentive auction that potentially could clear all existing 39 GHz licenses.¹⁴ In addition, we proposed a “voucher exchange” that would allow incumbents to modify existing spectrum usage rights, without increasing them in aggregate. We indicated that this framework would make it easier for incumbents with partial license holdings to retain existing spectrum usage rights without additional license payments.¹⁵ Further, we proposed provisions for a mandatory reconfiguration of incumbents’ existing spectrum usage rights, which an incumbent may choose to accept instead of participating in the voluntary incentive auction.¹⁶

⁷ *Use of Spectrum Bands Above 24 GHz For Mobile Radio Services*, GN Docket No. 14-177, Fourth Further Notice of Proposed Rulemaking, FCC 18-110, at para. 4 (Aug. 2, 2018) (*4th FNPRM*). For additional details on existing 39 GHz licenses, see *id.* at paras. 3-7.

⁸ *4th FNPRM* at para. 4.

⁹ 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*).

¹⁰ *Spectrum Frontiers R&O*, 31 FCC Rcd at 8053-54, para. 97; *4th FNPRM* at para. 5.

¹¹ *Spectrum Frontiers R&O*, 31 FCC Rcd at 8053-56, paras. 97-100.

¹² *Voluntary Rebanding PN* at 1.

¹³ See *4th FNPRM* at para. 5 (noting that about 20 RSA licenses were originally authorized for only a single 50 megahertz block).

¹⁴ *4th FNPRM* at paras. 14-30, 44-52.

¹⁵ *4th FNPRM* at paras. 31-37.

¹⁶ *4th FNPRM* at paras. 38-47.

III. DISCUSSION

A. The Need for an Incentive Auction

7. We will conduct an incentive auction that can clear existing 39 GHz licenses and offer new spectrum licenses in the Upper 37 GHz, 39 GHz, and 47 GHz bands. The incentive auction process that we adopt today will resolve the persistent difficulties presented by the need for existing 39 GHz licenses to be transitioned efficiently to the new band plan and possibly to new service areas. Absent this process, existing 39 GHz licenses break up blocks of spectrum and fragment frequencies across the 39 GHz band, creating barriers to the deployment of next-generation services in the band. The incentive auction will solve this challenge by offering incumbent licensees the opportunity to participate in the auction to relinquish their existing licensed spectrum usage rights in exchange for a payment determined by the auction and/or to replace existing licenses with new licenses for whole blocks that will be assigned contiguous frequencies within license areas. Further, for each incumbent that does not wish to participate in the auction, we will provide the incumbent with modified licenses for contiguous 100 megahertz blocks covering full PEAs (with possibly up to one partial PEA), leaving these incumbents better able to provide next-generation services. Providing these opportunities is necessary to resolve the difficulties presented by the existing encumbered and unpaired licenses and to clear the way for assignment of a significant number of new licenses for whole blocks with contiguous frequencies within PEAs. The incentive auction thereby substantially furthers the public interest in making available spectrum for the provision of next-generation services.

8. Our action today implements our proposal in the *4th FNPRM* for an incentive auction that potentially could clear all existing 39 GHz licenses, assign new licenses under a band plan providing 100 megahertz blocks by PEA, and provide modified 100 megahertz licenses to any incumbents that choose not to participate in the auction.¹⁷ Commenters respond favorably to the proposed incentive auction to resolve the difficulties presented by existing 39 GHz licenses.¹⁸ Consistent with the overall support, commenters also offer suggestions about specific details or request clarifications on particular points.¹⁹

9. We affirm our conclusion that we have authority under the Communications Act to modify existing licenses in a manner that will allow for a more efficient auction and to conduct the proposed incentive auction for these bands.²⁰ Commenters agree that the proposed auction is “well within [the Commission’s incentive auction] authority.”²¹ The statute authorizes the Commission to use an

¹⁷ See *4th FNPRM* at paras. 16-30. Changes to every existing license held by 39 GHz incumbent licensees are a prerequisite to these proposals. Pursuant to these proposals, each existing license will be changed as a result of relinquishment by the licensee or modification by the Commission.

¹⁸ *E.g.*, Competitive Carriers Association Comments at 1-2 (CCA) (“CCA supports the Commission’s plan for an incentive auction to allow access to valuable spectrum resources while properly reassigning incumbent 39 GHz license holders.”) References to Comments and Reply Comments are to responses to the *4th FNPRM*, unless otherwise noted. As AT&T observes in its reply comments, the “majority of commenters[] strongly supported the Commission’s proposal to use an incentive auction to limit the impact of 39 GHz encumbrances and maximize the potential public benefits of the band.” AT&T Services, Inc. Reply Comments at 1 (AT&T) (citing CCA Comments, Ericsson Comments, PVT Networks, Inc. Comments (PVT), T-Mobile USA, Inc. Comments (T-Mobile), Telecommunications Industry Association Comments (TIA), Verizon Comments). With respect to the 39 GHz band in particular, Verizon characterizes the Commission’s *4th FNPRM* proposal as “a fair and reasonable means to reduce encumbrances and reconfigure existing holdings into contiguous spectrum blocks.” Verizon Comments at 3-4.

¹⁹ See, *e.g.*, T-Mobile Comments at 2 (the *4th FNPRM* “will, with modest modifications and clarifications, facilitate the most efficient licensing and use of the subject spectrum bands and should be promptly adopted”), Verizon Comments at 2-3 (listing “a few modifications and clarifications” and “modest changes”).

²⁰ See *4th FNPRM*, paras. 44-52, 47 U.S.C. §§ 309(j)(8)(G), 316.

²¹ T-Mobile Comments at 17. One incumbent notes that incumbents should not be “forced” to participate in the incentive auction. PVT Comments at 5. As noted below, the voluntary incentive auction we implement will not

incentive auction to encourage licensees to relinquish their holdings voluntarily provided that at least two bidders compete to relinquish spectrum usage rights. The incentive auction, both as proposed in the *4th FNPRM* and adopted today, is voluntary.²² Furthermore, the clock phase of the incentive auction format we plan to use serves as both a reverse auction that will determine the amount of incentive payments as well as a forward auction to assign new flexible use licenses.²³ As such, we will conduct the auction only if there are two competing incumbent participants. As we concluded in the *4th FNPRM*, and no commenter disputes, as long as more than one incumbent licensee commits to relinquish its spectrum usage rights, there will be two licensees competing in the reverse auction portion of the incentive auction.²⁴

10. We also decide today the defining characteristics of the incentive auction and the related license modification process that will enable deployment of licenses for next-generation services in these bands. Because the clock phase of the incentive auction we adopt serves as both the reverse and forward auctions, the incentive amounts offered to relinquish existing licenses will be based on the final clock phase prices in each PEA. As a result, incumbents will have the opportunity to replace at no additional cost all existing spectrum usage rights equivalent to a full 100 megahertz block with new licenses that are offered in the auction and provide equivalent rights. Further, we conclude that it is necessary that incumbents that choose not to participate in the incentive auction will have their licenses modified based on a reconfiguration of their existing spectrum usage rights that is more consistent with the current band plan. As in the prior broadcast television spectrum incentive auction, and in all Commission auctions, we will develop and detail all the procedures necessary to implement our decisions in a pre-auction process framed by an Auction Comment Public Notice and Auction Procedures Public Notice.²⁵

B. Band Plan

11. In the *4th FNPRM*, we proposed to modify the 39 GHz band plan from seven 200 megahertz channels to fourteen 100 megahertz channels, in order to facilitate the repacking of incumbents without compromising the band's potential for supporting 5G services.²⁶ We also proposed to modify the band plan in the Upper 37 GHz band and the UMFUS portion of the 47 GHz band from 200 megahertz to 100 megahertz channels.²⁷ Maintaining the same channel width across these bands would avoid creating complexities for bidders should the Commission auction these bands together, and would allow the contiguous Upper 37 GHz and 39 GHz bands to function effectively as one 2,400 megahertz band of spectrum.²⁸

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force any incumbents or other parties to participate, and our process for quantifying incumbents' holdings addresses PVT's underlying *de minimis* encumbrance concern.

²² See 47 U.S.C. § 309(j)(8)(G).

²³ See 47 U.S.C. § 309(j)(8)(G)(i).

²⁴ See *4th FNPRM* at para. 50.

²⁵ In this Order, we address suggestions and requests raised in response to the *4th FNPRM* that are relevant to our decisions today. We leave for later discussion details that are more appropriately addressed later in the pre-auction process, such as opening bids. See Verizon Comments at 9-10 ("FCC Should Set Low Minimum Opening Bids"). We commit to moving forward expeditiously at the Commission level with public notices seeking comment and adopting detailed procedures to implement the incentive auction, i.e., the "pre-auction process."

²⁶ See *4th FNPRM* at paras. 9-10.

²⁷ See *4th FNPRM* at para. 12.

²⁸ See *4th FNPRM* at paras. 11-12.

12. We adopt our proposal, which is supported by nearly all commenters,²⁹ to modify the band plans of the Upper 37 GHz, 39 GHz, and 47 GHz bands from 200 megahertz channels to 100 megahertz channels. The Upper 37 GHz band and the 47 GHz band will now consist of ten 100 megahertz channels each, and the 39 GHz band will consist of fourteen channels. Modifying the band plan to 100 megahertz blocks offers multiple benefits for these bands, including facilitation of the repacking of incumbents,³⁰ consistency with emerging industry and international standards,³¹ and the potential for uniform channel sizes across multiple millimeter wave bands to facilitate secondary market transactions³² and the standardization of equipment.³³ Further, as noted by commenters, there are potential positive auction effects that would result from standardizing the channel width across the Upper 37 GHz, 39 GHz, and 47 GHz bands, which will be auctioned together.³⁴ Further, we agree with the commenters that suggest that adopting a uniform channel size for as many millimeter wave bands as possible will promote more efficient use of the spectrum.³⁵

13. This new band plan, which is heavily supported by the record, will facilitate the rationalization of existing licenses in the 39 GHz band and enable greater flexibility for licensees while remaining consistent with emerging standards for 5G.³⁶ Only one commenter, TIA, opposes the proposed change to 100 megahertz channels. TIA argues that wider channels will better support 5G services and that the previously-adopted 200 megahertz channels are sufficient to ensure adequate opportunities for participation by new entrants, due to the large number of channels available. It also offers an alternative to the 4th FNPRM's proposal concerning the size of channels.³⁷ While we agree with TIA that access to wide swathes of spectrum is an important goal in support of 5G and other bandwidth-intensive services, as other commenters note, licensees would still be able to achieve greater bandwidth through aggregation, particularly if the Commission facilitates aggregation of contiguous spectrum blocks in its auction design.³⁸

14. For the 39 GHz band in particular, using 100 megahertz channels will simplify the rationalization process for incumbents and reduce the number of existing licenses that are less than a whole channel block under the new licensing scheme, given that incumbents generally hold non-contiguous paired 50 megahertz blocks (100 megahertz), as opposed to the original band plan consisting

²⁹ See AT&T Comments at 2, CCA Comments at 3, Ericsson Comments at 4, PVT Comments at 1-3, Samsung Electronics America Comments at 10 (Samsung), T-Mobile Comments at 2-4, Verizon Comments at 4-5.

³⁰ AT&T Comments at 2, CCA Comments at 3-4, Ericsson Comments at 4, PVT Comments at 3, T-Mobile Comments at 2-3.

³¹ CCA Comments at 3, Ericsson Comments at 5, PVT Comments at 3, T-Mobile Comments at 4.

³² T-Mobile Comments at 4.

³³ Ericsson Comments at 4.

³⁴ AT&T Comments at 3 n.4, CCA Comments at 4, T-Mobile Comments at 3-4. We note that consistent block sizes across all licenses available will simplify application of eligibility and activity rules in the auction and will facilitate bidders' ability to address substitutability and complementarities among licenses.

³⁵ AT&T Comments at 2-3, CCA Comments at 3, Ericsson Comments at 4.

³⁶ 100 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 Oct. 24, 2018).

³⁷ TIA Comments at 5-6. Specifically, TIA proposes either retaining the 200 megahertz channels across the 39 GHz and Upper 37 GHz bands, or creating either two or four 100 megahertz channels at the upper edge of the 39 GHz band to facilitate repacking and retaining 200 megahertz channels across the remainder of the band. TIA Comments at 8. For the 47 GHz band, TIA proposes establishing even wider channels, including at least one 400 megahertz block. TIA Comments at 9.

³⁸ AT&T Comments at 2, Ericsson Comments at 5, PVT Comments at 3, Samsung Comments at 10, T-Mobile Comments at 3, Verizon Comments at 5.

of 200 megahertz channels.³⁹ Further, adopting a band plan using 100 megahertz building blocks does not prevent licensees that prefer channels wider than 100 megahertz from bidding on multiple blocks and aggregating spectrum to achieve that goal. The 100 megahertz channels we adopt in this Order will not impede carrier aggregation to achieve greater bandwidths, but merely provide additional flexibility, both for licensees for whom 100 megahertz is sufficient and for incumbents who currently hold licenses in multiples of 100 megahertz. We are mindful of the need for multiple 100 megahertz blocks assigned to the same carrier to be contiguous and we consider this factor in our auction design.

C. Preparing for an Incentive Auction

1. Modifying 39 GHz Licenses Based on Reconfigured Spectrum Usage Rights

15. As we noted in the *4th FNPRM*, the Commission has 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.”⁴⁰ No commenters dispute our authority generally or with respect to any aspect of modifications proposed in the *4th FNPRM*.

16. Prior to the incentive auction, each incumbent will be offered a reconfiguration of its existing spectrum usage rights that will conform more closely with the new band plan and service areas. Given that some incumbent licenses may cover geographic areas that do not match the PEA service areas established for the 39 GHz band, the reconfiguration may need to combine an incumbent’s spectrum rights in multiple license areas to create full spectrum blocks where possible, retaining at most one partial PEA block.⁴¹ Where such changes are unavoidable, the reconfiguration will maintain the overall value of spectrum usage rights by quantifying those rights by weighted MHz-Pops, as measured pursuant to the procedures established by this Order.

17. In addition, each incumbent will be given an option to choose an alternate reconfiguration, subject to certain constraints, in order to more closely align the reconfiguration with the incumbent’s interests, such as current operations. These modifications should leave each incumbent licensee better able to offer advanced services by providing contiguous frequencies within each PEA, while leaving the value of the incumbent’s spectrum usage rights unchanged as measured in weighted MHz-Pops.⁴² Each incumbent will decide whether to accept the modifications (which will take effect after the close of the auction), either as proposed by the Commission or an acceptable alternate, or to participate in the incentive auction to relinquish their existing spectrum usage rights in exchange for a share of the auction proceeds. We direct the Wireless Telecommunications Bureau to provide each incumbent with a proposed modification implementing our decisions today and to do so well in advance of the application window for the auction.

18. AT&T and Verizon both ask that the Commission clarify that all existing licenses are

³⁹ AT&T Reply Comments at 2, T-Mobile Reply Comments at 3-4, Verizon Reply Comments at 3.

⁴⁰ 47 U.S.C. § 316; *see 4th FNPRM* at para. 38.

⁴¹ A “partial PEA block” refers to a 100 megahertz channel block that covers a smaller population than the entire population in that PEA, or to an incumbent’s voucher in a PEA for purposes of the auction that is less than the weighted MHz-Pops for the full PEA.

⁴² Existing licensees that choose to accept modified licenses remain subject to FCC Rule 30.104(f), which states that existing 39 GHz licensees are required to make a buildout showing by June 1, 2024. *See* 47 CFR 30.104(f). If a licensee with a modified license is unable to make that showing by the deadline because of an expansion in the boundaries of its service area pursuant to these license modifications, that licensee may request relief from the rule, which we will consider given the specific facts and circumstances of each licensee. We remind licensees that the FCC will grant waiver requests only if the petitioner can demonstrate special circumstances that warrant a deviation from the general rule and that such a deviation will serve the public interest. *Northeast Cellular Co. v. FCC*, 897 F.2d 1164, 1166 (D.C. Cir. 1990); *WAIT Radio v. FCC*, 459 F.2d 1203 (D.C. Cir. 1972). *See also* 47 C.F.R. § 1.925; Wireless Telecommunications Bureau Reminds Licensees of Construction Obligations, 32 FCC Rcd 4802 (WTB 2017).

subject to modification, regardless of whether or not an incumbent participates in the incentive auction.⁴³ All existing licenses are subject to change, regardless of the licensee's participation in the incentive auction, in order to implement the Commission's transition to a new band plan and service rules for the 39 GHz band.⁴⁴ Though affected by an incumbent's decision whether to participate in the incentive auction, the exact form each license will take by the end of the incentive auction will be determined by the process discussed herein. Such modifications will include both frequency reassignments and, in many cases, geographical reassignments.

19. *Quantifying Existing Spectrum Usage Rights with Weighted MHz-Pops.* As a preliminary matter, an incumbent's total licensed spectrum usage rights in each PEA will be measured by adding up the MHz-Pops (bandwidth times covered population) for each of an incumbent's licenses in each PEA.⁴⁵ To compare MHz-Pops across PEAs, the MHz-Pops in each PEA will be weighted using an index calculated using the relative prices for spectrum licenses in each PEA in other auctions. We proposed a weighting process in the *4th FNPRM*.⁴⁶ While not opposing weighting, commenters disagreed on the best data to use to set the relative weights. T-Mobile advocates using price data in imminent auctions of licenses for millimeter wave spectrum, in particular the auction of 24 GHz spectrum licenses.⁴⁷ Verizon objects that any data from that auction may be too particular and uncertain to rely upon here, and instead it suggests using price data from Auction 1002, the auction for 600 MHz licenses.⁴⁸ AT&T notes the difficulty of arriving at "correct" weights but does not suggest looking toward any auction in particular.⁴⁹

20. Data currently available for determining the weights for this incentive auction all pertain to licenses for flexible use in spectrum below 3 GHz. For instance, when preparing for the incentive auction of broadcast television spectrum, the Commission used price data from prior auctions to estimate relative price differences across PEAs for the television spectrum in 600 MHz.⁵⁰ The subsequent prices for new 600 MHz licenses in that auction provide further data about relative differences across PEAs. As noted in the *4th FNPRM*, relative spectrum license prices among geographic areas can be substantially more similar across auctions than the spectrum license prices themselves.⁵¹ We note that the Commission's first auction of flexible use licenses for millimeter wave spectrum is currently ongoing and a second will follow after the first closes. Additional data regarding the prices for licenses in those auctions may be helpful, if available. Accordingly, for this incentive auction, we direct the Wireless

⁴³ AT&T Comments at 10, Verizon Comments at 13-14. *See also* Verizon Comments at 13-14 (citing IRS Private Letter Ruling, PLR 201821012 (Feb. 20, 2018), discussing the consequences a broadcaster would face if it did not participate in the broadcast television spectrum incentive auction), AT&T Reply Comments at 3 (citing Verizon Comments at 13-14).

⁴⁴ We note that, ultimately, the Internal Revenue Service can determine the tax consequences resulting from direct license modifications or participation in an incentive auction.

⁴⁵ The incumbent's total spectrum usage rights in a PEA divided by the MHz-pops for a full 100 megahertz block (the bandwidth of a new block) will indicate the equivalent number of blocks (whole and partial) held in the PEA under the new band plan. For RSA licenses, we will consider the portion of the RSA license that falls within each PEA such that an RSA license that crosses a PEA boundary will have the relevant portion of population counted in each PEA.

⁴⁶ *4th FNPRM* at para. 33.

⁴⁷ T-Mobile Comments at 9.

⁴⁸ Verizon Reply Comments at 8.

⁴⁹ *See* AT&T Comments at 6.

⁵⁰ *See Procedures for Competitive Bidding in Auction 1000, Including Initial Clearing Target Determination, Qualifying to Bid, and Bidding in Auctions 1001 (Reverse) and 1002 (Forward)*, Public Notice, 30 FCC Rcd 8975, 8981-82, 9023-24, at paras. 18 (weighting generally), 77 (prior auctions considered) (2015) (*Auction 1000 Bidding Procedures Public Notice*).

⁵¹ *4th FNPRM* at para. 33 n.44.

Telecommunications Bureau to set the weights considering the relative PEA price data prepared for and resulting from the broadcast television spectrum incentive auction, while also taking into account any additional Commission data regarding prices for millimeter wave spectrum licenses to the extent practicable.

21. As supported by commenters,⁵² 2010 Census data will be used to determine the population covered by each license. The two-by-two kilometer cell grid methodology employed to determine population in particular areas in the broadcast incentive auction will be used to calculate the population for licenses for RSAs and for licenses covering a full or partial PEA.⁵³

22. To further our goal of transitioning to the new band plan, separate licenses that are held by entities that control or are controlled by each other and/or have controlling ownership interests in common will be treated as held by one incumbent. For this purpose, we will use the definition of “controlling interest” as an entity with *de jure* or *de facto* control that we use with respect to auction applications, specifically the rule prohibiting an individual or entity from having a controlling interest in more than one application to participate in the auction.⁵⁴ Further, it may be appropriate to freeze assignments of these licenses at a future point.⁵⁵ We direct the Bureau to address whether or when it is necessary to freeze assignments of 39 GHz licenses prior to calculations of aggregate holdings.

23. In response to the 4th FNPRM, PVT Networks, Inc. (PVT) presents concerns regarding potentially significant consequences of *de minimis* encumbrances to its licenses.⁵⁶ PVT holds several licenses, two of which are encumbered to an extremely small extent.⁵⁷ PVT argues that if an RSA encumbrance of a PEA license is so small as to constitute a “flyspeck” or *de minimis* encumbrance (as calculated by percentage of population in a PEA), the encumbered PEA license should be treated as unencumbered.⁵⁸

24. We agree that we should not permit *de minimis* encumbrances, including PVT’s, to present unnecessary challenges to incumbents that seek to preserve spectrum usage rights. Where an incumbent holds a license that covers virtually the entire population in a PEA, we conclude it would be in the public interest to allow the licensee to serve the entire license area rather than considering it an encumbered block. Consistent with Commission precedent that has permitted *de minimis* modifications to licenses that further the public interest, we conclude that incumbent licensees with existing licenses that cover at least 99 percent of the MHz-Pops in a PEA will be considered as having the equivalent of an

⁵² See, e.g., AT&T Comments at 5, T-Mobile Reply Comments at 9 (supporting AT&T).

⁵³ AT&T suggests an approach for determining population using census tract population data. See AT&T Comments at 5-6. In the broadcast television spectrum incentive auction, we used two-by-two kilometer cells that provide more detailed population data than census tracts. See, e.g., *Auction 1000 Bidding Procedures Public Notice*, 30 FCC Rcd at 8988, para. 20, see also *Application Procedures for Broadcast Incentive Auction Scheduled to Begin on March 29, 2016; Technical Formulas for Competitive Bidding*, Public Notice, 30 FCC Rcd 11034, 11099, App. B 2.2 (WTB 2015) (*Auction 1000 Application Procedures Public Notice*). We conclude that we should use the more detailed method used in the prior incentive auction.

⁵⁴ See 47 CFR §§ 1.2105(a)(3) (prohibition of multiple applications) and (a)(4)(i) (definition of “controlling interest”).

⁵⁵ For example, when we finalize the procedures for calculating aggregate holdings, it may be necessary to preclude subsequent assignments that might disaggregate those holdings.

⁵⁶ See PVT Comments.

⁵⁷ PVT Comments at 1-2.

⁵⁸ Specifically, PVT asserts that its “flyspeck encumbrance” of forty-three one thousandths of one percent “would appear to unduly complicate” its ability to preserve its spectrum usage rights without participating in the incentive auction. PVT Comments at 2. Any requirement to participate in the incentive auction only “to preserve existing license rights,” asserts PVT, “is unreasonable.” PVT Comments at 4.

unencumbered whole block prior to the Commission's reconfiguration.⁵⁹

25. *Optimization to Reconfigure Existing Spectrum Usage Rights.* The Commission will propose a reconfiguration of each incumbent's holdings that will reduce the total number of partial PEA block holdings without reducing the incumbent's total weighted MHz-pops across all PEAs, a process we referred to as "mandatory repacking" in the 4th FNPRM.⁶⁰ As suggested in the 4th FNPRM, once the weighted MHz-pops have been calculated for each incumbent's licenses, each incumbent's spectrum holdings will be reconfigured using an optimization procedure to reduce the number of holdings that are equivalent to less than a full 100 megahertz block in a full PEA (i.e., one that covers the entire geographic area of the PEA). We anticipate that the objective of the optimization process will be to minimize the number of weighted MHz-Pops that are left over as unassigned spectrum usage rights ("white space"). This will enable us to offer more contiguous spectrum in the incentive auction. The optimization would ensure that each incumbent's total weighted MHz-pops across all the PEAs in which it has holdings would remain unchanged. In addition, each incumbent would hold at most one partial PEA block, which would be in a PEA in which it has existing holdings. Further, aggregate holdings in a PEA only would be reduced down to the greatest integer less than or equal to the incumbent's aggregate initial holdings or increased up to the least integer greater than or equal to the incumbent's aggregate initial holdings. This last constraint implies that only holdings for a partial PEA block would be moved across PEAs and that the optimization would not modify any license to require service in any PEA in which the licensee does not have existing holdings. We direct the Bureau to determine the best methodology for implementing this optimization process.

26. We conclude that a licensee's remaining holdings for a partial PEA block in one PEA following reconfiguration could cover a significant enough percentage of the population such that the remaining uncovered portion would qualify as *de minimis*, entitling the licensee to be considered as holding the entire license. That is, where after reconfiguration, an incumbent would cover nearly all of the population in a PEA, it would be unlikely that any other provider would seek to serve the remaining area in that PEA. Under these circumstances, we conclude that it is reasonable to adopt a five percent *de minimis* standard for an incumbent's remaining partial PEA block following reconfiguration. We find it is in the public interest to adopt this higher standard for the partial PEA blocks to ensure that the incumbent licensee has the opportunity to serve the entire PEA, rather than leaving the small percentage of the population most likely unserved. As all of the details of the methodology for reconfiguring holdings are not yet final, we direct the Bureau to consider increasing this threshold as appropriate when it finalizes the optimization methodology, to no more than a total of ten percent.

27. *Configuring Partial PEA Blocks.* We intend that the license for an incumbent's one partial PEA block will be configured by adjusting the incumbent's currently licensed area in the PEA so that it corresponds to the incumbent's reconfigured holding in that PEA. For example, if an incumbent's partial PEA block covers one-half of the MHz-pops in the PEA, and the reconfigured holding in that PEA is one-quarter the MHz-pops, the partial PEA block will consist of 100 megahertz covering an area of the PEA fully contained within its current license that encompasses 25 percent of the population in that PEA. Similarly, if the reconfigured fractional holdings are greater than the current MHz-Pops in the PEA, the geographic coverage will be adjusted in a manner that fully contains the currently licensed area but remains within the boundaries of the PEA. The geography of a current encumbered license will be adjusted to conform to an incumbent's new fractional holdings, rather than adjusting the bandwidth,

⁵⁹ See, e.g., *Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions*, GN Docket No. 12-268, Report and Order, 29 FCC Rcd 6567, 6791, para. 548 (2014) (concluding that allowing broadcast television stations to gain up to one percent (1%) in their signal coverage contours should be considered *de minimis* as it provided them with needed flexibility to engineer new facilities and quickly transition to new channels as part of the broadcast incentive auction); *In re Houston Cellular Telephone. Co.*, 8 FCC Rcd 1641, 1641, paras. 2-3 (Mob. Servs. Div. 1993) (determining that a cellular service area contour extension of up to a 1.5 percent increase was permitted as *de minimis*).

⁶⁰ See 4th FNPRM at paras. 38-43.

because we recognize that licensees of millimeter wave spectrum prefer 100 megahertz blocks at a minimum for advanced services, and incumbent licensees may better be able to provide service in an area closer to the footprints of their original licenses. The proposed geographic boundaries for the partial PEA block will be as similar as possible to the incumbent's original holdings in that PEA, recognizing that the remaining partial PEA block may cover a larger or smaller percentage of pops than the existing license.

28. In addition, a whole PEA block will be removed from the auction inventory when providing for licensing partial blocks based on reconfigured holdings. As a consequence, licenses for partial PEA blocks will be accompanied by unassigned white space in the remainder of the block. Licenses for partial PEA blocks will be needed only for an incumbent that both chooses to receive modified licenses and that chooses not to relinquish its rights to a partial PEA block in exchange for an incentive payment. Leaving the rest of the block unassigned will help to preserve the structure of the new band plan going forward. Although this approach potentially will result in unassigned white space, the total white space that will result is extremely low relative to the total 39 GHz band. We will seek comment in the Auction Comment Public Notice regarding assignment of the remaining unassigned white space.

2. Incumbent Options Following Reconfiguration

29. After the results of the reconfiguration process are announced, an incumbent 39 GHz licensee will have three options. It can choose to: (1) have its licenses modified based on the Commission's proposed reconfiguration of its holdings; or (2) have its licenses modified based on its proposed alternative reconfiguration that yields the same or fewer weighted MHz-pops and satisfies certain specified conditions; or (3) commit to relinquish its licenses in exchange for an incentive payment and/or the ability to bid for new licenses.

30. *Incumbents Not Participating in the Incentive Auction.* We recognize that an incumbent licensee may wish not to participate in the incentive auction to relinquish its existing spectrum usage rights, but may have existing holdings that do not correspond to full new blocks; in such cases the licensee may benefit from an alternative reconfiguration of its existing licenses. We will allow each incumbent, once it reviews the results of the Commission's reconfiguration, to propose modifications to its existing licenses before it decides whether it will participate in the auction. If the incumbent ultimately decides to participate in the auction, however, any proposed modifications to its existing licenses will not have any effect.

31. To be an acceptable alternative reconfiguration, we anticipate that the incumbent's proposal must satisfy the same requirements as the Commission's modification proposal, except that, in contrast to the Commission's proposed reconfiguration, an incumbent's proposal need not minimize the weighted MHz-Pops remaining as white space in the one PEA in which the incumbent is left with the equivalent of a partial PEA block. That is, in a proposed reconfiguration, an incumbent can hold at most one partial PEA block, which would be in a PEA in which it has existing holdings. In addition, proposed 100 megahertz full PEA licenses must be in PEAs in which it has existing holdings. Finally, aggregate holdings in a PEA can only be reduced down to the greatest integer less than or equal to the incumbent's aggregate initial holdings or increased up to the least integer greater than or equal to the incumbent's aggregate initial holdings. If a licensee chooses an acceptable alternate reconfiguration proposal, the incumbent can indicate that it will not participate in the incentive auction and instead opt to have its licenses modified after the auction based on its reconfiguration proposal. We direct the Bureau to announce the methodology and process for each incumbent to propose alternate reconfigurations and to elect how to proceed, and to educate incumbents about the process.

32. Even though an incumbent choosing to have its licenses modified, either as configured by the Commission or under an acceptable alternative proposal, cannot bid on new licenses in the incentive auction, it will be allowed to relinquish the licensed spectrum usage rights associated with its single partial PEA block holding in exchange for an incentive payment. The payment amount will be determined in the auction and will be equivalent to the incumbent's fractional share of the block times the final clock phase price of a generic spectrum block in that PEA. For example, an incumbent that

relinquishes a reconfigured partial PEA holding of .6 may receive 60% of the final clock phase price for generic blocks in that PEA. If an incumbent relinquishes holdings for a partial PEA block, the incentive auction can offer an additional full block of spectrum in the auction inventory. An incumbent that accepts reconfigured holdings and therefore does not fully participate in the incentive auction will not have the option of relinquishing any full block licenses in exchange for incentive payments however, nor will it be able to bid on new licenses in the auction.

33. An incumbent that chooses not to participate in the auction and instead chooses to accept reconfigured holdings, either corresponding to the results of the FCC optimization or to an acceptable alternative reconfiguration, will have frequency-specific licenses assigned for its reconfigured holdings after the incentive auction has concluded. New frequencies for the modified licenses will be determined in the assignment phase of the incentive auction. Incumbent licensees that accept reconfigured holdings will not be permitted to place bids for specific frequencies in the assignment phase, however.⁶¹ As described as part of the assignment phase, all licensees should be issued licenses with contiguous frequencies within a category of a PEA regardless of whether they participate in the auction or bid in the assignment phase.

34. *Incumbents Participating in the Incentive Auction.* Incumbents that commit to relinquishing all of their existing licenses⁶² will receive “vouchers” sufficient to win blocks in the auction equivalent to their existing PEA holdings.⁶³ Such incumbents do not need to rebid on spectrum blocks equivalent to their existing holdings, however, unless they want to continue to hold licenses in those areas. Participating incumbents can apply the vouchers toward payments for blocks in other PEAs and receive a cash incentive payment if the value of their vouchers exceeds their net auction obligations. Auction participants can also simply relinquish their holdings and choose not to bid on any new licenses, in which case they will receive a cash incentive payment for their vouchers.

35. Vouchers for existing holdings in a PEA will be valued at the final clock phase price of a generic spectrum block in the PEA. As a result, a participating incumbent with holdings equivalent to a full block in a PEA can retain the block without making any additional payment or can receive an incentive payment equal to the final clock phase price of a block in that PEA if it no longer wishes to hold the block. The incumbent then will have the option of bidding an additional amount in the assignment phase to obtain a particular frequency for its new license, but it will receive contiguous frequency blocks within a category regardless of whether it makes an additional assignment phase bid.

36. In addition to having the opportunity to modify its existing spectrum holdings through participation in the incentive auction, an incumbent that chooses to participate in the auction also will be able to make pre-bidding exchanges in its existing holdings of partial PEA blocks, subject to constraints (described below as “Round Zero” of the auction). As described below, this will encourage auction participation by enabling an incumbent to manage uncertain costs associated with retaining spectrum holdings in the incentive auction.

⁶¹ See *4th FNPRM* at paras. 47-48. No commenters oppose our proposal to prohibit incumbent licensees that choose not to relinquish all spectrum usage rights from bidding in the auction of new licenses (which includes bidding in the assignment phase).

⁶² An incumbent choosing to relinquish spectrum usage rights in the incentive auction must relinquish all of its holdings, as proposed in the *4th FNPRM* at para 30. Commenters support this proposal. See, e.g., T-Mobile Comments at 6. See also T-Mobile Comments at 11 (“incumbent participation in the forward auction [should] be conditioned on offering all of their existing spectrum usage rights in the incentive auction[.]”).

⁶³ For ease of discussion, we describe incentive payments for incumbents relinquishing spectrum usage rights as “vouchers.” See *4th FNPRM* at para. 20. Notwithstanding short-hand descriptions of the process, incumbents do not “exchange” licenses for vouchers or at any point receive a “voucher” that has any independent substance.

D. Incentive Auction Structure

1. Spectrum Available for New Licenses

37. Following the choices made by incumbent 39 GHz licensees to accept modified licenses based on reconfigured holdings or to relinquish their existing spectrum usage rights, we will offer new licenses in the incentive auction for all available spectrum in the Upper 37 GHz, 39 GHz, and 47 GHz bands.⁶⁴ The available spectrum will consist of spectrum throughout these bands, less any quantity of spectrum that must be retained to provide non-participating incumbents with modified licenses. If all incumbent licensees choose to participate, that quantity will be zero and we will offer new licenses for 3,400 megahertz of spectrum, or 34 licenses in every PEA. New licenses in the auction, whether won by incumbents relinquishing existing licenses or by new applicants, will authorize only the use of whole spectrum blocks in 100 megahertz blocks.

2. Eligibility

38. Any party eligible to hold a license in these bands will be eligible, subject to meeting the Commission's application requirements, to participate in the auction for new licenses, except for incumbent 39 GHz licensees that accept modified licenses as reconfigured and decline to relinquish all existing licenses. We proposed this qualification in the *4th FNPRM*.⁶⁵ We noted that the contrary approach of allowing an incumbent to retain existing licenses that might encumber the band while also bidding for whole blocks would appear to give incumbents an unfair advantage. Requiring incumbents to relinquish all existing licenses as a prerequisite to bidding on new licenses will facilitate the assignment of licenses to the entities that value them most highly, thus serving the public interest. All commenters addressing this issue support this requirement.⁶⁶

3. Round Zero Adjustments to Incumbent Spectrum Usage Rights – Voucher Exchange

39. Prior to round one of the incentive auction clock phase, we will offer incumbent licensees that decide to participate in the auction a limited opportunity to redistribute their initial voucher holdings across the PEAs in which they hold rights for a partial PEA block (Round Zero). In the *FNPRM*, we proposed such a “voucher exchange” to address concerns that an incumbent with existing licenses covering RSAs or partial PEAs may face significant uncertainty about the cost of obtaining full licenses in the incentive auction that cover its current partial PEA block holdings.⁶⁷

40. More specifically, after we quantify and aggregate existing usage rights in each PEA, an auction participant can exchange any vouchers equivalent to a partial PEA block among the PEAs where it has such vouchers, subject to two restrictions. First, the total value of its holdings, in weighted MHz-Pops using the FCC weights, following the exchange must be less than or equal the total weighted MHz-

⁶⁴ We do not make any decision regarding suggestions to auction licenses for additional bands of spectrum with the three bands already identified. Though licenses for the Upper 37 GHz, 39 GHz, and 47 GHz bands in one auction will provide up to 3,400 megahertz in every PEA for advanced services, various commenters encourage the Commission to consider adding other bands. *See, e.g.*, T-Mobile Reply Comments at 13 (stating the auction should include the 26 GHz, 32 GHz and 50 GHz bands); *see also* AT&T Reply Comments at 2 (noting that various parties agree as much substitutable spectrum should be auctioned together as possible). For example, commenters argue that because the 42 GHz band is in the same tuning range as the Upper 37 GHz and 39 GHz bands, the Commission should auction all of these bands together, which would generate economies of scale and reduce equipment costs. *See, e.g.*, CCA Comments at 3, Ericsson Comments at 3-4. We may consider whether other bands are in fact ready and suitable for inclusion in the auction of licenses for these three bands, after notice and comment, in the Auction Procedures Public Notice.

⁶⁵ *4th FNPRM* at para. 23.

⁶⁶ *See, e.g.*, Verizon Comments at 7.

⁶⁷ *See 4th FNPRM* at para. 31.

Pops of its initial holdings. Second, aggregate holdings in a PEA can only be reduced down to the greatest integer less than or equal to its aggregate initial holdings or increased up to the least integer greater than or equal to its aggregate initial holdings.⁶⁸ As a result, an incumbent thus can increase or decrease its vouchers in a PEA by strictly less than one, i.e., it may increase a partial holding of 0.5 to 0.75 or to 1, but cannot increase it to 1.2. No adjustments may be made in a PEA in which an incumbent has no existing licenses or has spectrum usage rights equivalent to a whole number of whole blocks.

41. These restrictions are similar to the constraints that we contemplate using in the FCC reconfiguration optimization, except that in this case incumbents could hold vouchers equivalent to partial PEA blocks in more than one of its PEAs. Allowing an incumbent in the auction to hold vouchers equivalent to partial PEA blocks enables the incumbent to better hedge against uncertainty about auction prices relative to the FCC weights. An incumbent in the auction already has committed to relinquish its current licenses, so there is no need to limit vouchers that are equivalent to partial PEA blocks, in contrast to the need to limit reconfigured holdings equivalent to partial PEA blocks when the holdings may become the basis for modified licenses.

42. Commenters differ on the question of permitting incumbents to redistribute their existing spectrum usage rights prior to bidding for new licenses. CCA cautions against the risk of creating unwarranted advantages for incumbent licensees.⁶⁹ T-Mobile is concerned that establishing the process to allow incumbents to adjust their holdings prior to the auction will delay the determination of actual auction procedures.⁷⁰ T-Mobile also raises concerns over the risk that the Commission may err in setting the relative weights of incumbent holdings in different PEAs. This could inadvertently create windfalls for incumbents that incumbents might further amplify through any pre-auction adjustments.⁷¹ T-Mobile further argues that there is no need to allow incumbents to modify their holdings if all the holdings will be relinquished in exchange for incentive payments.⁷² We find, however, that the limitations we impose on potential modifications will minimize any potentially unfair advantages to incumbents in the voluntary exchange.

4. Other Structural Issues

43. *Incumbent Bidding Credits for New Licenses.* Incumbents, like any other applicant in our auctions for spectrum licenses, may seek designated entity bidding credits as small businesses or rural service providers.⁷³ In the *4th FNPRM*, we noted the potential for a scenario in which an incumbent

⁶⁸ We clarify, as AT&T requests, that an incumbent may adjust its spectrum usage rights without necessarily creating an amount equivalent to a whole number of blocks. AT&T Comments at 8. We also proposed limiting the ability of an incumbent to make adjustments in a PEA in which all incumbents could not do so. *4th FNPRM* at para. 34. In response, AT&T proposes prioritizing the rights of incumbents to make adjustments in such situations. AT&T Comments at 7-8. Initial analysis of the data indicates that there are no PEAs in which each incumbent could not make adjustments that otherwise comply to the limitations we propose. Accordingly, we need not adopt any limitation or prioritization for such a scenario.

⁶⁹ CCA Comments at 6 (“the pre-auction exchange system and the use of vouchers in the auction could result in further concentration of valuable spectrum by AT&T and Verizon as incumbent licensees in these bands. Accordingly, the Commission should . . . ensure that any trades, and the corresponding value set for the vouchers, does not inadvertently offer an unfair advantage going into the auction.”)

⁷⁰ T-Mobile Comments at 7.

⁷¹ T-Mobile Comments at 9.

⁷² See T-Mobile Comments at 7-9.

⁷³ The Commission also offers a bidding credit when a winning bidder provides service to qualifying tribal land with a license won at auction. 47 CFR § 1.2110(f)(3). Commission rules already address the possibility that auction proceeds net of both other designated entity bidding credits and other commitments reflected in an auction reserve price may not be sufficient to pay all tribal land bidding credits that winning bidders seek after the auction. 47 CFR § 1.2110(f)(3)(v). In this case, we adopt a net revenue requirement for this auction to assure that auction proceeds will be sufficient to make all incentive payments owed. Accordingly, we specify that this provision shall apply to

licensee entitled to bidding credits for new licenses might participate in the incentive auction, win licenses that replace its existing spectrum holdings for which it would owe no additional payment, and be entitled to a bidding credit. This scenario effectively would leave a surplus payment that this incumbent might receive as a cash incentive payment, despite also receiving new licenses that replicate its prior holdings.⁷⁴ We proposed to address this anomaly by crediting such incumbents with a bidding credit only with respect to any outstanding cash payments for new licenses that offer spectrum usage rights beyond its aggregate spectrum usage rights prior to the auction.⁷⁵ All commenters addressing this issue agree with our proposal.⁷⁶ Accordingly, bidding credits for participating incumbent licensees will apply only to cash payments for new licenses.

44. *Incumbents Bidding Up Incentive Payments.* We noted in the *4th FNPRM* that the structure of the proposed incentive auction appeared to allow incumbents to bid up new licenses in order to increase the amounts of corresponding incentive payments. We sought comment on this scenario.⁷⁷ We agree with commenters that the concern is largely theoretical and that no action is needed to address it.⁷⁸ Incumbent licensees that bid up new licenses will risk winning the new license rather than receiving the corresponding incentive payment. That risk should deter insincere bidding to increase incentive payments.

45. *Assuring Full Incentive Payments.* We sought comment in the *4th FNPRM* about whether incumbents may relinquish spectrum if the demand for new licenses in a PEA may be met without relinquished spectrum.⁷⁹ We discussed several alternatives for prioritizing among incumbent relinquished spectrum blocks, either relinquished rights to full 100 megahertz PEA blocks or partial PEA blocks, as well as prioritizing Commission-held spectrum blocks.⁸⁰ We noted that satisfying limited demand with Commission spectrum could minimize payments to incumbents.⁸¹ We also observed, however, that regardless of “the proceeds or relinquishments in a particular PEA” the incentive auction could proceed “[p]rovided that the total auction proceeds exceed the total incentive payments[.]”⁸² That is, the level of demand in a single PEA need not determine whether we can make incentive payments for spectrum relinquished in that PEA. Commenters favor the Commission making all incentive payments even where incumbent spectrum is not needed for new licenses in a particular PEA, i.e., if there is a shortfall in demand in that PEA relative to the supply of spectrum made available in the auction.⁸³ We

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the incentive auction. *Id.* (“in any auction with reserve price(s) in which the Commission specifies that this provision shall apply”). Our action allows tribal land bidding credits to be paid in full so long as aggregate auction proceeds net of all applicable bidding credits and aggregate incentive payments are greater than the total amount of tribal bidding credits sought. If not, however, our action applies established procedures for reducing a tribal land bidding credit sought by any incentive auction winning bidder in proportion to the ratio of available proceeds and the total amount of tribal land bidding credits sought.

⁷⁴ *4th FNPRM* at para. 26.

⁷⁵ *4th FNPRM* at para. 26.

⁷⁶ See T-Mobile Comments at 14.

⁷⁷ *4th FNPRM* at para. 25.

⁷⁸ See T-Mobile Comments at 13-14.

⁷⁹ *4th FNPRM* at para. 22.

⁸⁰ *4th FNPRM* at para. 22.

⁸¹ *4th FNPRM* at para. 22.

⁸² *4th FNPRM* at para. 21.

⁸³ Verizon Comments at 10-11 (“The Commission should . . . make that incentive payment . . . regardless of whether a demand shortfall exists in a particular PEA[.]”). See T-Mobile Comments at 14-15 (The Commission “should also

agree that, so long as the total auction proceeds are sufficient, making all incentive payments irrespective of the level of demand in each PEA will serve the public interest. Accordingly, we will adopt a net revenue requirement for this auction that, if met, will ensure that the auction proceeds are sufficient to cover all incentive payments.

46. Making all incentive payments even when demand in a PEA falls short of the supply of available blocks serves the public interest in several ways. Assuring incumbents that all incentive payments will be made, irrespective of the demand in any given PEA, will encourage incumbents to relinquish their licenses and participate in the auction, which will facilitate the smooth transition of the 39 GHz band. Moreover, incumbent auction participants will have greater certainty about their respective auction budgets, including incentive payments, if they know they will receive a payment for usage rights they wish to relinquish, rather than being required to retain such rights. Incumbents then will be able to bid with more certainty for the licenses they value most highly. As a result, the auction will be more likely to assign new licenses to bidders that will use the licenses most effectively, enhancing benefits to consumers.

47. Separately, there is an additional public interest benefit to ensuring that an incumbent that otherwise chooses to accept modified licenses will receive an incentive payment if it also chooses to relinquish its spectrum usage rights in its one partial PEA block. Providing this assurance makes it more likely that the incumbent will relinquish its partial PEA rights, thereby allowing a new license to be issued for a full 100 megahertz block covering the entire PEA and facilitating the transition to the new 39 GHz band plan. Accordingly, we conclude that we will make all incentive payments, so long as there are sufficient auction proceeds available.

48. Incentive payments for relinquished spectrum usage rights in a PEA where there is insufficient demand will be low. As we noted in the *4th FNPRM*, the final clock phase price for a whole block, and the corresponding incentive payment, will equal the minimum opening bid when demand does not exist for all the available blocks in a PEA. Absent demand for all available blocks in a PEA, the price for a whole block in the PEA cannot rise above the minimum opening bid. Consequently, auction proceeds as low as the sum of all minimum opening bids would assure that any shortfall in demand would not prevent making all incentive payments in full.

49. A net revenue requirement to address much higher incentive payments could be necessary, however, due to another reason. Specifically, auction proceeds otherwise may not be sufficient to make all incentive payments in full. In the *4th FNPRM*, we sought comment on the possibility that bidding credits might reduce auction proceeds to less than the amount needed to pay all incentive payments owed incumbents.⁸⁴ In response, commenters propose that in such a case all incentive payments should be proportionally reduced.⁸⁵ We conclude, however, that we should instead adopt procedures to help assure incumbent auction participants that all incentive payments will be paid in full.

50. In the broadcast incentive auction, we adopted a “final stage rule” to assure that auction proceeds would be sufficient to satisfy specified conditions.⁸⁶ In part, that rule implemented a net revenue requirement for the auction based on the incentive payments set in the auction and that took into account

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provide cash payment to incumbents first (at minimum opening bid prices) in the event that there is excess[sic insufficient] demand”).

⁸⁴ *4th FNPRM* at para. 27. Incentive payments will be determined by prices set in the auction. Winning bidders eligible for bidding credits, however, will pay less than the full auction price. Any such reductions will reduce the auction proceeds regardless of our decision to apply bidding credits for incumbent winning bidders only to net cash payments.

⁸⁵ T-Mobile Comments at 15; Verizon Reply Comments at 5 n.10.

⁸⁶ See *Auction 1000 Bidding Procedures Public Notice*, 30 FCC Rcd at 9078-82, paras. 215-24.

bidding credits available to bidders for new licenses.⁸⁷ Under such a net revenue requirement, the auction will not close unless auction proceeds are sufficient to cover all incentive payments owed. We will establish procedures in this auction implementing a net revenue requirement based on auction bids that will assure that auction proceeds are sufficient to cover all incentive payments owed, including potential discounts to new licensees that qualify for bidding credits. We will specify the procedures through the Auction Comment Public Notice and Auction Procedures Public Notice.

51. *Incumbent Upfront Payments.* Verizon advocates for crediting participating incumbent licensees with upfront payments for existing licenses that they agree to relinquish.⁸⁸ Verizon appears to suggest that an incumbent that might win licenses without making additional cash payments for winning bids should be credited with an upfront payment sufficient to obtain the bidding eligibility needed to make such bid(s).⁸⁹ Verizon observes that payment defaults cannot occur if an incumbent can cover the auction price with its incentive payment.⁹⁰ While Verizon is correct about one typical purpose of upfront payments – to mitigate against defaults for lack of payment – we note that a winning bidder may default for reasons other than failing to make a winning bid payment.⁹¹ Accordingly, we do not grant Verizon’s request at this time, and we will address upfront payments through the Auction Comment Public Notice and the Auction Procedures Public Notice.

E. Incentive Auction Bidding

52. As proposed in the *4th FNPRM*, we will use a two-phase auction procedure.⁹² Commenters generally support the proposal for how bidding will be conducted.⁹³ Accordingly, in the first phase, participants will bid for generic spectrum blocks by PEA in the Upper 37, 39, and 47 GHz Bands using an ascending clock auction. The second phase will assign frequency-specific licenses to the winners of generic blocks in the bands.

1. Auction Clock Phase

53. In the clock phase of the incentive auction, bidders will indicate their demand for quantities of spectrum blocks in two generic bidding categories in each PEA. The clock phase will set a uniform price for generic blocks in each category in each PEA. Bidding for generic spectrum blocks by category will facilitate a speedier auction than if bidding were conducted for large numbers of unique licenses that nonetheless are reasonably substitutable. Where blocks are sufficiently similar, bidders can

⁸⁷ See *Auction 1000 Bidding Procedures Public Notice*, 30 FCC Rcd at 9081-82, paras. 221-23. Unlike Auction 1000, where three stages of bidding for new licenses ended without proceeds sufficient to satisfy the final stage rule, the bids for all new licenses in this auction, even taking into account all available bidding credits, easily should exceed the total of all incentive payments for relinquished 39 GHz spectrum. Available bidding credits can reduce the auction proceeds to no less than 75 percent of the amounts bid for all new licenses. See *4th FNPRM* at para. 26 (available bidding credits). All possible incentive payments, however, would be at most an amount needed to clear 68 percent of the 39 GHz band. See *4th FNPRM* at para. 4 (noting percent of 39 GHz band held by Commission).

⁸⁸ Verizon Comments at 7-9.

⁸⁹ See Verizon Comments at 9.

⁹⁰ Verizon Comments at 9 (“no need to protect against defaults in this auction” for incumbents that will not bid for licenses to add to their spectrum holdings).

⁹¹ 47 CFR § 1.2109(c). A winning bidder not granted the licenses subject to its winning bid may be found in default, whether the decision not to grant arises from the winning bidder’s failure to prosecute its application for the license or the Commission’s decision to reject the application for any reason.

⁹² See *4th FNPRM* at para.17.

⁹³ “AT&T strongly supports the basic framework” including “a two-phase auction – a clock phase and an assignment phase – to allow bidders to acquire the amount of spectrum best suited to their needs, while guaranteeing the maximal degree of contiguity.” AT&T Comments at 4-5. See also CCA Comments at 2 (“fully supports”), Verizon Comments at 2 (supporting design), T-Mobile Comments at 5-7.

bid for a quantity of blocks rather than bidding separately for unique licenses, enabling the auction to reach a clearing price for all available blocks in a shorter time.

54. *Categories of Spectrum Blocks.* We will offer 100 megahertz blocks of spectrum in two bidding categories. The first category will consist of generic blocks in the Upper 37 GHz and 39 GHz bands. The Commission effectively has treated the Upper 37 GHz and 39 GHz bands as one contiguous 2,400 megahertz band of spectrum. The bands are adjacent. In addition, both are subject to the same service rules and operability requirement. Accordingly, it is appropriate to consider blocks in these two bands as interchangeable and offer them as one category in the auction.

55. We will offer 100 megahertz blocks of 47 GHz spectrum as a second generic bidding category. In contrast to the Upper 37 GHz and 39 GHz bands, the 47 GHz band is not contiguous with the other two and does not share the same operability requirement with respect to equipment for using the band. Consequently, we will treat 47 GHz blocks distinctly from Upper 37 GHz and 39 GHz blocks and offer 47 GHz blocks as a separate category in the auction.

56. *Bidding Process.* The rules for bidding in the first phase of the forward auction will be similar to those used in the clock portion of the forward auction in the broadcast incentive auction and in the auction of licenses for 24 GHz spectrum blocks.⁹⁴ The clock price for a category of blocks in a PEA will increase as long as the demand for blocks exceeds the supply of blocks.

57. Bidding will continue until the number of blocks demanded by bidders in each category of generic blocks in each PEA does not exceed the number of such blocks available. At that point, bidders demanding blocks in a category at the current price will be deemed clock phase winning bidders.⁹⁵ We will determine the exact procedures for clock phase bidding in the Auction Comment and Auction Procedures Public Notices.

2. Auction Assignment Phase

58. As proposed in the *4th FNPRM*, the incentive auction will include a second phase that will determine the frequencies for licenses to be assigned to the winners of generic spectrum blocks. We anticipate being able to assign contiguous frequencies within a category and a PEA to winners of multiple blocks in a category and a PEA. In the assignment phase, winning bidders for generic blocks will have an opportunity to submit sealed bids by PEA specifying additional amounts, if any, that they would be willing to pay for licenses on particular frequencies.⁹⁶ Winning clock phase bidders would not be required to bid in the assignment phase or otherwise pay more than the price for generic blocks in the clock phase and would still be assured to have contiguous frequencies assigned to all of their licenses in the same category in a PEA. Incumbents that elect to receive modified licenses instead of bidding for new licenses in the auction will be assigned frequencies in the assignment phase but cannot bid for particular frequencies in the assignment phase. We will detail the exact procedures for bidding in the assignment phase in the Auction Comment Public Notice and Auction Procedures Public Notice. We expect that the final procedures will be similar to those used in the assignment portion of the auction of licenses for 24 GHz spectrum blocks.

F. Post-Auction Transition

59. Incumbents will retain their existing licenses until after the auction, when either the existing licenses are modified or relinquished, and new licenses are issued. New licenses will be assigned based on the results of bidding in the incentive auction.

⁹⁴ *4th FNPRM* at para. 18.

⁹⁵ *4th FNPRM* at para. 18.

⁹⁶ *4th FNPRM* at para. 19.

60. *Existing Secondary Licenses.* Diversified Communications, Inc. (DCI)⁹⁷ asks the Commission to include secondary local television transmission service (LTTS) licensees in any transition plan and reimbursement program it creates for primary licensees in the band. DCI argues that in analogous situations in the past, the Commission has made accommodations for secondary services.⁹⁸

61. It is a well-established principle under Commission precedent and our rules that secondary operations cannot cause harmful interference to primary operations nor claim protection from harmful interference from primary operations.⁹⁹ As such, secondary users are not entitled to relocation or reimbursement from new entrants.¹⁰⁰ Indeed, as T-Mobile points out, in the broadcast incentive auction, the Commission specifically considered LPTV and TV translator stations television stations ineligible to participate in the reverse auction or to receive compensation because they had not been granted primary status.¹⁰¹ These secondary users were later granted compensation rights only by Congressional directive.¹⁰² Accordingly, T-Mobile, Verizon, and AT&T argue the Commission need not utilize the incentive auction structure to reclaim DCI's spectrum rights, pay for DCI's repacking, or reimburse its investment in equipment purchased for 39 GHz operations.¹⁰³ In consideration of the above, we decline to create any specific transition plan or reimbursement program for secondary operations as part of the 39 GHz auction. Such users were fully aware of their secondary status at the time of establishing these secondary operations with the knowledge that they would be required to modify their operations at any time to protect licensees.

IV. PROCEDURAL MATTERS

62. *Effectiveness of Order.* This Order will become effective 30 days after publication in the

⁹⁷ Diversified Communications, Inc., and its wholly-owned subsidiary, DCI, II, Inc. ("DCI"), is a provider of transportable uplink services for broadcast networks and holds a temporary-fixed microwave license (WPJC398) that covers multiple local television transmission service (LTTS) bands it uses for this purpose. DCI *3rd FNPRM* Comments at 1-2.

⁹⁸ For example, DCI notes that Congress directed the FCC to reimburse secondary LPTV stations and TV translators in connection with the TV Incentive Auction Repacking and similarly, reimbursement plans for secondary operations were included in the "Sprint/Nextel 2 GHz repacking." DCI *3rd FNPRM* Comments at 2-3 (citing *LPTV, TV Translator, and FM Broadcast Station Reimbursement; Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions*, Notice of Proposed Rulemaking and Order, MB Docket Nos. 18-214 and 12-268, FCC 18-113 (rel. Aug. 3, 2018)).

⁹⁹ See 47 C.F.R. § 2.105(c)(2)(i)-(ii). AT&T notes that DCI, as a secondary user with a temporary license, operates "at the sufferance of primary licensees," and consequently is not entitled to any compensation as a result of being displaced by primary users' operations. AT&T Reply Comments at 5.

¹⁰⁰ See, e.g., Improving Public Safety Communications in the 800 MHz Band, *Memorandum Opinion and Order*, WT Docket No. 02-5, 20 FCC Rcd 16015 at 16062-63, paras.106-7 (2005)(stating that the Commission does "not alter the well-established principle" that "secondary operations are not entitled to relocation or reimbursement from new entrants" but approving a voluntary agreement by the parties that included funding relocation of certain secondary BAS incumbents).

¹⁰¹ T-Mobile Reply Comments at 14 (citing *Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions*, Report and Order, 29 FCC Rcd. 6567, 6716-17 para. 352 (2014)); see also *Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions*, Notice of Proposed Rulemaking, 27 FCC Rcd. 12357, 12380-81 para.74 (2012) (stating that under Commission rules, full power and Class A television stations enjoy 'primary' status and therefore are protected from interference by other primary and secondary facilities, whereas facilities with only 'secondary' status receive no protection against interference received from primary users and must resolve any interference caused to new, existing or modified primary users, including going off the air if necessary).

¹⁰² T-Mobile Comments at 14 (citing *Consolidated Appropriations Act 2018*, Pub. L. No. 115-141, div. E, tit. V, § 511).

¹⁰³ See T-Mobile Reply Comments at 14, Verizon Reply Comments at 9-10, AT&T Reply Comments at 5.

Federal Register. Petitions for reconsideration pursuant to section 405(a) of the Act or protests of this order of modification under section 316(a)(1) of the Act may be submitted in WT Docket No. 14-177 any time before such date that is 30 days following publication in the *Federal Register*.

63. *Final Regulatory Flexibility Analysis*. As required by the Regulatory Flexibility Act (RFA) of 1980,¹⁰⁴ as amended, an Initial Regulatory Flexibility Analysis (IRFA) was incorporated into the *4th FNPRM*.¹⁰⁵ The Commission sought, but did not receive, written public comment on the possible significant economic impact on small entities regarding the proposals addressed in the *4th FNPRM*, including comments on the IRFA. Pursuant to the RFA, the Final Regulatory Flexibility Analysis in this *Report and Order* is attached as Appendix B. The Commission's Consumer and Governmental Affairs Bureau, Reference Information Center, will send a copy of the *Report and Order*, including the FRFA, to the Chief Counsel for Advocacy of the Small Business Administration. In addition, the Commission will send a copy of the *Report and Order*, including the FRFA, in a report to Congress pursuant to the Congressional Review Act.¹⁰⁶

64. *Paperwork Reduction Act Analysis*. This document does not contain new or modified information collection requirements subject to the Paperwork Reduction Act of 1995 (PRA), Public Law 104-13. In addition, therefore, it does not contain any new or modified information collection burden for small business concerns with fewer than 25 employees, pursuant to the Small Business Paperwork Relief Act of 2002, Public Law 107-198, *see* 44 U.S.C. 3506(c)(4).

65. *Congressional Review Act*. The Commission will send a copy of this *Report and Order* to Congress and the Government Accountability Office pursuant to the Congressional Review Act.¹⁰⁷

¹⁰⁴ 5 U.S.C. § 604.

¹⁰⁵ *4th FNPRM* at Appendix B.

¹⁰⁶ *See* 5 U.S.C. § 801(a)(1)(A).

¹⁰⁷ 5 U.S.C. § 801(a)(1)(A).

V. ORDERING CLAUSES

66. Accordingly, IT IS ORDERED that, pursuant to Sections 4(i), 201(b), 303, 308, 309, 316, 324, 332, and 337 of the Communications Act of 1934, as amended, 47 U.S.C. §§ 154(i), 201(b), 303, 308, 309, 316, 324, 332, 337, this *Report and Order* IS HEREBY ADOPTED.

67. IT IS FURTHER ORDERED that the amendments of the Commission's rules as set forth in Appendix A ARE ADOPTED, effective thirty days from the date of publication in the Federal Register.

68. IT IS FURTHER ORDERED that the Commission's Consumer and Governmental Affairs Bureau, Reference Information Center, SHALL SEND a copy of this *Report and Order*, including the Final Regulatory Flexibility Analysis, to the Chief Counsel for Advocacy of the Small Business Administration.

69. IT IS FURTHER ORDERED that the Commission SHALL SEND a copy of this *Report and Order* in a report to be sent to Congress and the Government Accountability Office pursuant to the Congressional Review Act, *see* 5 U.S.C. § 801(a)(1)(A).

FEDERAL COMMUNICATIONS COMMISSION

Marlene H. Dortch
Secretary

APPENDIX A
Final Rules

For the reasons discussed in the preamble, the Federal Communications Commission amends 47 CFR parts 1 and 30 as follows:

PART 1 – GENERAL RULES OF PRACTICE AND PROCEDURE

The authority citation for part 1 continues to read as follows:

Authority: [[INSERT CURRENT AUTHORITY CITATION]].

2. Amend § 1.2101 by revising to read as follows:

§1.2101 Purpose.

The provisions of §§1.2101 through 1.2115 implement section 309(j) of the Communications Act of 1934, as added by the Omnibus Budget Reconciliation Act of 1993 (Pub. L. 103-66) and subsequent amendments.

3. Add §1.2115 to read as follows:

§ 1.2115 Public notice of incentive auction related procedures. The provisions of this Subpart may be used to conduct an incentive auction pursuant to 47 U.S.C. 309(j)(8)(G), including either or both a reverse auction to determine the incentive payment a licensee would be willing to accept in exchange for relinquishing spectrum usage rights and a forward auction to assign flexible use licenses for any spectrum made available as the result of such relinquishments. The Commission shall provide public notice of any procedures necessary for the implementation of an incentive auction that are not otherwise provided for pursuant to the rules of this Subpart. The Commission may do so in one or more such public notices.

The Commission's procedures may include, without limitation:

(a) *Spectrum usage rights relinquishment procedures.* The procedures pursuant to which a licensee may make an unconditional, irrevocable offer to relinquish spectrum usage rights in exchange for an incentive payment, including any terms the offer must include and procedures pursuant to which the Commission may accept such an offer.

(b) *Information required from a licensee.*

(1) The procedures for a licensee to provide any identifying information and or certifications that the Commission may require from any licensee that seeks to relinquish spectrum usage rights in the incentive auction.

(2) The procedures for a licensee that is relinquishing spectrum usage rights to provide any financial information that the Commission may require to facilitate the disbursement of any incentive payment.

PART 30 – UPPER MICROWAVE FLEXIBLE USE SERVICE

3. 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.

4. 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

Final Regulatory Flexibility Analysis

1. As required by the Regulatory Flexibility Act of 1980, as amended (RFA),¹ an Initial Regulatory Flexibility Analysis (IRFA) was incorporated in the *Fourth Further Notice of Proposed Rulemaking (4th FNPRM)* released in August 2018 in this proceeding.² The Commission sought written public comment on the proposals in the *4th FNPRM*, including comments on the IRFA. No comments were filed addressing the IRFA. This present Final Regulatory Flexibility Analysis (FRFA) conforms to the RFA.³

A. Need for, and Objectives of, the Fourth Report and Order

2. In the attached *Fourth Report and Order*, the Commission takes major steps to make spectrum available for fifth-generation (5G) wireless, Internet of Things, and other advanced services in the Upper 37 GHz (37.6 - 38.6 GHz), 39 GHz (38.6 - 40 GHz), and 47 GHz (47.2 - 48.2 GHz) bands. We adopt the proposal set forth in the *4th FNPRM* to conduct an incentive auction that can clear existing 39 GHz licenses and offer new spectrum licenses in the Upper 37 GHz, 39 GHz, and 47 GHz bands.

3. The *Fourth Report and Order* also modifies the band plans for the 39 GHz, Upper 37 GHz, and 47 GHz bands from 200 megahertz to 100 megahertz channels for the Part 30 Upper Microwave Flexible Use Service (UMFUS). The incentive auction that we adopt today will promote the flexible-use wireless services rules that the Commission has adopted for these bands. Moreover, the incentive auction process will resolve the persistent difficulties presented by the need for existing 39 GHz licenses to be transitioned efficiently to the new band plan and possibly new service areas.

4. In the *Fourth Report and Order* we decide that we will make all existing licenses conform more closely with the new band plan and service rules by proposing modifications based on reconfigurations to each incumbent's spectrum usage rights under existing licenses. The reconfiguration will preserve the existing spectrum rights of incumbents as much as possible, and where variations are unavoidable, maintain overall spectrum usage rights. An incumbent can choose to accept the reconfiguration, propose an alternative reconfiguration, or instead elect to participate in the auction. An incumbent that chooses not to participate in the incentive auction will have frequencies assigned for modified licenses based on reconfigured spectrum usage rights after the incentive auction has concluded.

5. The *Fourth Report and Order* sets forth details about incumbents that choose to participate in the incentive auction. Incumbents that choose to participate in the incentive auction will relinquish existing spectrum licenses and receive "vouchers" sufficient to win blocks in the auction equivalent to their existing Partial Economic Area (PEA) holdings. A participating incumbent will be able to make pre-bidding exchanges in its existing holdings of partial PEA blocks, subject to constraints.

6. The *Fourth Report and Order* emphasizes that auction participants do not need to rebid on spectrum blocks equivalent to their existing holdings, however, but can apply the vouchers toward payments for blocks in other PEAs, receiving a cash incentive payment if the value of their vouchers exceeds their net auction obligations. Auction participants can also simply relinquish their holdings and choose not to bid on any new licenses, in which case they will receive a cash incentive payment for their vouchers.

7. The *Fourth Report and Order* also adopts the proposal to implement a two-phase incentive auction that will offer new licenses. In the first phase, participants would bid to win generic

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

² See *Use of Spectrum Bands Above 24 GHz For Mobile Radio Services, GN Docket No. 14-177*, Fourth Further Notice of Proposed Rulemaking, FCC 18-110 (Aug. 2, 2018) (*4th FNPRM*).

³ See 5 U.S.C. § 604.

spectrum blocks using an ascending clock auction that would determine a uniform price in each category in each PEA. Any party eligible to hold a license in these bands will be eligible to participate in the auction for new licenses, except for incumbent 39 GHz licensees that decline to relinquish existing licenses. 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, they will be offered as one category of generic blocks in a clock auction. We will treat 47 GHz blocks distinctly from Upper 37 GHz and 39 GHz blocks and offer 47 GHz blocks as a separate category in the auction. Winning bidders for generic blocks in the clock phase would have an opportunity to submit sealed bids by PEA specifying additional amounts, if any, that they would be willing to pay for licenses in the PEA on particular frequencies in the assignment phase. Winning clock phase bidders would participate in the assignment phase only if they so choose. Consequently, they would not be required to bid in the assignment phase or otherwise pay more than the price for generic blocks in the clock phase. Regardless of participation in the assignment phase, the assignment phase would aim to assign contiguous frequency blocks within a category in a PEA to a bidder that wins multiple blocks. Incumbents that elect to receive modified licenses instead of bidding for new licenses in the auction will be assigned frequencies in the assignment phase but cannot bid.

8. Overall, the decisions in the *Fourth Report and Order* 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 used efficiently 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. Summary of Significant Issues Raised by Public Comments in Response to the IRFA

9. There were no comments filed that specifically addressed the proposed rules and policies presented in the IRFA.

C. Response to Comments by the Chief Counsel for Advocacy of the Small Business Administration

10. Pursuant to the Small Business Jobs Act of 2010, which amended the RFA, the Commission is required to respond to any comments filed by the Chief Counsel for Advocacy of the Small Business Administration (SBA), and to provide a detailed statement of any change made to the proposed rules as a result of those comments.⁴

11. The Chief Counsel did not file any comments in response to the proposed rules in this proceeding.

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

12. The RFA directs agencies to provide a description of and, where feasible, an estimate of the number of small entities that may be affected by the rules adopted herein.⁵ The RFA generally defines the term "small entity" as having the same meaning as the terms "small business," "small organization," and "small governmental jurisdiction."⁶ In addition, the term "small business" has the same meaning as the term "small business concern" under the Small Business Act.⁷ A "small business concern" is one

⁴ 5 U.S.C. § 604(a)(3).

⁵ *Id.*

⁶ 5 U.S.C. § 601(6).

⁷ 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

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.⁸

13. *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.⁹ 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.¹⁰ These types of small businesses represent 99.9% of all businesses in the United States which translates to 28.8 million businesses.¹¹

14. 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."¹² 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).¹³

15. 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."¹⁴ U.S. Census Bureau data from the 2012 Census of Governments¹⁵ indicate that there were 90,056 local governmental jurisdictions consisting of general purpose governments and special purpose governments in the United States.¹⁶ Of this number there were

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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."

⁸ 15 U.S.C. § 632.

⁹ See 5 U.S.C. § 601(3)-(6).

¹⁰ 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)

¹¹ 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).

¹² 5 U.S.C. § 601(4).

¹³ Data from the Urban Institute, National Center for Charitable Statistics (NCCS) reporting on nonprofit organizations registered with the IRS was used to estimate the number of small organizations. Reports generated using the NCCS online database indicated that as of August 2016 there were 356,494 registered nonprofits with total revenues of less than \$100,000. Of this number, 326,897 entities filed tax returns with 65,113 registered nonprofits reporting total revenues of \$50,000 or less on the IRS Form 990-N for Small Exempt Organizations and 261,784 nonprofits reporting total revenues of \$100,000 or less on some other version of the IRS Form 990 within 24 months of the August 2016 data release date. See <http://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".

¹⁴ 5 U.S.C. § 601(5).

¹⁵ See 13 U.S.C. § 161. The Census of Government is conducted every five (5) years compiling data for years ending with "2" and "7". See also Program Description Census of Government <https://factfinder.census.gov/faces/affhelp/jsf/pages/metadata.xhtml?lang=en&type=program&id=program.en.CO.G#>.

¹⁶ 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

37,132 general purpose governments (county¹⁷, municipal and town or township¹⁸) with populations of less than 50,000 and 12,184 special purpose governments (independent school districts¹⁹ and special districts²⁰) 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 50,000.²¹ Based on this data we estimate that at least 49,316 local government jurisdictions fall in the category of “small governmental jurisdictions.”²²

16. *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.²³ The appropriate size standard under SBA rules is that such a business is small if it has 1,500 or fewer employees.²⁴ For this industry, U.S. Census Bureau data for 2012 show that there were 967 firms that operated for the entire year.²⁵ Of this total, 955 firms had employment of 999 or

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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).

¹⁷ 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.

¹⁸ 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.

¹⁹ 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.

²⁰ 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.](#)

²¹ 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.

²² *Id.*

²³ 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.

²⁴ 13 CFR § 121.201, NAICS code 517210.

²⁵ 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.

fewer employees and 12 had employment of 1,000 employees or more.²⁶ Thus under this category and the associated size standard, the Commission estimates that the majority of wireless telecommunications carriers (except satellite) are small entities.

17. *Fixed Microwave Services.* Microwave services include common carrier,²⁷ private-operational fixed,²⁸ and broadcast auxiliary radio services.²⁹ They also include the Upper Microwave Flexible Use Service,³⁰ the Millimeter Wave Service,³¹ Local Multipoint Distribution Service (LMDS),³² the Digital Electronic Message Service (DEMS),³³ and the 24 GHz Service,³⁴ where licensees can choose between common carrier and non-common carrier status.³⁵ 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.³⁶ The Commission has not yet defined a small business with respect to microwave services. The closest 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.³⁷ For this industry, U.S. Census Bureau data for 2012 shows that there were 967 firms that operated for the entire year.³⁸ Of this total, 955 had employment of 999 or fewer, and 12 firms had employment of 1,000 employees or more.³⁹ Thus under this SBA category and the associated standard, the Commission estimates that the majority of fixed microwave service licensees can be considered small.

18. 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

²⁶ *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."

²⁷ See 47 CFR Part 10, Subpart I.

²⁸ 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.

²⁹ 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.

³⁰ See 47 CFR Part 30.

³¹ See 47 CFR Part 101, Subpart Q.

³² See 47 CFR Part 101, Subpart L.

³³ See 47 CFR Part 101, Subpart G.

³⁴ See *id.*

³⁵ See 47 CFR §§ 30.6, 101.1017.

³⁶ These statistics are based on a review of the Universal Licensing System on September 22, 2015.

³⁷ 13 CFR § 121.201, NAICS code 517210.

³⁸ 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.

³⁹ *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."

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.

19. *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.⁴⁰ 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.⁴¹ Establishments providing Internet services or voice over Internet protocol (VoIP) services via client-supplied telecommunications connections are also included in this industry.⁴² 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.⁴³ 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.⁴⁴ Of these firms, a total of 1,400 firms had gross annual receipts of under \$25 million and 42 firms had gross annual receipts of \$25 million to \$49, 999,999.⁴⁵ Thus, the Commission estimates that a majority of “All Other Telecommunications” firms potentially affected by our actions can be considered small.

20. *Radio and Television Broadcasting and Wireless Communications Equipment Manufacturing.* This industry comprises establishments primarily engaged in manufacturing radio and television broadcast and wireless communications equipment.⁴⁶ 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.⁴⁷ The SBA has established a size standard for this industry of 1,250 employees or less.⁴⁸ U.S. Census Bureau data for 2012 shows that 841 establishments operated in this industry in

⁴⁰ 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#>.

⁴¹ *Id.*

⁴² *Id.*

⁴³ 13 CFR § 121.201, NAICS Code 517919.

⁴⁴ 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.

⁴⁵ *Id.*

⁴⁶ 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#>.

⁴⁷ 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#>.

⁴⁸ 13 CFR § 121.201, NAICS Code 334220.

that year.⁴⁹ 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.⁵⁰ Based on this data, we conclude that a majority of manufacturers in this industry is small.

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

21. We expect the rules adopted in the *Fourth Report and Order* will impose new or additional reporting or recordkeeping and/or other compliance obligations on small entities as well as other applicants and licensees. The projected reporting, recordkeeping, and other compliance requirements in the *Fourth Report and Order* will apply to entities slightly differently depending on whether they accept modified licenses, relinquish spectrum usage rights entirely, relinquish spectrum rights and seek new licenses to continue to operate in the band, or are new entrants seeking new licenses. The requirements the Commission adopts should benefit small entities by giving them more information, more flexibility, and more options for gaining access to wireless spectrum.

22. The Commission has designed the process of applying to participate in auctions involving spectrum license auctions generally, including the incentive auction, to minimize reporting and compliance requirements for applicants, including small business applicants. We expect that the filing, recordkeeping and reporting requirements associated with the demands described below will require small businesses as well as other entities that intend to utilize these new UMFUS licenses to use professional, accounting, engineering or survey services in order to meet these requirements. Incumbent licensees that volunteer to relinquish spectrum usage rights will make a binding commitment to do so in a submission to the Commission. Parties desiring to participate in an auction for new licenses, including incumbents and new entrants, either of which may be small entities, will begin by filing streamlined, short-form applications in which they certify under penalty of perjury as to their qualifications. The Commission will provide detailed instructions for each auction applicant to maintain the accuracy of its respective short-form application electronically using the FCC Auction Application System and/or by direct communication with the Auctions Division. The Commission also will provide detailed instructions for any incumbent eligible to be paid an incentive payment regarding financial information that must be provided to the Commission, as well as instructions for any winning bidder for new licenses regarding the license application process. As with other winning bidders, any small entity that is a winning bidder will be required to comply with paying the net amount of its winning bids and electronically submitting a properly completed long-form application (FCC Form 601) and required exhibits for each license won. A winning bidder claiming eligibility for a bidding credit must demonstrate its eligibility in its FCC Form 601 post-auction application for the bidding credit sought.

23. Small entities and other applicants for Upper Microwave Flexible Use Service (UMFUS) licenses will be required to file license applications using the Commission's automated Universal Licensing System (ULS). ULS is an online electronic filing system that also serves as a powerful information tool, one that enables potential licensees to research applications, licenses, and antenna structures. It also keeps the public informed with weekly public notices, FCC rulemakings, processing utilities, and a telecommunications glossary. Small entities, like all other entities who are UMFUS applicants, must submit long-form license applications through ULS using Form 601,⁵¹ FCC Ownership

⁴⁹ 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.

⁵⁰ *Id.*

⁵¹ 47 CFR § 1.913(a)(1).

Disclosure Information for the Wireless Telecommunications Services using FCC Form 602,⁵² and other appropriate forms.⁵³

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

24. The RFA requires an agency to describe any significant alternatives for small businesses that it has considered in reaching its 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 the rule, or any part thereof, for such small entities.⁵⁴

25. The Commission believes that the incentive auction mechanism adopted in the *Fourth Report and Order* will result in both operational and administrative cost savings for small entities, as well as other participants. At the outset, because participating in the auction is voluntary, we allow incumbent licensees, including small entities, to have their existing licenses modified instead of having to participate in an auction if they so choose. The incentive auction will give incumbent licensees, including small entities, an opportunity to receive incentive payments for their spectrum licenses that are based on a market price, while providing opportunities to obtain additional licenses. Moreover, should new licenses match the spectrum usage rights of an incumbent's current licenses, the incentive payments will be enough so that the incumbents can win new licenses without making additional payments, regardless of how high bids for those new licenses may go in the auction. Furthermore, adopting a two-phase auction procedure will benefit all participants by resulting in a quick auction, due to the first clock phase, followed by an assignment phase. This benefits small entities, as they may not have the same flexibility as larger entities to devote time to participating in the auction. In addition, winning bidders do not have to bid in the assignment phase. Furthermore, we anticipate being able to assign contiguous frequencies within a PEA category, even where a clock phase winning bidder does not bid in the assignment phase. This benefits smaller entities that otherwise might have difficulty aggregating contiguous licenses through transactions in the secondary market. In addition, the Commission has adopted bidding credits for applicants for new licenses who qualify as small businesses. An entity with average annual gross revenues for the preceding three years not exceeding \$55 million will qualify as a "small business" and be eligible to receive a 15 percent discount on its winning bid. An entity with average annual gross revenues for the preceding three years not exceeding \$20 million will qualify as a "very small business" and be eligible to receive a 25 percent discount on its winning bid.⁵⁵

26. We also believe that our actions 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. Similarly, we believe the proposed mechanism for auctioning the 39 GHz and Upper 37 GHz bands will facilitate access to spectrum by small businesses. Accordingly, the Commission does not believe that its adopted changes will have a significant economic impact on small entities. Nevertheless, to the extent applying the rules equally to all entities results in the cost of complying with these burdens being relatively greater for smaller businesses than for large ones, this approach is necessary to effectuate the purpose of the Communications Act, namely to further the efficient use of spectrum and to prevent spectrum warehousing.

⁵² 47 CFR § 1.919.

⁵³ 47 CFR § 1.2107.

⁵⁴ 5 U.S.C. § 603(c)(1)-(4).

⁵⁵ See 47 CFR §§ 30.301, 30.302.

Report to Congress

27. The Commission will send a copy of the *Fourth Report and Order*, including this FRFA, in a report to Congress pursuant to the Congressional Review Act.⁵⁶ In addition, the Commission will send a copy of the *Fourth Report and Order*, including this FRFA, to the Chief Counsel for Advocacy of the SBA. A copy of the *Fourth Report and Order*, and FRFA (or summaries thereof) will also be published in the Federal Register.⁵⁷

⁵⁶ See 5 U.S.C. § 801(a)(1)(A).

⁵⁷ See 5 U.S.C. § 604(b).

APPENDIX C**Parties Filing Comments and Reply Comments re:
Use of Spectrum Bands Above 24 GHz For Mobile Radio Services, GN Docket No. 14-177,
Fourth Further Notice of Proposed Rulemaking, FCC 18-110, (Aug. 2, 2018)****Comments**

AT&T Services, Inc. (AT&T)
Competitive Carriers Association (CCA)
Diversified Communications, Inc. and DCI II, Inc. (collectively, DCI)
Ericsson
PVT Networks, Inc. (PVT)
Samsung Electronics America (Samsung)
Telecommunications Industry Association (TIA)
T-Mobile USA, Inc. (T-Mobile)
Verizon

Reply Comments

AT&T
T-Mobile
Verizon

**STATEMENT OF
CHAIRMAN AJIT PAI**

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

Pushing more spectrum into the commercial marketplace is a key component of our 5G FAST plan to maintain American leadership in the next generation of wireless connectivity. Currently, we're conducting an auction of 28 GHz band spectrum, to be followed by a 24 GHz band auction. And today, we are taking a critical step towards holding an auction of the Upper 37, 39, and 47 GHz bands in 2019. These and other steps will help us stay ahead of the spectrum curve and allow wireless innovation to thrive on our shores.

Notably, we're setting up the Upper 37, 39, and 47 GHz auction to be our second-ever incentive auction. This incentive auction will be different from the broadcast incentive auction that Congress authorized years ago, but it'll have the same worthy goal: clearing or repacking existing licensees to make spectrum as useful as possible, boosting competition and benefiting consumers.

In this Order, we also take a number of steps to facilitate this auction. First, we harmonize the block size to 100 megahertz for all three bands. This will make it easier to both transition incumbents with mismatched license holdings and auction all of these bands together.

Next, we enable incumbent licensees to rationalize their spectrum holdings and new licensees to gain meaningful access to millimeter-wave spectrum. And at multiple steps along the way, we let incumbents choose how to relinquish or modify their existing rights, which ensures that they will be treated fairly.

I'm pleased that the Commission is committed to making these bands available in 2019 to facilitate American leadership in 5G and provide additional opportunities for consumers across the country to access advanced wireless services. It is part of an ambitious auction schedule that will push almost five gigahertz of spectrum into the commercial marketplace in late 2018 and 2019.

As always, I'd like to thank the staff who worked on this item: Simon Banyai, Steve Buenzow, Jonathan Campbell, Catherine Schroeder, Blaise Scinto, Dana Shaffer, Don Stockdale, Joel Taubenblatt, and Jennifer Tomchin from the Wireless Telecommunications Bureau; Rita Cookmeyer, Evan Kwerel, Paul LaFontaine, Erik Salovaara, Martha Stancill, and Margaret Wiener from the Office of Economics and Analytics; and David Horowitz, Doug Klein, Bill Richardson, and Max Staloff from the Office of General Counsel.

**STATEMENT OF
COMMISSIONER MICHAEL O'RIELLY**

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

Today, we implement a process to modify and rationalize existing 39 GHz licenses, which will enable incumbent licensees to provide next-generation services. By adopting an incentive auction format for these bands, incumbents will have the choice and flexibility to either keep or expand on their spectrum holdings in a market or to sell their licenses to other auction participants. This model should ensure that licenses will go to those that value them the most and are most likely to deploy next-generation services. I approve.

While I acknowledge that this is not the simplest of processes, we must accept the reality we face. Here, as in other bands we look to repurpose, incumbents' varying spectrum holdings often do not fit neatly into any workable geographic area for providing 5G services. Ultimately, this entire item highlights the difficulties and the innovative lengths to which we will go to find clean spectrum. To make the large-scale investments required for new technologies, licensees continue and appropriately want cleared, exclusive use licenses, covering significant geographic areas. While some have visions of a permanent move to a sharing paradigm, clean, licensed spectrum has been the hallmark of our spectrum policy in the past and will continue to be going forward. However, using creative mechanisms, like this one, to create exclusive use licenses may become more of a mainstay.

Finally, this agency has put in countless hours opening these millimeter wave bands – and others – for next-generation services. These decisions were based on public comment; negotiations between federal agencies, satellite providers, and the wireless industry; and studies regarding how incumbent services can coexist with new terrestrial uses. Companies have made spectrum investments in reliance on our prior adopted orders. Any attempts to undermine these decisions cannot be tolerated. The U.S. needs to finalize its World Radiocommunication Conference proposals to advocate for global harmonization of this band.

**STATEMENT OF
COMMISSIONER BRENDAN CARR**

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

A few minutes from now, the Commission will complete the 59th round of bidding for spectrum in the 28 GHz band. It is the FCC's first ever high-band, 5G auction, and the results thus far are promising.

The auction already has yielded nearly \$700 million in provisionally winning bids. And that's despite some unique constraints on this auction. For one, much of the band was licensed before the auction. Most of the license areas include incumbents, and what's left contains less than a quarter of the country's population. For another, auctioning millimeter wave spectrum is uncharted territory, and there was some uncertainty in the market about the spectrum's value and use cases.

So why is there so much demand for this spectrum? It's because brilliant engineers have done what they always do: invent, innovate, and make it work. In fact, one wireless provider already is using the 28 GHz band to offer service to families who feel for the first time that they have a choice in home broadband. When it announced plans to build out the service, the provider said it could get up to gigabit speeds delivered over a distance of maybe 1,500 feet or a few city blocks. The engineers continued testing, and they extended that range to 2,000 feet, through foliage, varied weather conditions, and even without a line of sight. Last week, the provider announced another break through: it can deliver peak speeds of two to four gigabits per second up to half a mile from its small cells, bouncing the signal off structures and through trees.

In short, we can do more with millimeter wave spectrum than we originally thought. That's great news for the rollout of 5G services. And it's great news for the millions of Americans who want more providers to compete for their broadband dollars.

Next up after the 28 GHz auction is the 24 GHz band, which is greenfield, almost wholly unencumbered spectrum. And through the item before us today, we set the stage for three additional millimeter wave auctions in 2019. This plan will result in more spectrum being auctioned in a single year than at any time in the Commission's history. It's a full calendar, for sure. And it couldn't come at a better moment, either. All of our nationwide carriers plan to deploy 5G next year. So 2019 will see the first 5G smartphone, the first commercial launch of 5G on low-band spectrum, and the first truly mobile 5G service.

Put simply, 2019 will be the Year of 5G. And this is due, in part, to the Commission's decisions to open up more spectrum for this new technology. To continue winning the race to 5G, we must keep up efforts like those that produced this item. So I want to thank the hardworking team in the Wireless Telecommunications Bureau for their work. This item 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

This decision sets the stage for the Federal Communications Commission to auction the largest swath of contiguous spectrum for 5G services yet. With an auction planned for 2019, airwaves in the 37, 39, and 47 GHz bands will be primed and ready for the first generation of 5G devices. This is exciting. Even better, the approach we adopt here puts a premium on auctioning millimeter wave bands together, instead of one-by-one. That's a method I have long championed, and I appreciate that my colleagues have recognized this is the right way to go. In addition, we grant incumbents the opportunity to trade in their existing spectrum rights in the 39 GHz band in exchange for new rights in any of the bands we offer in this auction. This promises to generate more interest and provide bidders with more freedom to assess which bands work best for them. This has also been an approach I have argued for from the start. I think a more thoughtful auction will result.

However, as we hurry to increase the licensed spectrum in the pipeline available for 5G service, I believe there should be a cut for unlicensed, too. In the past, I've called this the Wi-Fi Dividend. I believe good spectrum policy requires a mix of licensed and unlicensed services. Here today we have done just that by committing in 2019 to advance unlicensed opportunities in the lower 37 GHz band. This band was designated for innovative shared use under a license-by-rule regime but requires additional work on a coordination mechanism. I appreciate that my colleagues have supported my request to expedite this effort.

For all these reasons, this order has my full and enthusiastic support.