FEDERAL COMMUNICATIONS COMMISSION

47 CFR Parts 1, 2, 25, 27, and 101

[GN Docket No. 18–122; FCC 20–22; FRS 16548]

Expanding Flexible Use of the 3.7 to 4.2 GHz Band

AGENCY: Federal Communications Commission.

ACTION: Final rule.

SUMMARY: In this document, the Federal Communications Commission (Commission) adopts rules to reform the use of the 3.7–4.2 GHz band, also known as the C-Band. By repacking existing satellite operations into the upper 200 megahertz of the band (and reserving a 20 megahertz guard band), the Commission makes 280 megahertz of spectrum available for flexible use throughout the contiguous United States, and does so in a manner that ensures the continuous and uninterrupted delivery of services currently offered in the band. The Commission will hold a public auction to ensure that the public recovers a substantial portion of the value of this resource. And the Commission schedules that auction for later this year, with a robust transition schedule to ensure that a significant amount of spectrum is made available quickly for upcoming 5G deployments. This action is the next critical step in advancing American leadership in 5G and implementing the Commission's comprehensive 5G FAST Plan. The Commission modified the Report and Order released on March 3, 2020 with an erratum released on March 27, 2020 and a second erratum released on April 16, 2020. The changes from the first and second errata are included in this document.

DATES:

Effective date: June 22, 2020.

Compliance date: Compliance will not be required for §§ 25.138(a) and (b); 25.147(a) through (c); 27.14(w)(1) through (4); 27.1412(b)(3)(i), (c) introductory text, (c)(2), (d)(1) and (2), and (f) through (h); 27.1413(a)(2) and (3), (b), and (c)(3) and (7); 27.1414(b)(3), (b)(4)(i) and (iii), and (c)(1) through (3) and (6) and (7); 27.1415; 27.1416(a); 27.1417; 27.1419; 27.1421; 27.1422(c); 27.1424; and 101.101, Note (2) until the Commission publishes a document in the **Federal Register** announcing that compliance date.

ADDRESSES: Federal Communications Commission, 445 12th Street SW, Washington, DC 20554.

FOR FURTHER INFORMATION CONTACT: Anna Gentry of the Wireless Telecommunications Bureau, Mobility Division, at (202) 418–7769 or *Anna.Gentry@fcc.gov*. For information regarding the PRA information collection requirements contained in this PRA, contact Cathy Williams, Office of Managing Director, at (202) 418–2918 or *Cathy.Williams@fcc.gov*.

SUPPLEMENTARY INFORMATION: This is a summary of the Commission's *Report and Order and Order of Proposed Modification* in GN Docket No. 18–122, FCC 20–22 adopted February 28, 2020 and released March 3, 2020. The full text of the *Report and Order and Order of Proposed Modification,* including all Appendices, is available for inspection and copying during normal business hours in the FCC Reference Center, 445 12th Street SW, Room CY–A257, Washington, DC 20554, or by downloading the text from the Commission's website at *http://docs.fcc.gov/public/attachments/FCC-20-22A1.pdf*. Alternative formats are available for people with disabilities (Braille, large print, electronic files, audio format), by sending an email to *FCC504@fcc.gov* or calling the Consumer and Governmental Affairs Bureau at (202) 418–0530 (voice), (202) 418–0432 (TTY).

The Commission will send a copy of this *Report and Order and Order of Proposed Modification* 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).

Final Regulatory Flexibility Analysis

The Regulatory Flexibility Act (RFA) requires that an agency prepare a regulatory flexibility analysis for notice and comment rulemakings, unless the agency certifies that ''the rule will not, if promulgated, have a significant economic impact on a substantial number of small entities.'' Accordingly, the Commission has prepared a Final Regulatory Flexibility Analysis (FRFA) concerning the possible impact of the rule changes contained in this *Report and Order* on small entities. As required by the Regulatory Flexibility Act of 1980, as amended (RFA), an Initial Regulatory Flexibility Analysis (IRFA) was incorporated in the *Notice of Proposed Rulemaking (NPRM)* released in July 2018 in this proceeding (83 FR 44128, August 29, 2018). The Commission sought written public comment on the proposals in the *NPRM,* including comments on the IRFA. No comments were filed addressing the IRFA. This present Final Regulatory Flexibility Analysis (FRFA) conforms to the RFA.

Paperwork Reduction Act

The requirements in §§ 25.138(a) and (b); 25.147(a) through (c); 27.14(w)(1) through (4); 27.1412(b)(3)(i), (c) introductory text, (c)(2), (d)(1) through (2), and (f) through (h); 27.1413(a)(2) and (3), (b), and (c)(3) and (7); 27.1414(b)(3), (b)(4)(i) and (iii), and (c)(1) through (3) and (6) and (7); 27.1415; 27.1416(a); 27.1417; 27.1419; 27.1421; 27.1422(c); 27.1424; and 101.101, Note (2) constitute new or modified collections subject to the Paperwork Reduction Act of 1995 (PRA), Public Law 104–13. They will be submitted to the Office of Management and Budget (OMB) for review under Section 3507(d) of the PRA. OMB, the general public, and other Federal agencies will be invited to comment on the new or modified information collection requirements contained in this proceeding. In addition, the Commission notes that, pursuant to the Small Business Paperwork Relief Act of 2002, Public Law 107–198, see 44 U.S.C. 3506(c)(4), the Commission previously sought, but did not receive, specific comment on how the Commission might further reduce the information collection burden for small business concerns with fewer than 25 employees. The Commission describes impacts that might affect small businesses, which includes more businesses with fewer than 25 employees, in the Final Regulatory Flexibility Analysis.

Congressional Review Act

The Commission will send a copy of this Report & Order to Congress and the Government Accountability Office pursuant to the Congressional Review Act. *See* 5 U.S.C. 801(a)(1)(A). In addition, the Commission will send a copy of the *Report and Order and Order of Proposed Modification,* including this FRFA, to the Chief Counsel for Advocacy of the SBA. A copy of the *Report and Order and Order of Proposed Modification,* and FRFA (or summaries thereof) will also be published in the **Federal Register**.

Synopsis

I. Introduction

1. In this *Report and Order,* the Commission expands on its efforts to close the digital divide and promote U.S. leadership in the next generation of wireless services, including 5G wireless and other advanced spectrum-based services, by reforming the use of the 3.7–4.2 GHz band, also known as the C-Band. By repacking existing satellite operations into the upper 200 megahertz

of the band (and reserving a 20 megahertz guard band), the Commission makes a significant amount of spectrum—280 megahertz or more than half of the band—available for flexible use throughout the contiguous United States, and does so in a manner that ensures the continuous and uninterrupted delivery of services currently offered in the band. The Commission will hold a public auction to ensure that the public recovers a substantial portion of the value of this resource. And it schedules that auction for later this year, with a robust transition schedule to ensure that a significant amount of spectrum is made available quickly for upcoming 5G deployments. This action is the next critical step in advancing American leadership in 5G and implementing the Commission's comprehensive strategy to Facilitate America's Superiority in 5G Technology (the 5G FAST Plan).

II. Background

2. Mid-band spectrum is well-suited for next generation wireless broadband services given the combination of favorable propagation characteristics (as compared to high bands) and the opportunity for additional channel re-use (as compared to low bands). With the ever-increasing demand for more data on mobile networks, wireless network operators increasingly have focused on adding data capacity. One technique for adding capacity is to use smaller cell sizes—*i.e.,* have each base station provide coverage over a smaller area. Using mid-band frequencies can be advantageous for deploying a higher density of base stations. The decreased propagation distances at these frequencies reduce the interference between base stations using the same frequency, thereby allowing base stations to be more densely packed and increasing the overall system capacity. Mid-band spectrum thus presents wireless providers with the opportunity to deploy base stations using smaller cells to achieve higher spectrum reuse than the lower frequency bands while still providing indoor coverage. In addition, mid-band spectrum offers more favorable propagation characteristics relative to higher bands for fixed wireless broadband services in less densely populated areas. Given these characteristics, the Commission expects mid-band spectrum to play a prime role in next-generation wireless services, including 5G.

3. For these same reasons, mid-band spectrum was a key focus of Congress in the Making Opportunities for Broadband Investment and Limiting Excessive and Needless Obstacles to Wireless Act (MOBILE NOW Act), when it considered how to address the pressing need for more spectrum for wireless broadband. Specifically, Section 605(b) of the MOBILE NOW Act requires the Commission to evaluate ''the feasibility of allowing commercial wireless services, licensed or unlicensed, to use or share use of the frequencies between 3700 megahertz and 4200 megahertz.'' The MOBILE NOW Act also requires that, no later than December 31, 2022, the Secretary of Commerce and the Commission ''identify a total of at least 255 megahertz of Federal and non-Federal spectrum for mobile and fixed wireless broadband use.'' In making 255 megahertz available, the MOBILE NOW Act provides that 100 megahertz below 8 GHz shall be identified for unlicensed use, 100 megahertz below 6 GHz shall be identified for use on an exclusive, flexible-use, licensed basis for commercial mobile use, and 55 megahertz below 8 GHz shall be identified for licensed, unlicensed, or a combination of uses.

4. The United States is not alone in recognizing the potential of mid-band spectrum for 5G. International governing bodies and several other countries likewise are reviewing the suitability of a number of frequency bands for next generation 5G wireless services, including the 3.7–4.2 GHz bands. For example, the Radio Spectrum Policy Group of the European Commission issued a mandate to the European Conference of Postal and Telecommunications Administrations (CEPT) that the 3.4–3.8 GHz band be the first primary band for 5G, and CEPT currently is developing a report that will provide recommendations for updating the European regulatory framework for this band. A number of European governments are taking actions to make parts of the band available for 5G. Germany intends to make the 3.4–3.8 GHz band available by the end of 2021. In December 2019, France announced the procedures for awarding licenses in the 3.4–3.8 GHz band, which it allocated as a ''core'' 5G band, consistent with the European Commission's guidance. And the Austrian government held its first auction of 5G licenses in the 3.4–3.8 GHz band in the spring of 2019. There is also significant interest in parts of the band in Asia and in Australia. For example, the Ministry of Internal Affairs and Communications in Japan awarded licenses in the 3.6–4.1 GHz band for 5G in 2019. In August 2019, Australia initiated an initial investigation of possible arrangements for fixed and mobile broadband use in the 3.7–4.2 GHz band. And in November 2018, the United Arab Emirates issued licenses in the 3.3–3.8 GHz band for the establishment of 5G networks.

A. Current Use of the 3.7–4.2 GHz Band and Adjacent Bands

5. The 3.7–4.2 GHz band currently is allocated in the United States exclusively for non-Federal use on a primary basis for Fixed Satellite Service (FSS) and Fixed Service. For FSS, the 3.7–4.2 GHz band (space-to-Earth or downlink) is paired with the 5.925–6.425 GHz band (Earth-to-space or uplink), and collectively these bands are known as the ''conventional C-band.'' Domestically, space station operators use the 3.7–4.2 GHz band to provide downlink signals of various bandwidths to licensed transmit-receive, registered receive-only, and unregistered receive-only earth stations throughout the United States. FSS operators use this band to deliver programming to television and radio broadcasters throughout the country and to provide telephone and data services to consumers. The 3.7–4.2 GHz band is also used for reception of telemetry signals transmitted from satellites to earth stations, typically near the edges of the band, *i.e.,* at 3.7 GHz or 4.2 GHz.

6. Satellites operating in the C-band typically have 24 transponders, each with a bandwidth of 36 megahertz. Thus, the 24 transponders on a satellite use 864 megahertz of spectrum, or 364 megahertz more than the 500 megahertz available. This is the result of spectrum reuse—adjacent transponders overlap, and self-interference is avoided by using opposite polarizations. Under existing rules, space station operators in the 3.7–4.2 GHz band are authorized to use all 500 megahertz exclusively at any orbital slot, but non-exclusively in terms of geographic coverage. Therefore, multiple FSS incumbents using satellites deployed at different locations in the geostationary orbit can transmit within overlapping geographic boundaries. Space stations that serve or transmit signals into the U.S. market may also be providing service to other countries.

7. For the Fixed Service in the 3.7–4.2 GHz band, 20 megahertz paired channels are assigned for point-to-point common carrier or private operational fixed microwave links. There are fewer than 100 fixed service licensees operating in the band.

8. Last year, in response to a Bureau-level public notice, space station operators and earth station owners filed certifications and information regarding their 3.7–4.2 GHz usage. Intelsat License

LCC (Intelsat), SES Americom, Inc. (SES), Eutelsat S.A. (Eutelsat) and Telesat Canada, ABS Global (ABS), Hispamar S.A. (Hispasat), and Star One S.A. (Star One) provided specific information on the existing C-band downlink capacity and contracted use for 66 satellites authorized to provide service in the 3.7–4.2 GHz band to the United States. In March 2019, the most recent month of data collected, the combined FSS downlink capacity and usage of those 66 satellites was, respectively, 59,427 megahertz and 33,138 megahertz in total with 19,961 megahertz of usage providing service to the United States (*i.e.,* 33.59% of the total capacity of the 66 satellites). Intelsat, SES, Eutelsat, Telesat Canada, and Star One have publicly disclosed the provision of service to registered earth stations in the United States in the 3.7–4.2 GHz band.

9. The spectrum band immediately below the 3.7–4.2 GHz band is already authorized for commercial wireless operations. In 2015, the Commission established the Citizens Broadband Radio Service in the 3.55–3.7 GHz band for shared use between commercial wireless operations and incumbent operations—including military radar systems, non-federal FSS earth stations, and, for a limited time, grandfathered wireless broadband licensees in the 3.65–3.7 GHz band. Under the Commission's rules, existing terrestrial wireless operations in the 3.65–3.7 GHz band are grandfathered for up to five years or until the end of their license term, whichever is longer. The Citizens Broadband Radio Service is available for flexible wireless use and will support next generation wireless services, including 5G. Spectrum at or below the 3.7 GHz band is also used for reception of telemetry signals transmitted by satellites. The band just above the 3.7–4.2 GHz band—4.2–4.4 GHz—is allocated for aeronautical radionavigation using radio altimeters in the United States. In 2015, the World Radio Conference added a global co-primary allocation for wireless avionics intra-communications systems. Radio altimeters are critical aeronautical safety-of-life systems primarily used at altitudes under 2500 feet and must operate without harmful interference. Wireless Avionics Intra-Communications systems provide communications over short distances between points on a single aircraft and are not intended to provide air-to-ground communications or communications between two or more aircraft.

B. Procedural History

10. *Mid-Band Notice of Inquiry.*—In the *NOI,* the Commission began an evaluation of whether spectrum between 3.7 GHz and 24 GHz could be made available for flexible wireless use. The *NOI* sought comment in particular on three mid-range bands that stakeholders had identified for expanded flexible use (3.7–4.2 GHz, 5.925–6.425 GHz, and 6.425–7.125 GHz), and it asked commenters to identify other mid-range frequencies that may be suitable for expanded flexible use. The Commission asked questions specific to the challenges and opportunities presented by each band. For example, the Commission asked commenters to identify options for more intensive fixed and mobile use in the 3.7–4.2 GHz band, including whether the band is desirable or suitable for mobile use, whether the existing Fixed Service rules should be modified to support more flexible and intensive fixed use, such as point-to-multipoint services.

11. *Freeze and Filing Window Public Notices.*—In April 2018, the Wireless Telecommunications, International, and Public Safety and Homeland Security Bureaus announced a temporary freeze on the filing of new or modified applications for earth station licenses, receive-only earth station registrations, and fixed microwave licenses in the 3.7–4.2 GHz band, in order to preserve the current landscape of authorized operations in the band pending the Commission's consideration of the issues raised in response to the *NOI.* In June 2018, the International Bureau established a window ending October 17, 2018 (later extended to October 31, 2018), for filing applications to license or register existing earth stations in the 3.7–4.2 GHz frequency band as a limited exception to the earth station application freeze. Further, the International Bureau announced a temporary freeze on the filing of certain space station applications, effective June 21, 2018.

12. *Order and Notice of Proposed Rulemaking.*—In July 2018, the Commission adopted an *Order and Notice of Proposed Rulemaking* (83 FR 44128, Aug. 28, 2018) (*Order and NPRM*) in this proceeding. To enable the Commission to make an informed decision about the proposals discussed in the *NPRM,* the *Order* required certain parties to file information about their operations—including information on the scope of current FSS use of the band—and it noted that several of the potential transition methods outlined in the *NPRM* might require additional earth station or space station information.

13. In the *NPRM,* the Commission sought comment generally on the future of incumbent use of the 3.7–4.2 GHz band and specifically on how to define the classes of incumbents, including earth stations, space stations, and point-to-point FS. The Commission sought comment on revising its part 25 rules to limit eligibility to file applications for earth station licenses or registrations to incumbent earth stations, proposed to update International Bureau Filing System (IBFS) to remove 3.7–4.2 GHz band earth station licenses or registrations for which the licensee or registrant did not file the certifications required in the *Order* (to the extent they were licensed or registered before April 19, 2018), and sought comment on how to maintain the accuracy of IBFS data. Regarding space stations, the Commission proposed to revise its rules to bar new applications for space station licenses and new petitions for market access concerning space-to-Earth operations in the 3.7–4.2 GHz band. Given the limited number of point-to-point Fixed Service licensees in the band, the Commission proposed to sunset point-to-point Fixed Service use in the band, and it sought comment on whether existing fixed links should be grandfathered or transitioned out of the band over some time period, after which all licenses would either be cancelled or modified to operate on a secondary, non-interference basis.

14. The Commission also sought comment on the current and future economic value of FSS in the band, on approaches for expanding flexible and more intensive fixed use of the band without causing harmful interference to incumbent operations, and on proposals to clear all or part of the band for flexible use. More specifically, the Commission sought comment on a variety of approaches for expanding flexible use in the 3.7–4.2 GHz band, including market-based, auction-based, hybrid, and other approaches to repurpose some or all of the band. The Commission also sought comment on the appropriate band plan, as well as the licensing, operating, and technical rules for any new flexible use licenses in the band. In response to the *NPRM,* comments and reply comments were due on October 29, 2018 and December 11, 2018, respectively.

15. *May Public Notice.*—On May 3, 2019, the International and Wireless Telecommunications Bureaus issued a public notice (84 FR 25514, June 3, 2019) (*May 3 Public Notice*) seeking comment on positions taken by the C-Band Alliance, the Small Satellite

Operators, and T-Mobile. The *May 3 Public Notice* sought comment on the enforceable interference protection rights, if any, granted to space station operators against co-primary terrestrial operations and whether those rights depend on the extent to which incumbent earth stations receive their transmissions within the United States. The *May 3 Public Notice* also sought comment on the enforceable interference protection rights granted to licensed or registered receive-only earth station operators against co-primary terrestrial operations and whether registered receive-only earth station operators are eligible as ''licensee[s]'' under Section 309(j)(8)(G), to voluntarily relinquish their rights to protection from harmful interference in the reverse phase of an incentive auction. The *May 3 Public Notice* also asked whether the Commission had authority to offer payments to such earth stations to induce them to modify or relocate their facilities. The *May 3 Public Notice* also sought comment on the limits, if any, that Section 316 of the Act places on the proposals raised by the Commission in the *NPRM* or by the commenters in this docket and on obligations, if any, that Section 316 of the Act places on the Commission vis-à-vis licensed or registered receive-only earth station operators.

16. *July Public Notice.*—On July 19, 2019, the Wireless Telecommunications Bureau, International Bureau, Office of Engineering and Technology, and Office of Economics and Analytics issued a public notice (84 FR 35365, July 23, 2019) (*July 19 Public Notice*) seeking comment on filings by: (1) ACA Connects—America's Communications Association, the Competitive Carriers Association, Charter Communications, Inc. (ACA Connects Coalition); (2) AT&T; and (3) the Wireless internet Service Providers Association, Google, and Microsoft (WISPA plan). In particular, the *July 19 Public Notice* sought comment on ways to increase the efficient shared use of the C-band through the submitted plans, the viability of ACA Connects Coalition's plan to move all video programming to fiber, and the viability of fiber generally.

III. Report and Order

17. The Commission believes C-band spectrum for terrestrial wireless uses will play a significant role in bringing next-generation services like 5G to the American public and assuring American leadership in the 5G ecosystem. The Commission takes action to make this valuable spectrum resource available for new terrestrial wireless uses as quickly as possible, while also preserving the continued operation of existing FSS services during and after the transition. The record in this proceeding makes clear that licensing mid-band spectrum for flexible use will lead to substantial economic gains, with some economists estimating billions of dollars in increases on spending, new jobs, and America's economy. At the same time, the Commission also recognizes the significant benefit to consumers provided by incumbent FSS services throughout the United States. Because the Commission finds that incumbent space station operators will be able to maintain the same services in the upper 200 megahertz as they are currently providing across the full 500 megahertz of C-band spectrum, the rules adopted in this *Report and Order* will benefit the American public by simultaneously preserving existing FSS services and making way for the provision of next-generation wireless services throughout the contiguous United States.

18. In this *Report and Order,* the Commission concludes that a public auction of the lower 280 megahertz of the C-band will best carry out the Commission's goals, and it adds a mobile allocation to the 3.7–4.0 GHz band so that next-generation services like 5G can use the band. Relying on the *Emerging Technologies* framework, the Commission adopts a process to relocate FSS operations into the upper 200 megahertz of the band, while fully reimbursing existing operators for the costs of this relocation and offering accelerated relocation payments to encourage a speedy transition. The Commission also adopts service and technical rules for overlay licensees in the 280 megahertz of spectrum designated for transition to flexible use.

A. Public Auction of 280 Megahertz of C-Band Spectrum for Flexible Use

19. After review of the extensive record in this proceeding, the Commission adopts a traditional Commission-administered public auction of overlay licenses in the 280 megahertz of C-band spectrum made available for flexible use. The Commission adopts this approach because it will rapidly and effectively repurpose this band for new wireless terrestrial uses, rely on established mechanisms for putting this valuable spectrum to its highest valued use pursuant to statutory criteria designed to promote competition and other important public interest goals, and provide reasonable accommodations to eligible space station operators and incumbent earth stations. The advantages of the public auction include making a significant amount of 3.7–4.2 GHz band spectrum available quickly for flexible-use licenses and adopting a transition period that aligns stakeholders' incentives, particularly those of incumbent FSS operators, so as to achieve an expeditious transition, while ensuring effective accommodation of relocated incumbent users.

20. In the *NPRM,* the Commission sought comment on a variety of market-based mechanisms for expanding flexible use in the 3.7–4.2 GHz band, including a private sale approach, auction mechanisms, and other hybrid approaches that combined elements of various mechanisms. For the private sale approach, the *NPRM* sought comment on a process whereby the satellite industry voluntarily would negotiate with any interested terrestrial operators for the sale of the space station operators' rights in the band and then would clear the negotiated-for spectrum and make it available for flexible use while ensuring uninterrupted incumbent earth station operations through a variety of potential means. With respect to more traditional, Commission-led transition mechanisms, the *NPRM* sought comment on various auction approaches, such as an overlay, incentive, and capacity auctions, including transition mechanisms used in prior proceedings. The *May 3 Public Notice* sought additional comment on the Commission's authority under the Act as well as approaches raised by the C-Band Alliance and T-Mobile. And the *July 19 Public Notice* sought additional comment on a public auction approach advocated by ACA Connects (the ACA Plan), among other issues. Under each of these approaches, the Commission sought comment on how to ensure that incumbent C-band users are effectively transitioned out of the spectrum made available for flexible-use and on whether to provide reimbursement to incumbent space station operators for the costs of transitioning their services.

21. The Commission adopts a traditional Commission-administered public auction of overlay licenses to make the C-band spectrum available expeditiously for next-generation terrestrial wireless use. With overlay licenses, the licensees obtain the rights to geographic area licenses ''overlaid'' on top of the incumbent licensees, meaning that they may operate anywhere within its geographic area, subject to protecting the operations of incumbent licensees. The Commission has offered two basic forms of overlay licenses: One that grandfathers legacy incumbents and allows their voluntary relocation, and another that makes relocation of incumbents to comparable facilities mandatory. The Commission

adopts the latter approach—assigning overlay licenses via public auction with rules for clearing the band for flexible use and holding incumbents harmless—for several reasons.

22. *First,* the Commission finds that a public auction of flexible-use licenses—conditioned upon relocation of incumbent operations—will best ensure fairness and competition in the allocation of these new flexible-use licenses. The Commission has a long and successful history conducting public auctions of spectrum and has well-established oversight processes designed to promote transparency and ensure that valuable public spectrum resources are put to their highest and best use, while also promoting other public interest goals articulated in Section 309(j) of the Act. In more recent years, public auctions of new flexible-use rights have played a pivotal role in transitioning existing bands and making spectrum available for new uses. Importantly, the Commission carefully designs each auction to include transparent procedures that promote fair-market pricing and robust participation from a diverse group of bidders. Commission control and oversight of the auction of new flexible-use licenses in the 3.7–3.98 GHz band will ensure that a wide range of interested parties have fair and equal access to new spectrum rights that will be vital to the introduction of next-generation wireless services.

23. *Second,* a public auction will maintain the Commission's ability to ensure that incumbent space station operators and earth station owners are able to provide and receive the services and content that they currently provide and receive both during and after mandatory relocation. The safeguards the Commission adopts in conjunction with a public auction ensure that the clearing process is both equitable and transparent and that it provides customers of these incumbent C-band providers assurance that they will continue to be able to receive C-band services during and after the transition. In addition to licensing and technical rules designed to promote harmony between existing C-band services and new flexible uses in the band, the Commission adopts rules for the transition process to ensure that all relevant stakeholders have access to information regarding the necessary steps, costs, respective obligations of each party, and overall timeline for transitioning existing C-band services to the upper 200 megahertz of the band. The Commission's experience in overseeing other complicated, multi-stakeholder transitions of diverse incumbents demonstrates the need for Commission rules and oversight of the transition process to mitigate disputes among stakeholders, expedite the clearing process, and ensure all affected parties receive what they are entitled to in a timely manner.

24. *Third,* the Commission finds that its authority to hold such an auction is firmly established. Section 309 governs the Commission's process for granting licenses under Title III, and it expressly grants the Commission authority to hold an auction where mutually exclusive applications are accepted for initial spectrum licenses. The Commission has used an auction of overlay licenses on a number of occasions to repurpose spectrum for a new service, by requiring incoming licensees to clear the band (typically by funding the relocation of incumbent licensees) in order to fully deploy the new service in a manner that meets the goals and requirements that the Commission had established under Section 303 for providing that service. Since 1992, the Commission has also adopted a series of rules to enable new licensees to enter into voluntary or mandatory negotiations with incumbent operators to clear a spectrum band after which, failing an agreement, the new entrant could involuntarily clear incumbent operations by expressing its intent to commence operations in that band and paying for all reasonable relocation costs. Courts repeatedly have approved the Commission's use of this authority as a means of introducing new services and ensuring that displaced incumbents are placed in positions comparable to those that they had occupied prior to displacement. In light of this well-established precedent and the Commission's repeated success in conducting such auctions in a manner that promotes the public interest, convenience, and necessity, the Commission finds that it has ample legal authority to employ an auction of overlay licenses as a means of introducing new flexible uses in the C-band.

25. *Fourth,* the Commission finds that holding a public auction will ensure this spectrum gets put to its highest, best use quickly. In formulating the transition process and rules adopted in this *Report and Order,* stakeholders have repeatedly emphasized the need to make C-band spectrum available for flexible use as quickly as possible, with the goal of conducting an auction of overlay licenses in the 3.7–3.98 GHz band by the end of 2020. Indeed, by seeking comment, in a separate public notice, on procedures for an auction of 3.7 GHz Service licenses concurrently with this *Report and Order,* the Commission immediately initiates the necessary Commission processes to prepare for an auction. Notably, while satisfying the administrative procedures and requirements associated with a Commission-administered auction, the timelines adopted in this *Report and Order* result in spectrum being made available for flexible use at least as quickly as any of the other transition mechanisms proposed in this proceeding.

26. The Commission's decision to hold a public auction has overwhelming support in the record. A range of commenters with diverse interests support Commission-led auction approaches—including those involving spectrum clearing and geographic clearing—and they emphasize the importance, regardless of the chosen transition approach, that the Commission maintain oversight throughout the transition process. Several commenters support a traditional forward auction, using a standard clock auction format such as that used in Auction 102 for the 24 GHz band. Many commenters that support a public auction of flexible-use licenses in a portion of the 3.7–4.2 GHz band emphasize that the approach must also include a condition on the licenses requiring new flexible-use licensees to reimburse incumbent C-band users for their relocation costs. Certain parties that originally advocated for alternate transition mechanisms in this proceeding have come to support a public auction of overlay licenses as an effective approach to repurposing C-band spectrum for flexible use.

27. Next, the Commission designates 280 megahertz of C-band spectrum (3.7–3.98 GHz) throughout the contiguous United States to be cleared for auction plus another 20 megahertz (3.98–4.0 GHz) to be cleared to serve as a guard band. Given the high demand for mid-band spectrum, the Commission in the *NPRM* sought comment on whether to set a ''socially efficient amount of [C-band] spectrum'' for repurposing in order to ensure this valuable spectrum is put to its highest and best use.

28. The Commission finds that clearing the lower 280 megahertz (plus a 20 megahertz guard band) of the C-band strikes the appropriate balance between making available as much spectrum as possible for terrestrial use in a short timeframe and ensuring sufficient spectrum remains to support and protect incumbent uses. In particular, the Commission finds that making 280 megahertz available for flexible use is sufficiently large to spur necessary investment in equipment and network deployment resources for next-

generation wireless services in this band. Numerous commenters support clearing 280 megahertz or more to support terrestrial 5G use.

29. The Commission's approach will permit all incumbents to maintain comparable service for existing customers and to obtain future customers in the upper part of the band, while making more efficient use of the band as a whole. C-band space station operators that currently are serving U.S. customers are in a unique position to quickly clear a significant portion of this band spectrally by transitioning their services to the upper portion of the band. Through a process of ''satellite grooming,'' each satellite company can use their internal fleet management resources to determine the most efficient way to migrate customers to the upper portion of the band, including in some instances by migrating customers to transponders on a different space station operator's fleet. The record adequately demonstrates the satellite industry's ability to clear 280 megahertz for public auction, along with a 20 megahertz guard band, while also ensuring that its customers and incumbent earth station operators are adequately transitioned and able to continue operations without interruption. Furthermore, the rules adopted in this *Report and Order* will ensure that incumbent operations are adequately accommodated and can continue to make use of existing satellite services, while incurring no significant transition costs. The Commission therefore finds that an auction of the lower 280 megahertz of C-band spectrum across the contiguous United States will best advance the Commission's goal of ensuring the United States' leadership in 5G deployment and service offerings without compromising the continued operation of existing C-band services.

30. The Commission's decision to hold a public auction of overlay licenses to operate in the 3.7–3.98 GHz band is the result of careful review of the extensive record in this proceeding, which included transition mechanism proposals submitted by a variety interested parties across stakeholder groups.

31. *C-Band Alliance.*—The Commission declines to adopt the C-Band Alliance proposal for a private sale approach led by incumbent C-band space station operators. The Commission finds that, relative to the C-Band Alliance proposal, the use of a public auction will provide a greater benefit to potential bidders, ensure Commission oversight and protect the interests of displaced incumbent C-band users, promote a rapid transition, and be more firmly grounded in established legal authority. *First,* the C-Band Alliance proposal would place the licensee selection process for an entire band of newly configured spectrum into private hands by vesting private entities with the exclusive ability to allocate new terrestrial rights to valuable C-band spectrum through privately negotiated sales that would not be subject to any of the procedural protections or public interest requirements that Commission-led auctions are designed to promote. Such an approach lacks the transparency and procompetitive features of a public auction and would provide bidders with less certainty about fair and equal access to new flexible-use licenses. In contrast to a private sale conducted by private entities whose primary incentive would be to maximize profits, a Commission-led auction will be driven by broader public interests, including robust participation by a diverse group of bidders, competitive pricing, and transparent allocation of this valuable public resource.

32. *Second,* Commission oversight of the public auction and issuance of flexible-use licenses conditioned upon relocation of incumbent operations will more effectively ensure that all incumbent C-band users are made whole upon completion of the transition. The C-Band Alliance's proposal would give certain incumbent space station operators substantial discretion to decide whether and to what extent all affected C-band users should be accommodated in the transition and compensated for their relocation costs. This responsibility is directly at odds with space station operators' fiduciary duties to their shareholders to maximize the retained profits from the private sale. In contrast, Commission oversight of a public auction and the transition process will be specifically designed to ensure that incumbent C-band users are able to maintain their existing services and are reimbursed for all reasonable costs associated with the transition.

33. *Third,* the Commission believes that a public auction of overlay licenses will make spectrum available for flexible-use just as fast as a private sale approach. Indeed, the Commission plans to hold the public auction this year—just as the C-Band Alliance had proposed for its private sale—and the Commission incorporates aspects of their proposed transition process and deadlines into this *Report and Order.* The Commission disagrees with the C-Band Alliance argument that any Commission-led auction mechanism would fail to overcome the holdout problem due to non-exclusive incumbent rights in the band and would require significant Commission intervention that would delay the auction approach relative to a market-based approach. Despite its initial claim that its private sale proposal would solve the holdout problem by incentivizing incumbent space station operators to cooperate in the transition and collectively sell their shared spectrum rights to new flexible-use licensees, only three incumbent C-band space station operators are members of the C-Band Alliance and have fully supported the C-Band Alliance's proposal. Unless the Commission were to adopt rules granting the C-Band Alliance exclusive authority to lead the transition and compelling non-member space station operators to cooperate with the C-Band Alliance's approach, there would be a potential, and indeed likely, holdout problem that could undermine the success of such a transition. The Commission believes such exclusive authority would raise significant competitive concerns in the absence of unanimity among incumbent space station operators. In other words, due to the existing licensing regime in this band, the potential holdout problem needs to be addressed regardless of whether the Commission adopts a public auction or private sale approach. The rules adopted in this *Report and Order* are specifically designed to reduce the risk of potential holdouts by aligning the incentives of all relevant C-band space station operators with the Commission's goals of rapid introduction of C-band spectrum into the marketplace, and the Commission finds that its public auction approach will provide for rapid clearing upon final action in this proceeding.

34. *Finally,* the Commission finds that a public auction is more consistent with the Commission's long-standing legal authority to manage spectrum in the public interest than a private sale conducted by incumbent space station operators. In contrast to the Commission's well-established authority to conduct auctions of overlay licenses conditioned upon the relocation of incumbent users, the C-Band Alliance proposal would require an unprecedented grant of authority to private entities to negotiate with new entrants for the conveyance of spectrum-use rights that FSS licensees do not currently have. While the Commission has previously modified the existing licenses of incumbents to assign new license rights without creating a mechanism to allow for the

filing of mutually exclusive applications, such modifications were adopted in order to authorize the incumbent licensees to provide new or additional services. Under the C-Band Alliance proposal, the Commission would be granting incumbent space station operators new flexible-use rights *solely* for the purpose of allowing the incumbents to sell those rights on the secondary market, without actually requiring them to meet any buildout requirements or initiate terrestrial service. Indeed, given the full band, full arc nature of FSS licenses, incumbent space station operators could not provide terrestrial mobile services without causing interference to existing C-band satellite services.

35. *T-Mobile Proposal.*—The Commission declines to adopt T-Mobile's proposal of an incentive auction and modified proposal of a more traditional forward auction of flexible-use licenses. *First,* T-Mobile's proposal exceeds our incentive auction authority. Section 309(j)(8)(G) restricts our use of incentive auctions so that only ''licensees'' may voluntarily relinquish licensed ''spectrum usage rights'' in exchange for accelerated relocation payments. Unlike the incumbent space station operators, earth station registrants are not licensees. The Communications Act defines the term ''license'' narrowly as ''that instrument of authorization *required by* [the Act] or the rules and regulations of the Commission made pursuant to [the Act], for the use or operation of apparatus for *transmission* of energy, or communications, or signals by radio, by whatever name the instrument may be designated by the Commission.'' Since 1979 the Commission has found that licensing receive-only earth stations was not required by the Communications Act because, by definition, such earth stations do not transmit energy, communications, or signals by radio, and since 1991 receive-only earth stations have not been eligible to apply for a Commission license. While some receive-only earth stations in the C-band are licensed to transmit in another band (*i.e.,* licensed transmit-receive earth stations), that license to transmit does not provide the earth station operator with the right to transmit in the C-band, where they hold no ''licensed spectrum usage rights.'' Because receive-only earth stations are (and must be) unlicensed and have no ''transmission'' authority, earth station registrants may not participate in the supply-side of an incentive auction.

36. *Second,* because FSS licensees in the C-band share the same non-exclusive rights to transmit nationwide, across the full 500 megahertz, their license rights are not substitutes such that they could compete against one another in a reverse auction to forfeit those rights; all incumbent space station operators would need to clear their existing services from a portion of the band in order to make that spectrum available for flexible use. Section 309(j)(8)(G) specifically requires that, in order for the Commission to hold an incentive auction, ''at least two *competing* licensees participate in the reverse auction.'' Because incumbent C-band space station operators are not competing licensees that could bid against one another in a reverse auction, T-Mobile's proposal would be an unlawful exercise of the Commission's incentive auction authority.

37. *Third,* the incentive auction would result in a patchwork of spectrum and geographic areas being made available for flexible use, rather than a uniform block of spectrum being cleared throughout the contiguous United States. T-Mobile's proposal would allow incumbent earth station owners to agree to clear geographically, for example by switching existing C-band services to fiber. This would likely result in a disproportionate amount of C-band spectrum being made available in urban areas, where the demand for C-band spectrum is higher and the costs of transitioning to alternative transition mechanisms is lower than in rural areas. The Commission therefore finds that T-Mobile's proposal would undermine the Commission's stated goals for this proceeding to close the digital divide and promote the introduction of next-generation wireless services in all communities, both rural and urban, throughout the contiguous United States.

38. Because our public auction of overlay licenses provides a Commission-led auction mechanism to make 280 megahertz available for flexible use throughout the contiguous United States and compensate incumbent C-band users for their relocation costs, the Commission finds that it captures all the benefits of T-Mobile's proposal while avoiding the legal and practical complications of an incentive auction in this band. Indeed, T-Mobile now agrees that a traditional forward auction of overlay licenses will be a more straight-forward approach to implement than the incentive auction it originally proposed.

39. *ACA Connects Coalition Proposal.*—The Commission declines to adopt the ACA Connects Coalition proposal to transition MVPD earth stations to fiber and repack remaining earth station users into the upper portion of the band. *First,* while the ACA Connects Coalition proposes a public auction to award new terrestrial flexible-use licenses and assign obligations for transition costs, it does not provide potential bidders with the same certainty as the public auction of overlay licenses adopted here. Importantly, the ACA Connects Coalition suggests that programmers, MVPDs, and C-band service providers would negotiate contracts and develop plans for the transition ''in the period between an FCC decision and the completion of an auction.'' However, such private contract negotiations would involve decisions—such as how much spectrum will be made available, in which geographic areas, and on what timeline—that would be crucial for potential bidders to understand in advance of the auction. It is unclear from the ACA Connects Coalition proposal when these decisions would be made and how that information would be conveyed to potential bidders such that they could make informed decisions about the spectrum band and geographic areas they would compete for at auction. The Commission finds that its public auction of overlay licenses will provide bidders with more certainty by designating a uniform block of 280 megahertz that will be made available for flexible use throughout the contiguous United States.

40. *Second,* the Commission finds that its approach will more effectively ensure that all incumbent C-band users are adequately transitioned and able to continue receiving C-band services after the introduction of new terrestrial wireless operations in the 3.7 GHz Service. The Commission agrees with those commenters who point out that the ACA Connects Coalition proposal lacks important implementation details, such as how to manage the transition of a wide variety of stakeholders, including the design, testing, construction, and integration of nationwide fiber networks and the necessary provisions for maintaining fiber operations in the future. In contrast to the ACA Connects Coalition proposal, the approach the Commission adopts here ensures that incumbent earth station owners will be effectively transitioned and will be able to receive the same C-band services after the transition as they do today.

41. *Third,* the Commission finds that the ACA Connects Coalition proposal is likely to underestimate the complexities and costs of transitioning from C-band satellite spectrum to fiber and would be unlikely to facilitate more rapid and extensive deployment of terrestrial wireless services than the approach the

Commission adopts in this *Report and Order.* The ACA Connects Coalition proposes that clearing would be conducted on a market-by-market basis, which would have ''some urban markets'' available for flexible-use in approximately 30 months, the ''majority of remaining markets'' in three years, and the last, ''hard-to-build areas'' in five years. The Commission shares the concerns of many commenters who doubt that the ACA Connects Coalition proposal could be completed by those timelines. The Commission finds that its approach minimizes the costs, complexities, and risks of delay inherent in the ACA Connects Coalition proposal and is therefore more likely to clear a substantial amount of C-band spectrum in a faster timeframe via a more efficient mechanism.

42. *Fourth,* the Commission finds that the approach adopted in this *Report and Order* is more consistent with the Commission's legal authority to manage spectrum and conduct auctions in the public interest than the ACA Connects Coalition proposal. Section 309(j) of the Act requires that all proceeds from the use of a competitive bidding system must be deposited in the U.S. Treasury. The ACA Connects Coalition proposal that the Commission retain a portion of the revenues from a traditional forward auction to cover the C-band incumbents' relocation costs would therefore violate the provisions of Section 309(j). There is an exception to this rule where the Commission exercises its incentive auction authority to incentivize incumbent licensees to relinquish their spectrum usage rights in exchange for a share of the auctions proceeds. However, because space station operators have non-exclusive rights the full C-band nationwide, an incentive auction in this band would fail to satisfy the Section 309(j)(8)(G) requirement that at least two competing licensees must participate in the reverse auction. The Commission therefore finds that the ACA Connects Coalition proposal would be an unlawful exercise of the Commission's incentive auction authority.

1. Allocation of the 3.7–4.2 GHz Band

43. The Commission adopts rules to add a primary non-Federal mobile, except aeronautical mobile, allocation to the 3.7–4.0 GHz band nationwide. In the United States, that band currently has exclusive non-Federal allocations for FSS and Fixed Service. In addition, the International Table of Frequency Allocations also has a mobile allocation worldwide in the band, with the limitation that in the Americas, Southeast Asia, Australia, and New Zealand, the mobile allocation excludes aeronautical mobile.

44. As the Commission noted in the *NPRM,* Section 303(y) provides the Commission with authority to provide for flexibility of use if: ''(1) Such use is consistent with international agreements to which the United States is a party; and (2) the Commission finds, after notice and opportunity for public comment, that (A) such an allocation would be in the public interest; (B) such use would not deter investment in communications services and systems, or technology development; and (C) such use would not result in harmful interference among users.'' Adopting a primary non-Federal mobile, except aeronautical mobile, allocation to the 3.7–4.0 GHz band and revising the FSS allocation within the contiguous United States will foster more efficient and intensive use of mid-band spectrum to facilitate and incentivize investment in next generation wireless services. Mid-band spectrum is important for next generation wireless broadband service due to its favorable propagation and capacity characteristics. Allocating the 3.7–4.0 GHz band nationwide for mobile services also meets the Commission's mandate under the MOBILE NOW Act to identify spectrum for mobile and fixed wireless broadband use. In addition, adopting this allocation will harmonize the Commission's allocations for the 3.7–4.0 GHz band with international allocations. Adding a primary mobile service allocation will provide the ability to make as much mid-band spectrum available as possible, which will help to ensure the nation's success in deploying the next generation of wireless services. Finally, because we adopt rules designating 3.98–4.0 GHz as a guard band and requiring FSS and Fixed Service licensees to transition their services to the upper portion of the band and to other bands, respectively, the introduction of mobile use will not result in harmful interference among users of the 3.7–4.2 GHz band.

45. The Commission also removes the FSS allocation within the contiguous United States in the 3.7–4.0 GHz band. To allow for flexible use of the 3.7–3.98 GHz band within the contiguous United States and for fixed use outside of the contiguous United States, the Commission leaves in place the existing Fixed Service allocation to the 3.7–4.2 GHz band while sunsetting the existing licenses for point-to-point operations within the contiguous United States. Authorizations for FSS and Fixed Service operations outside of the contiguous United States may continue to operate in the entire 3.7–4.2 GHz band. The Commission excludes locations outside of the contiguous United States from the public auction and relocation. Locations outside of the contiguous United States have a greater need for C-band services, particularly for the provision of services necessary for the protection of life and property—including telehealth, E911, and education services. The Commission agrees that Alaska, Hawaii, and the U.S. territories should be excluded from any reallocation and repurposing to terrestrial use because C-band service is often the only option available to reach remote villages to provide basic telephone service, E911, and broadband service used to support applications such as telehealth and distance learning. As a result, we believe it is appropriate to retain the FSS allocation across the 3.7–4.2 GHz band outside the contiguous United States.

46. The Commission also modifies footnote NG457A which describes the status of earth stations on vessels in 3.7–4.2 GHz to be consistent with its new band plan. NG457A will now provide that incumbent licensees may continue to provide service to earth stations on vessels on an unprotected basis vis-à-vis both fixed service operations and the new mobile services. In addition, NG457A will now limit the band where ESVs may be coordinated for up to 180 days to 4.0–4.2 GHz rather than 3.7–4.2 GHz as in the existing footnote because FSS will no longer have primary status below 4 GHz. These changes are necessary because of the addition of mobile services and the deletion of FSS in the 3.7–4.0 GHz band. While these changes to NG457A were not specifically proposed in the *NRPM,* they logically follow from the allocation changes that were proposed because earth stations on vessels are an application of the FSS and we proposed to remove FSS from some or all of the band in the *NPRM.*

47. The Commission's plan will ensure that content that FSS now delivers to incumbent earth stations will continue uninterrupted as an essential element of the transition mechanism. Although the Commission allocates the 3.98–4.0 GHz band to mobile services, except aeronautical, for flexible use, the Commission declines at this time to establish service rules for that band. Instead, it will function as a guard band to protect earth station registrants from harmful interference both during and after the transition. The Commission also declines to add a mobile allocation to the 4.0–4.2 GHz band reserved for primary FSS use at this time, as doing so could undermine investment in content distribution. Figures 1 and 2

below demonstrate the post-transition allocation and uses of the band in the contiguous United States and in the rest of the United States, respectively.

Figure 1: Post-Transition 3.7-4.2 GHz Band Allocations in the Contiguous United States

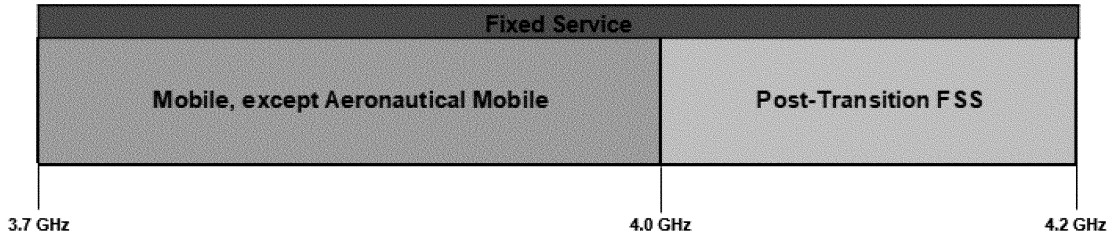
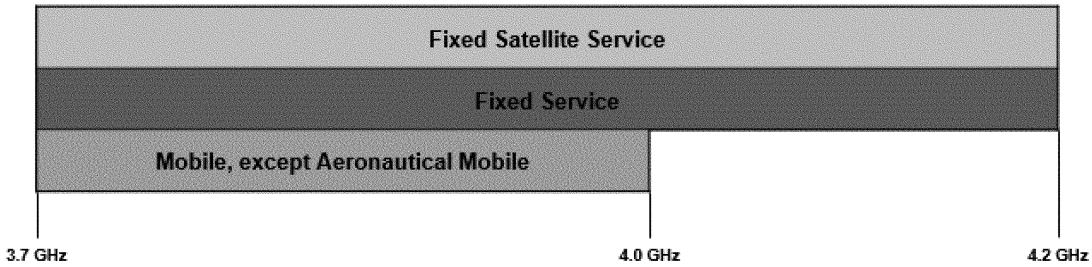


Figure 2: Post-Transition 3.7-4.2 GHz Band Allocations Outside the Contiguous United States



2. Competitive Bidding Rules

48. The Communications Act requires that the Commission resolve any mutually exclusive applications for new flexible-use licenses in this band through a system of competitive bidding. In the *NPRM,* the Commission sought comment on our proposal to conduct any auction for licenses in this band in conformity with the general competitive bidding rules set forth in part 1, subpart Q, of the Commission's rules. The Commission specifically proposed to employ part 1 rules governing competitive bidding design, application and certification procedures, reporting requirements, the prohibition on certain communications regarding the auction, and designated entity preferences and unjust enrichment. These competitive bidding rules provide a framework for the auction process. More detailed, auction-specific procedures will be addressed in the separate pre-auction process.

49. Given the record and the Commission's experience in successfully conducting auctions pursuant to the part 1 rules, the Commission adopts its proposal to employ those rules when developing the auction for new licenses in this band. Should the Commission subsequently modify its general competitive bidding rules, the modifications would apply as well.

50. We note that Section 647 of the Open-market Reorganization for the Betterment of International Telecommunications Act (ORBIT Act) prohibits the Commission from assigning by competitive bidding either orbital locations or spectrum used for the provision of international or global satellite communications services. In the *NPRM,* the Commission tentatively concluded that the ORBIT Act prohibition would not apply here, since any auctioned spectrum would be used for a new domestic terrestrial service, and the auction mechanisms would not be used to assign by competitive bidding orbital locations or spectrum used for the provision of international or global satellite communications services.

51. The Commission affirms its tentative conclusion. Based on the record and consistent with precedent on this issue, the Commission finds that Section 647 of the ORBIT Act does not prohibit it from assigning terrestrial licenses in this band through a system of competitive bidding.

a. Designated Entity Provisions

52. In the *NPRM,* the Commission sought comment on a proposal for bidding credits to be offered to designated entities when conducting an auction of new licenses in this band. In authorizing the Commission to use competitive bidding, Congress mandated that the Commission ''ensure that small businesses, rural telephone companies, and businesses owned by members of minority groups and women are given the opportunity to participate in the provision of spectrum-based services.'' Based on the its prior experience with the use of bidding credits in spectrum auctions, the Commission finds that using bidding credits is an effective tool to achieve the statutory objective of promoting participation of designated entities in the provision of spectrum-based service.

53. *Small Businesses.*—One way the Commission fulfills this mandate is through the award of bidding credits to small businesses. In the *Competitive Bidding Second Memorandum Opinion and Order,* the Commission stated that it would define eligibility requirements for small businesses on a service-specific basis, taking into account the capital requirements and other characteristics of each particular service in establishing the appropriate threshold. Further, in the *Part 1 Third Report and Order* and the more recent *Competitive Bidding Update Report and Order (81 FR 43523, July 5, 2016),* the Commission, while standardizing many auction rules, determined that it would continue a service-by-service approach to defining small businesses. In the *NPRM,* the Commission sought comment on whether to adopt bidding credits for the two larger designated entity business sizes provided in the part 1 rules.

54. In adopting competitive bidding rules for other spectrum bands that will

be used as part of 5G services, the Commission included provisions for designated entities to promote opportunities for small businesses, rural telephone companies, and businesses owned by members of minority groups and women to participate in the provision of spectrum-based services. For example, the Commission adopted two small business definitions for the auction of licenses in the Upper Microwave Flexible Use Service (39 GHz band). These two small business definitions are the highest two of three thresholds in the Commission's standardized schedule of bidding credits.

55. The Commission adopts its proposal to apply the two small business definitions with higher gross revenues thresholds to auctions of overlay licenses in the 3.7–3.98 GHz band. Accordingly, an entity with average annual gross revenues for the relevant preceding period not exceeding $55 million will qualify as a ''small business,'' while an entity with average annual gross revenues for the relevant preceding period not exceeding $20 million will qualify as a ''very small business.'' Since their adoption in 2015, the Commission has used these gross revenue thresholds in auctions for licenses likely to be used to provide 5G services in a variety of bands. The results in these auctions indicate that these gross revenue thresholds have provided an opportunity for bidders claiming eligibility as small businesses to win licenses to provide spectrum-based services at auction. These thresholds do not appear to be overly inclusive as a substantial number of qualified bidders in these auctions do not come within the thresholds. This helps preclude designated entity benefits from flowing to entities for which such credits are not necessary.

56. The Commission also adopts its proposal to provide qualifying ''small businesses'' with a bidding credit of 15% and qualifying ''very small businesses'' with a bidding credit of 25%, consistent with the standardized schedule in part 1 of the Commission's rules. This proposal was modeled on the small business size standards and associated bidding credits that the Commission adopted for a range of other services. The Commission believes that this two-tiered approach has been successful in the past, and it will employ it once again. The Commission believes that use of the small business tiers and associated bidding credits set forth in the part 1 bidding credit schedule will provide consistency and predictability for small businesses. No commenter provides any alternative or reason why the bidding credit thresholds or small business definitions that the Commission adopts would not work in this service.

57. *Rural Service Providers.*—In the *NPRM,* the Commission also sought comment on a proposal to offer a bidding credit for rural service providers. The rural service provider bidding credit awards a 15% bidding credit to those that service predominantly rural areas and that have fewer than 250,000 combined wireless, wireline, broadband and cable subscribers. As a general matter, the Commission ''has made closing the digital divide between Americans with, and without, access to modern broadband networks its top priority . . . [and is] committed to ensuring that all Americans, including those in rural areas, Tribal lands, and disaster-affected areas, have the benefits of a high-speed broadband connection.''

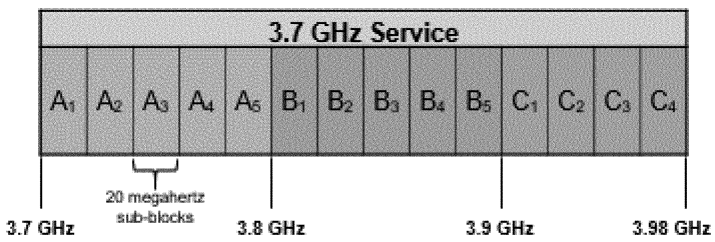
58. The Commission finds that a targeted bidding credit will better enable entities already providing rural service to compete for spectrum licenses at auction and in doing so, will increase the availability of 5G service in rural areas. Accordingly, the Commission will apply the rural service provider bidding credit to auctioning new licenses in this band.

3. Licensing and Operating Rules

59. Building on its previous experience introducing mobile service in bands shared with fixed terrestrial and FSS users, the Commission adopts rules to license new mobile operations under its part 27 rules, with modifications to tailor certain rules to the specific characteristics of C-band spectrum. The Commission adopts licensing and operating rules that afford licensees the flexibility to align licenses in the 3.7–3.98 GHz band with licenses in other spectrum bands governed by part 27 of the Commission's rules and other flexible-use services. Specifically, finding no opposition in the record, the Commission adopts rules requiring 3.7 GHz Service licensees in the 3.7–3.98 GHz band to comply with licensing and operating rules that are applicable to all part 27 services, including flexible use, regulatory status, foreign ownership reporting, compliance with construction requirements, renewal criteria, permanent discontinuance of operations, partitioning and disaggregation, and spectrum leasing. In addition, the Commission adopts service-specific rules for the 3.7–3.98 GHz band, including eligibility, mobile spectrum holdings policies, license term, performance requirements, renewal term construction obligations, and other licensing and operating rules to be included in part 27.

a. Band Plan

60. *Block Size.*—The Commission will designate the lower 280 megahertz of C-band spectrum in 100 megahertz increments as the A and B Blocks and in an 80-megahertz increment as C Block. The Commission will issue licenses in the A, B, and C Blocks in 20 megahertz ''sub-blocks.'' Specifically, the A Block (3.7–3.8 GHz), B Block: (3.8–3.9 GHz), and C Block (3.9–3.98 GHz) will be licensed according to the following channel plan:



61. In the *NPRM,* the Commission sought comment on whether 20 megahertz blocks would be appropriate for the wireless technologies that are likely to be deployed in this band. The Commission sought comment on the appropriate block size that would accommodate a wide range of terrestrial wireless services, while also providing sufficient bandwidth to support 5G services. Commenters support relatively smaller sized sub-blocks with the

potential to aggregate to larger sizes of 60 to 160 megahertz.

62. The Commission finds that 100 megahertz blocks, with 20 megahertz sub-blocks, will provide sufficient flexibility for interested bidders to tailor their decisions based on the anticipated clearing costs and accelerated relocation payment obligations associated with a particular amount of spectrum or geographic license area. For carrier frequencies below 6 GHz, 3GPP has specified thirteen possible channel bandwidths for 5G deployments as follows: 5, 10, 15, 20, 25, 30, 40, 50, 60, 70, 80, 90, and 100 megahertz. To facilitate operation of 100 megahertz bandwidth 5G channels, the Commission implements and defines the uniform block size of 100 megahertz that would run across the entire band from 3.7–4.0 GHz. By allowing new flexible-use licensees to acquire full 100-megahertz blocks, the Commission will ensure that C-band spectrum is licensed in sufficiently wide bandwidths to enable 5G deployments. The inclusion of 20 megahertz sub-blocks provides sufficient flexibility for manufacturers and licensees to tailor application of the band to suit future needs, especially when considering that LTE can be made to coexist within or adjacent to 5G operations. A number of commenters support a Commission auction of this spectrum in 20 megahertz blocks. Because it finds that 20 megahertz sub-blocks provide sufficient flexibility, the Commission finds it unnecessary to divide the blocks even smaller into 10 megahertz sub-blocks, as some commenters have proposed.

63. *Spectrum Block Configuration.*—The Commission adopts rules to license the A, B, and C 20 megahertz sub-blocks of C-band spectrum in an unpaired spectrum block configuration because there is wide support in the record for this approach, and it will enhance the flexible and efficient use of the band for next-generation services and other advance spectrum-based services. In contrast to a paired channel configuration that assumes frequency division duplex operations, an unpaired spectrum configuration is technology neutral, *i.e.,* enables time division duplex operations, which has become increasingly prevalent in deployments of digital broadband networks. In light of these considerations, the Commission concludes that an unpaired spectrum block configuration will provide licensees the flexibility necessary to increase the capacity of their networks and make the most efficient use of C-band spectrum.

64. *Use of Geographic Licensing.*—Consistent with its approach in several other bands used to provide fixed and mobile services, the Commission finds that it is in the public interest to license the A, B, and C Blocks in 20 megahertz sub-blocks on an exclusive, geographic area basis. Geographic area licensing provides flexibility to licensees, promotes efficient spectrum use, and helps facilitate rapid assignment of licenses, using competitive bidding when necessary. There is wide support in the record for licensing C-band flexible-use spectrum on an exclusive, geographic basis, and the Commission finds that such an approach will give certainty to licensees and provide the efficiencies of scale and scope that drive innovation, investment, and rapid deployment of next generation services.

65. *Geographic License Area.*—The Commission adopts PEAs as the geographic license area for new 3.7 GHz Service licenses and divide those licenses into 20 megahertz sub-blocks within the A, B, and C Blocks; the Commission finds that this license-area size best optimizes and balances our statutory and regulatory objectives in licensing spectrum. In determining the appropriate geographic license area size, the Commission must consider several factors, including: (1) Facilitating access to spectrum by both small and large providers; (2) providing for the efficient use of spectrum; (3) encouraging deployment of wireless broadband services to consumers, including those in rural areas and Tribal lands; and (4) promoting investment in and rapid deployment of new technologies and services. In the *NPRM,* the Commission sought comment on using PEAs, as well as on licensing on a county, nationwide, or other basis.

66. The Commission finds that licensing on a PEA basis strikes the appropriate balance between being sufficiently large to facilitate wide-area deployments of 5G, while also being sufficiently small to ensure that small and regional carriers are able to compete for new 3.7 GHz Service licenses. PEAs offer a compromise between EAs, on the one hand, and CMAs or counties, on the other hand, because they are smaller than EAs and serve to separate rural from urban markets to a greater degree than EAs do (given that EAs often include both rural and urban markets), yet PEAs are also subdivisions that ''nest'' within EAs and can easily be aggregated to larger areas such as EAs, Major Economic Areas, and Regional Economic Areas. As a result, licensing new 3.7 GHz Service licenses on a PEA basis in the contiguous United States will encourage entry by providers that contemplate offering wireless broadband service on a localized basis, yet at the same time will not preclude carriers that plan to provide service on a much larger geographic scale. PEAs therefore will encourage auction participation by a diverse group of buyers and will generate competition between large, regional, and small carriers across various geographic areas, while also minimizing the difficult coordination and border issues that might arise from smaller license areas. The Commission agrees with commenters that recommend excluding areas outside of the contiguous United States from the transition and will not issue licenses in those PEAs.

67. In summary, for Blocks A, B, and C, the Commission will issue 3.7 GHz Service licenses on a PEA basis for 20 megahertz sub-blocks in the contiguous states and the District of Columbia (PEAs 1–41, 43–211, 213–263, 265–297, 299–359, and 361–411). The Commission will not issue flexible-use licenses for Honolulu, Anchorage, Kodiak, Fairbanks, Juneau, Puerto Rico, Guam-Northern Mariana Islands, U.S. Virgin Islands, American Samoa, and the Gulf of Mexico (PEAs numbers 42, 212, 264, 298, 360, 412–416).

b. Application Requirements & Eligibility

68. Licensees in the A, B, and C blocks must comply with the Commission's general application requirements. Further, the Commission adopts an open eligibility standard for licenses in the A, B, and C Blocks. The Commission has determined that eligibility restrictions on licenses may be imposed only when open eligibility would pose a significant likelihood of substantial harm to competition in specific markets and when an eligibility restriction would be effective in eliminating that harm.

69. The Commission agrees that the record in this proceeding does not demonstrate a compelling need for regulatory intervention to exclude potential participants. The Commission finds that adopting an open eligibility standard appropriately relies on market forces and will encourage efforts to develop new technologies, products, and services, while helping to ensure efficient use of this spectrum. Generally applicable qualifications that may apply under the Commission's rules, including those relating to citizenship and character, apply to any and all licenses issued for flexible use of this spectrum, and any person who has been, for reasons of national security, barred by any agency of the Federal Government from bidding on a contract,

participating in an auction, or receiving a grant is ineligible.

c. Mobile Spectrum Holdings

70. The Commission does not impose a pre-auction bright-line limit on acquisitions of the 3.7–3.98 GHz band. Instead, it will incorporate into the spectrum screen the 280 megahertz of spectrum that we make available in the 3.7–3.98 GHz band. The Commission will also perform case-by-case review of the long-form license applications filed as a result of the auction.

71. In the *NPRM,* the Commission sought comment on whether and how to address mobile spectrum holdings issues to meet its statutory requirements and ensure competitive access in the 3.7–4.2 GHz band, including whether to include the 3.7–4.2 GHz band in the spectrum screen for secondary market transactions. The Commission proposed not to adopt a pre-auction bright-line limit on a party's ability to acquire spectrum in the 3.7–4.2 GHz band in a public auction. The Commission also asked whether to apply a post-auction case-by-case review of holdings when applications for initial licenses are filed and whether to limit the amount of spectrum one party can acquire through a market-based mechanism.

72. Similar to its approach in the *2017 Spectrum Frontiers Order and FNPRM (83 FR 37, Jan. 2, 2018; 83 FR 85, Jan. 2, 2018)* and the *2018 Spectrum Frontiers Order and FNPRM* (83 FR 34478, July 20, 2018), the Commission finds that, ''[g]enerally, bright-line, pre-auction limits may restrict unnecessarily the ability of entities to participate in and acquire spectrum in an auction, and we are not inclined to adopt such limits on auction participation absent a clear indication that they are necessary to address a specific competitive concern.''

73. The Commission agrees with commenters that an in-band spectrum aggregation limit is unnecessary for this band. Commenters requesting an in-band limit raise only general concerns regarding the need to prevent a few dominant carriers from obtaining an excessive concentration of this spectrum and to ensure smaller carriers have a fair opportunity to obtain the spectrum. But limiting the amount of 3.7–3.98 GHz band spectrum that one party can acquire, as these commenters request, could unnecessarily restrict providers' ability to participate in the auction and acquire spectrum in this band. This ultimately could ''constrain providers in their paths towards 5G deployment,'' limit providers' ''incentives to invest'' in the band, and ''delay the realization of related economic benefits.'' Further, ''a variety of spectral paths to 5G deployment in the United States'' exist, including the additional opportunities for access to spectrum through our recent actions to remove restrictions on the 2.5 GHz band, to make the 3.5 GHz band available for priority access licenses, and to make millimeter-wave spectrum available through auction. Because the Commission's ''balancing of objectives'' has ''shift[ed] towards facilitating rapid 5G deployment in the United States,'' and because commenters have not pointed to ''a clear indication'' that in-band limits ''are necessary to address a specific competitive concern,'' the Commission finds it unnecessary to impose an in-band limit on the 3.7–3.98 GHz band. Instead, the Commission finds that a case-by-case review of acquisitions of 3.7–3.98 GHz band spectrum will allow the Commission to review spectrum aggregation on market competition without unnecessarily restricting entities from acquiring spectrum to deploy 5G services.

74. The Commission will include the A, B, and C Blocks of the 3.7–3.98 GHz band in the screen for secondary market transactions because the spectrum will become ''suitable and available in the near term for the provision of mobile telephony/broadband services.'' The relevant product market for the screen incorporates both mobile voice and data services, including services provided over advanced broadband wireless networks—particularly emerging, next generation wireless services. The Commission adopts flexible-use rules here to enable terrestrial mobile use for 5G deployment. Accordingly, it is appropriate to incorporate this band into the screen for mobile telephony/broadband services.

75. The Commission will add the 280 megahertz to the spectrum screen once the auction closes. While winners of the auction must clear incumbents from the band following the auction, the Commission finds it is ''fairly certain'' that the auctioned spectrum ''will meet the criteria for suitable spectrum in the near term'' once the auction closes, given the Commission's transition plan. This is consistent with its approach for the 600 MHz band (where the Commission found that the spectrum was available following the Broadcast Incentive Auction, even though incumbents had to be moved) and the 700 MHz band (where the Commission found that the spectrum was available a year and a half before the spectrum would be cleared by incumbents).

76. Finally, the Commission will perform case-by-case review of the long form applications of the 3.7–3.98 GHz spectrum following the auction. The Commission will use the same case-by-case review as it does for secondary market transactions, updated to account for the additional 3.7–3.98 GHz spectrum. As the Commission has explained, case-by-case review ''permits bidders to participate fully'' in acquiring the spectrum, ''while still allowing the Commission to assess the impact on competition from the assignment of initial . . . licenses, and to take appropriate action to preserve or protect competition only where necessary.'' As it has done in other bands made available for flexible use, the Commission will apply the standard articulated in the 2008 *Union Telephone Order.* This review will create sufficient bidder certainty for the auction, consistent with Section 309(j)(3)(E).

d. License Term

77. The Commission finds that a 15-year license term will provide sufficient time to encourage investment in the 3.7–3.98 GHz band given the clearing, relocation, and repacking that must occur prior to mobile operations. In the *NPRM,* the Commission proposed a 15-year license term for this very reason, suggesting that 15 years would afford licensees sufficient time to achieve significant buildout obligations post-transition. Many commenters agree that a longer term is warranted where time-consuming activities are needed to ready the spectrum for mobile use, and several argue that 15 years will promote the provision of innovative services and applications.

78. The Commission agrees and concludes that a 15-year license term for the A, B, and C Blocks best serves the public interest by providing the time needed for significant investment that ultimately will usher in valuable services to consumers.

e. Performance Requirements; Renewal

79. The Commission recognizes the critical role that performance requirements play in ensuring that licensed spectrum does not lie fallow. The performance requirements the Commission adopts for the 3.7–3.98 GHz band take into account the unique characteristics of this band, but also will ensure that licensees begin providing service to consumers in a timely manner by relying on specific quantifiable benchmarks. To support a variety of different use cases in this spectrum, the Commission adopts below specific metrics for mobile/point-to-multipoint, fixed, and IoT services in the A, B, and C Blocks, consistent with its proposal in the *NPRM.*

80. *Mobile or Point-to-Multipoint Performance Requirements.*—The Commission concludes that licensees in the A, B, and C Blocks offering mobile or point-to-multipoint services must provide reliable signal coverage and offer service to at least 45% of the population in each of their license areas within eight years of the license issue date (first performance benchmark), and to at least 80% of the population in each of their license areas within 12 years from the license issue date (second performance benchmark). These population benchmarks are slightly more aggressive than those for other flexible-use services under part 27. Given the critical role of mid-band spectrum in today's spectral environment, the Commission finds that this approach is warranted.

81. Commenters generally support performance requirements to prevent warehousing of this valuable spectrum, but some object that these benchmarks are more stringent than for other part 27 services in lower frequency bands that have better propagation characteristics, *e.g.,* BRS, H Block, AWS–3, AWS–4, 600 MHz, and 700 MHz Upper C Band, that have better propagation characteristics than the 3.7–3.98 GHz band.

82. In the *NPRM,* the Commission proposed that the deadline for the first performance benchmark would be six years from the license issue date. However, consistent with the rules the Commission adopts for the transition of existing space station and earth station operations to the upper 200 megahertz of the band, new flexible-use licensees may not commence operations until the necessary clearing has been completed and the flexible-use licensee has complied with all obligations to provide reimbursement for relocation costs and any additional accelerated relocation payments have been made. The Commission anticipates that flexible-use licensees will begin deploying their systems and constructing their networks while incumbents are still transitioning out of the 3.7–3.98 GHz band so that flexible-use licensees are able to commence operations soon after incumbent clearing is complete. Nevertheless, given the potential length of that transition, the Commission finds that a six-year initial benchmark may not be reasonable. The Commission therefore finds it appropriate to adjust its proposed deadline for the first performance benchmark to eight years from the license issue date, in order to provide licensees additional time to deploy once the license area has been cleared of FSS use.

83. The Commission believes that 12 years will provide sufficient time for A, B, and C Block licensees, relying on mobile or point-to-multipoint service in accordance with our part 27 rules, to meet the proposed coverage requirements. Given the expected desirability of mid-band spectrum for the provision of innovative 5G services that promote American competitiveness, the performance benchmarks the Commission adopts are not unduly burdensome because it expects that the market will drive deployment beyond these Commission's benchmarks. The Commission anticipates that after satisfying the 12-year second performance benchmark, a licensee will continue to provide reliable signal coverage, or point-to-point links, as applicable, and offer service at or above that level for the remaining three years in the 15-year license term prior to renewal. The Commission, therefore, declines to set the second performance benchmark at the end of the license term, as some commenters proposed. Establishing benchmarks before the end of the license term will ensure continuity of service over the license term, which is essential to the Commission's evaluation under its renewal standards. We note that our Wireless Radio Services Renewal requirements include safe harbor certifications, in lieu of a detailed renewal showing, for qualified licensees.

84. *Alternate IoT Performance Requirements.*—The Commission recognized in the *NPRM* that 3.7–3.98 GHz licenses have flexibility to provide services potentially less suited to a population coverage metric. Therefore, the Commission sought comment on an alternative performance benchmark metric for licensees providing IoT-type fixed and mobile services. Based on the record evidence, the Commission will provide licensees in the A, B, and C Blocks the flexibility to demonstrate that they offer geographic area coverage of 35% of the license area at the first (eight-year) performance benchmark, and geographic area coverage of 65% of the license area at the second (12-year) performance benchmark. The Commission finds that the aforementioned levels of geographic coverage maintain reasonable parity between the requirements in these IoT-focused metrics and the requirements for mobile providers relying on population-based coverage metrics. This framework is intended to provide enough certainty to licensees to encourage investment and deployment in these bands as soon as possible, while retaining enough flexibility to accommodate both traditional services and innovative services or deployment patterns.

85. A performance metric based on geographic area coverage (or presence) will allow for networks that provide meaningful service but deploy along lines other than residential population. This definition separates ''traditional'' point-to-point links from the sensor and device connections that likely will be part of new IoT networks in these bands and applies to a network of fixed sensors or smart devices operating at low power over short distances. Although the Commission adopts an additional metric in order to facilitate the deployment of IoT and other innovative services, there is no requirement that a licensee build a particular type of network or provide a particular type of service in order to use whatever metric it selects to demonstrate that it met its performance requirement.

86. *Fixed Point-to-Point Under Flexible Use.*—Recognizing that its part 27 flexible-use policies enable licensees to potentially offer a variety of different services in the 3.7–3.98 GHz band, the Commission sought comment in the *NPRM* on performance metrics for licensees offering point-to-point service in the band. For licensees providing fixed, point-to-point links, the Commission generally has evaluated buildout by comparing the number of links in operation to the population of the license area.

87. The Commission adopts performance metrics using this framework, as proposed in the *NPRM.* Specifically, the Commission adopts a requirement that part 27 geographic area licensees providing Fixed Service in the A, B, and C Blocks band must demonstrate within eight years of the license issue date (first performance benchmark) that they have four links operating and providing service, either to customers or for internal use, if the population within the license area is equal to or less than 268,000. If the population within the license area is greater than 268,000, the Commission requires a licensee relying on point-to-point service to demonstrate it has at least one link in operation and providing service, either to customers or for internal use, per every 67,000 persons within a license area. The Commission requires licensees relying on point-to-point service to demonstrate within 12 years of the license issue date (final performance benchmark) that they have eight links operating and providing service, either to customers or for internal use, if the population within the license area is equal to or less than 268,000. If the population within the

license area is greater than 268,000, the Commission requires a licensee relying on point-to-point service to demonstrate it is providing service and has at least two links in operation per every 67,000 persons within a license area.

88. These standards are generally similar to the standards the Commission established for fixed point-to-point services in the 2.3 GHz band and several *Spectrum Frontiers* bands. In the *NPRM,* the Commission also asked whether to require point-to-point links to operate with a transmit power greater than +43 dBm in order to be eligible to be counted under the point-to-point buildout standard. The Commission observed that for the UMFUS bands, the 43 dBm minimum power requirement is intended to separate traditional point-to-point links from the sensor and device connections anticipated to be part of new Internet of Things networks in those bands. The Commission received no comment on this issue. Based on the record, including the different propagation characteristics of the 3.7–3.98 GHz band, the Commission find that its approach in the *Spectrum Frontiers* proceeding does not support adoption of a similar rule for the 3.7–3.98 GHz band. Links in the 3.7–3.98 GHz band, however, must be part of a network that is actually providing service, whether to unaffiliated customers or for private, internal uses, and all links must be present and operational in accordance with our discontinuance and renewal rules. As with the mobile performance milestone, the size of the population will be calculated over the entire license area.

89. *Penalty for Failure To Meet Performance Requirements.*—Along with performance benchmarks, the Commission adopts meaningful and enforceable penalties for failing to ensure timely build-out. Specifically, as proposed in the *NPRM,* the Commission adopts a rule requiring that, in the event a licensee in the A, B, or C Block fails to meet the first performance benchmark, the licensee's second benchmark and license term would be reduced by two years, thereby requiring it to meet the second performance benchmark two years sooner (at 10 years into the license term) and reducing its license term to 13 years. Consistent with the approach in many other bands, the Commission concludes that, if a licensee fails to meet the second performance benchmark for a particular license area, its authorization for each license area in which it fails to meet the performance requirement shall terminate automatically without Commission action.

90. This approach will promote prompt buildout and appropriately penalize a licensee for not meeting its performance obligations for a particular license area. The Commission declines to adopt a ''use-or-lose'' regime, as suggested by some commenters, under which a licensee would lose only those areas within a license area that are not developed. The Commission finds that such an approach, which has been adopted rarely for other bands, likely would reduce incentives for licensees to build out to the less populated areas covered by their license, and would be less effective in ensuring use of the spectrum. In addition, in the event a licensee's authority to operate terminates, the licensee's spectrum rights would become available for reassignment pursuant to the competitive bidding provisions of Section 309(j) and any licensee who forfeits its license for failure to meet its performance requirements would be precluded from regaining the license.

91. *Compliance Procedures.*—In addition to compliance procedures applicable to all part 27 licensees, including the filing of electronic coverage maps and supporting documentation, the Commission adopts a rule requiring that such electronic coverage maps must accurately depict both the boundaries of each licensed area and the coverage boundaries of the actual areas to which the licensee provides service. Although the Commission sought comment on additional compliance procedures in the *NPRM,* only a small number of commenters addressed this issue.

92. As proposed in the *NPRM,* the rule the Commission is adopting requires measurements of populations served on areas no larger than the Census Tract level so a licensee deploying small cells has the option to measure its coverage using a smaller acceptable identifier such as a Census Block. The Commission finds that such procedures will confirm that the spectrum is being used consistent with the performance requirements. If a licensee does not provide reliable signal coverage to an entire license area, the licensee must provide a map that accurately depicts the boundaries of the area or areas within each license area not being served. Each licensee also must file supporting documentation certifying the type of service it is providing for each licensed area within its service territory and the type of technology used to provide such service. Supporting documentation must include the assumptions used to create the coverage maps, including the propagation model and the signal strength necessary to provide reliable service with the licensee's technology. The Commission will adopt conforming amendments to part 27 to include these requirements. The Commission directs the Wireless Telecommunications Bureau to specify the format of submissions, consistent with these determinations.

93. *License Renewal.*—As proposed in the *NPRM,* the Commission will apply the general renewal requirements applicable to all Wireless Radio Services licensees to 3.7–3.98 GHz band licensees in the A, B, and C Blocks. This approach will promote consistency across services.

94. *Renewal Term Construction Obligation.*—In addition to, and independent of, these general renewal provisions, the Commission finds that any additional renewal term construction obligations adopted in the *Wireless Radio Services Renewal Reform* proceeding would apply to licenses in the A, B, and C Blocks of the 3.7–3.98 GHz band.

95. In the *NPRM,* the Commission noted that the *Wireless Radio Services Renewal Reform FNPRM* (82 FR 41580, Sept. 1, 2017) sought comment on various renewal term construction obligations such as incremental increases in the construction metric in each subsequent renewal term. The Commission also noted that the *Wireless Radio Services Renewal Reform FNPRM* proposed to apply any rules adopted in that proceeding to all flexible geographic licenses. Commenters generally support the Commission's adopting renewal term construction obligations for the 3.7–3.98 GHz band in the context of the *Wireless Radio Services Renewal Reform* proceeding, as its decision ensures consistency across services.

96. The Commission finds that applying any additional renewal term construction obligations adopted in the *Wireless Radio Services Renewal Reform* proceeding to licenses in the A, B, and C Blocks will encourage robust deployment and maintain consistency across flexible geographic licensees.

B. The Transition of FSS Operations

97. For a successful public auction of overlay licenses in the 3.7–3.98 GHz band, bidders need to know before an auction commences when they will get access to that currently occupied spectrum as well as the costs they will incur as a condition of their overlay license. In this section, the Commission addresses precisely those questions while also setting forth a transition path that ensures that incumbent FSS users will continue to receive the content they

do today both during and after the transition.

98. That transition of FSS operations relies on the Commission's *Emerging Technologies* framework, a framework the Commission has relied on since the early 1990s to facilitate the swift transition of spectrum from one use to another. In short, the framework allows for new licensees to incentivize a swift transition while requiring those licensees to hold incumbents harmless during the transition. Specifically, the Commission requires overlay licensees to pay for the reasonable relocation costs of incumbent space station and incumbent earth station operators who are required to clear the lower 300 megahertz of the C-band spectrum in the contiguous United States.

99. To effectuate that process, the Commission takes several steps. *First,* the Commission defines the class of incumbent earth stations and incumbent space stations to make clear what FSS entities it expects to take part in the transition (and what entities may be eligible for relocation payments). *Second,* the Commission lays out its legal authority to carry out the transition as well as the effect of that transition on future operations in the C-band. *Third,* the Commission sets a deadline for clearing the band by 2025 while offering incumbent space station operators the option to accelerate that process to 2021 for the lower 120 megahertz and 2023 for the upper 180 megahertz. *Fourth,* the Commission sets forth the relocation payments we expect incumbent operators to receive and how to apportion such payments among overlay licensees. *Fifth,* the Commission establishes a neutral, third-party clearinghouse to manage collection and distribution of relocation payments. *Sixth,* the Commission describes the logistics of transitioning FSS operations out of the lower 300 megahertz of the C-band spectrum. *Finally,* the Commission addresses additional issues related to the FSS transition, including the maintenance of IBFS data and revisions to the coordination policy for FSS and Fixed Services. The Commission finds that these rules will best promote the rapid and effective transition of incumbent FSS operations out of the portion of C-band spectrum to be made available for public auction.

1. Incumbent FSS Operations

100. In this section, the Commission defines the class of incumbent FSS space stations and earth stations that must be accommodated during the transition and reimbursed for their relocation costs. The Commission finds that its definition of incumbents effectively captures existing C-band FSS users that will need to be transitioned and protected in order to ensure that they are able to continue providing and receiving their existing services during and after the transition. Commenters generally agree that the Commission should define incumbent FSS operations for these purposes.

101. *Incumbent Space Station Operators.*—The Commission defines ''incumbent space station operators'' to include all C-band space station operators authorized to provide service to any part of the contiguous United States pursuant to an FCC-issued license or grant of market access as of June 21, 2018—the date of the International Bureau's temporary freeze on certain new space station applications in the 3.7–4.2 GHz band. There are eight such operators: ABS, Empresa, Eutelsat, Hispasat, Intelsat, SES, Star One, and Telesat.

102. *Incumbent Earth Stations.*—The Commission defines ''incumbent earth stations'' to be protected from interference from flexible-use licensees to include FSS earth stations that: (1) Were operational as of April 19, 2018; (2) are licensed or registered (or had a pending application for license or registration) in the IBFS database as of November 7, 2018; and (3) have timely certified, to the extent required by the July 2018 *Order* adopted in FCC 18–91 (as we clarify below to include certain renewal applications and license and registration applications filed through November 7, 2018), the accuracy of information on file with the Commission.

103. This definition largely parallels the definition the Commission proposed in the *NPRM,* with a few minor changes. For one, the Commission affirms the finding of the International Bureau that registrants and licensees that filed applications or modifications during the processing window, which effectively updated or confirmed their earth station details, are exempt from the separate certification requirement. For another, the Commission includes all license and registration applications that were filed through November 7, 2018, rather than the initial filing window deadline (October 17, 2018) or the extended filing deadline (October 31, 2018) due to outages in the IBFS filing system around that deadline. Under the approach the Commission adopts, the fact that an earth station has not filed an exhibit demonstrating coordination with terrestrial Fixed Service stations will not disqualify it as an incumbent earth station. For earth stations licensed or registered before the processing window, the Commission finds that renewal applications, as well as certifications, filed by the May 28, 2019 certification deadline, effectively updated or confirmed their earth station details. And finally, the Commission makes clear that the definition does not include those whose authorization terminated by law because the earth station was not operational for more than 90 days.

104. Several commenters, including CCA, Microsoft, Motorola, and Verizon, support the Commission's proposed definition of incumbent earth stations. The Commission disagrees with commenters who assert the definition is too restrictive. Earth station operators have been provided ample opportunity to register their earth stations with the Commission. In addition to waiving the coordination requirement during the freeze filing window, the International Bureau took numerous other steps to ease the filing process, including conducting tutorials and providing step-by-step filing instructions on the Commission's website to assist those unfamiliar with the International Bureau's filing system. Moreover, the filing deadline was extended numerous times to accommodate filers. Therefore, contrary to the arguments of some commenters, the Commission has decided not to open another window for the registration of earth stations that existed as of April 19, 2018.

105. The Commission also declines to adopt the C-Band Alliance's suggestion that incumbent earth stations should encompass all earth stations identified by the C-Band Alliance. The Commission finds that there is a significant public interest in providing a stable, comprehensive list of incumbent earth stations that meet the criteria described above. The members of the C-Band Alliance and other space station operators may, of course, treat unregistered earth stations like incumbent earth stations for their own commercial purposes. But any such commercial decisions are outside the scope of this proceeding.

106. The Commission also adopts the proposal in the *NPRM* that the classes of earth stations entitled to protection and transition are those registered as fixed or temporary fixed (*i.e.,* transportable) earth stations in IBFS. That proposal was supported by the record. The Commission did not propose to include other classes of earth stations registered in IBFS, such as earth stations on vessels and other licensees operating under blanket earth stations, and the record does not support the inclusion of any additional classes of earth stations. The Commission directs the International Bureau to complete the

processing of earth station license and registration applications filed during the limited freeze filing window.

107. As the Commission proposed in the *NPRM,* any receive-only earth stations that failed to meet the requirements to be incumbent earth stations will be removed from IBFS. In the *NPRM,* the Commission proposed to update IBFS to terminate 3.7–4.2 GHz band earth stations licenses or registrations for which the licensee or registrant had not timely filed the certification required by the *July 2018 Order* (to the extent it held or applied for a license or registration before April 19, 2018). Several commenters support such termination, as well as eliminating an obligation to protect those stations from harmful interference. For the same reasons that the Commission limits incumbent earth stations to those that timely filed the required certifications or submitted renewal applications by the certification deadline, the Commission now directs the International Bureau to terminate automatically the registrations of those uncertified receive-only earth stations in IBFS, consistent with our treatment of surrendered licenses and registrations that no longer authorize operations. The Commission proposes to modify the licenses of transmit-receive earth stations that failed to submit a certification or submit a renewal application by the certification deadline to remove their protection rights in 3.7–4.0 GHz and to allow them to continue to receive transmissions on an unprotected basis in 4.0–4.2 GHz. These licensed transmit-receive earth stations will not be considered eligible earth stations and will not be eligible to have their relocation expenses reimbursed, but can adjust their reception so as to receive transmissions to the upper 200 megahertz at their own expense.

2. Clearing the 3.7–4.0 GHz Band of FSS Operations

108. The Commission next adopts rules to limit FSS operations to the 4.0–4.2 GHz band in the contiguous United States. To accomplish this goal and make the 3.7–4.0 GHz band available for terrestrial wireless use, the Commission uses its authority under Section 316 of the Communications Act to modify the existing FSS licenses and market access authorizations held by space station operators in the band. The Commission finds that such modifications are consistent with its statutory authority, supported by judicial and Commission precedent, and will serve the public interest. The Commission also revises its rules to prohibit new applications for space station licenses and new petitions for market access concerning space-to-Earth operations in the 3.7–4.0 GHz band in the contiguous United States.

109. *Clearing Space Station Operations.*—Section 316 of the Communications Act vests the Commission with broad authority to modify licenses ''if in the judgment of the Commission such action will promote the public interest, convenience, and necessity.'' The Commission finds that modifying the authorizations of incumbent space station operators to clear use of the 3.7–4.0 GHz band (and confine their operations in the contiguous United States to the 4.0–4.2 GHz band) is within the Commission's statutory authority, consistent with prior Commission practice, and will promote the public interest convenience, and necessity. The Commission accordingly proposes to modify the authorizations of the incumbent space station operations to carry out the clearing of this band.

110. The Commission has long relied on Section 316 to change or reduce the frequencies used by a licensed service where it has found that doing so would serve the public interest. For example, in the *2002 MSS Order,* the Commission relied on its Section 316 authority to relocate the Motient Services, Inc. (Motient) spectrum assignment from solely upper L-band frequencies to mostly lower, internationally coordinated L-band frequencies and reduce it from 28 to 20 megahertz, to enable Motient to construct and operate an economically viable MSS system without interfering with maritime distress and safety communications. In the *DEMS Relocation Order,* the Commission, pursuant to Section 316, modified licenses to relocate the operations of certain Digital Electronic Message Service (DEMS) licensees from the 18 GHz band to the 24 GHz band, in order to accommodate Department of Defense military systems. Similarly, in the 2004 *800 MHz Order (69 FR 67823, Nov. 22, 2004),* the Commission relied on Section 316 to relocate the public safety and other land mobile communications systems operating in the 800 MHz band to new spectral locations both within and outside the band (including the relocation of a large set of licenses then held by Nextel Communications, Inc., to the 1.9 GHz band), in order to eliminate the interference to the public safety and other high site, non-cellular systems caused by the inherently incompatible operations of the band's cellular-architecture multi-cell systems. The Commission has also relied on its Section 316 authority to ''rearrang[e] licensees within a spectrum band.'' And as part of the recent *Spectrum Frontiers* incentive auction, the Commission modified the authorizations of incumbent licensees by altering their assigned frequencies and, in many cases, their geographic service areas, in a way that ensured that the spectrum usage rights under the modified licenses were comparable to those under the originally configured licenses.

111. Notably, the Commission's modification authority under Section 316 does not require the consent of licensees. As the United States Court of Appeals for the District of Columbia Circuit has stressed, ''if modification of licenses were entirely dependent upon the wishes of existing licensees, a large part of the regulatory power of the Commission would be nullified.'' [1] Indeed, that court has reiterated that Congress broadened the Commission's discretion by adding Section 316, which ''provides the FCC with the authority to modify licenses without the approval of their holders.'' [2] Rather, the Commission need only find, as it does here, that the modification ''serves the public interest, convenience and necessity.'' [3] Further, the courts have consistently held that the Commission may exercise its license modification authority as part of a rulemaking proceeding, as it does here.[4]

112. The International and Wireless Telecommunications Bureaus sought comment on the scope of our Section 316 authority to modify licenses in this proceeding in the *May 3 Public Notice.* The record confirms that modifying the licenses of the incumbent space station operators falls within the scope of the Commission's authority and would serve the public interest. As several commenters argue, modifying the authorizations of the incumbent space station operators is in the public interest because it will enable the clearing of 280 megahertz for public auction while preserving the content distribution system currently offered over the C-band spectrum by reserving for incumbent space station operators the upper 200 megahertz of the band.

113. One constraint, however, is that Congress limited the Commission's

[1] *Peoples Broadcasting Co.* v. *United States,* 209 F.2d 286, 288 (D.C. Cir. 1953).

[2] *Rainbow Broadcasting* v. *FCC,* 949 F.2d 405, 410 (D.C. Cir. 1991).

[3] *California Metro Mobile Commc'ns, Inc.* v. *FCC,* 365 F.3d 38, 45 (D.C. Cir. 2004). As the D.C. Circuit has noted, the Commission's judgements on the public interest arising from a license modification ''are entitled to substantial judicial deference.'' *NTCH, Inc.* v. *FCC,*—F.3d —, 2020 WL 855465 at *7 (D.C. Circ. 2020).

[4] *See Celtronix Telemetry, Inc.* v. *FCC,* 272 F.3d 585, 589 (D.C. Cir. 2001) (citing cases and noting that the Commission retains the power ''to alter the term[s] of existing licenses by rulemaking'').

authority to only ''modify'' a license under Section 316, which the courts have construed to mean we may not effect a ''fundamental change'' to a license under this authority. Although effectively revoking a license or substantially disrupting a licensee's ability to provide service may amount to a fundamental change, courts have repeatedly found that if a licensee can continue to provide substantially the same service, a modification to that license is not a fundamental change.

114. The Commission finds that the upper 200 megahertz of spectrum it is reserving for future FSS operations is sufficient to continue the services that are provided today over the whole 500 megahertz of the C-band. Indeed, all incumbent space station operators that responded to the space-station data collection have agreed that the upper 200 megahertz portion of the band provides a sufficient amount of spectrum to support their services. Users of FSS services, agree that 200 megahertz is a sufficient amount of spectrum for space station operators to continue their services uninterrupted. Indeed, by adopting the clearing plan proposed by incumbent space station operators themselves and that they themselves have claimed allows for the full range of C-band services to continue in the contiguous United States, the Commission is confident that incumbent space station operators can continue to offer the services they do today after they clear their operations out of the 3.7–4.0 GHz band (and thus that this license modification does not constitute a fundamental change).

115. In sum, the Commission finds that a Section 316 modification would serve the public interest, as it will spur the investment in and deployment of next generation wireless services, while ensuring that incumbent space station services will be able to maintain the same services as they are currently providing. Consistent with prior practice, in these circumstances the Commission will accord to grants of market access the same protections in this regard that we accord to Commission licenses and grants of market access.

116. The Commission notes that, consistent with the scope of the public auction it adopts, the Section 316 license modification that the Commission adopts applies only to licenses and grants of market access held within the contiguous United States; authorizations for FSS operations outside of the contiguous United States may continue to operate in the entire 3.7–4.2 GHz band. Commenters argue, and the Commission agrees, that the Commission should exclude locations outside of the contiguous United States from the license modification. Locations outside of the contiguous United States, many of which are remote, have a greater need for a wide variety of C-band services, particularly for the provision of services necessary for the protection of life and property—including telehealth, E911, and education services.

117. The Commission finds that retaining C-band operation is important for the time being in areas outside of the contiguous United States. As a result, the Commission believes it is appropriate to exclude PEAs outside of the contiguous United States from the proposed license modification, notably in the Honolulu, Anchorage, Kodiak, Fairbanks, Juneau, Puerto Rico, Guam-Northern Mariana Islands, U.S. Virgin Islands, American Samoa, and the Gulf of Mexico PEAs (PEA numbers 42, 212, 264, 298, 360, 412–416) and FSS operations in those PEAs may continue to use the entire 3.7–4.2 GHz band.

118. The Commission also notes that, due to the nature of space-to-earth transmissions and the practicalities of space-to-earth communications, it does not modify the authorizations of incumbent space station operators to prohibit transmissions in the 3.7–4.0 GHz band entirely. Transmissions from space station operators can reach many countries at the same time. As a result of this, many transmissions from space station operators sent to locations outside of the contiguous United States and other countries may incidentally transmit to earth stations within the contiguous United States. Since space-to Earth transmissions pose no risk of harmful interference to terrestrial wireless operations, the Commission will allow such incidental transmissions without penalty, if the transmissions are duly authorized by a foreign government or the Federal Communications Commission. In other words, the Commission allows those transmissions that incidentally occur within the contiguous United States but are directed at earth stations outside that area. Beyond these incidental transmissions, the Commission will only permit space station operators to continue to operate in the contiguous United States in the 3.7–4.0 GHz band on an unprotected basis after the sunset date for the purpose of transmitting service to earth stations at four designated TT&C sites.

119. The C-Band Alliance and the Small Satellite Operators have argued that eliminating their right to operate and be protected from harmful interference over the lower 300 megahertz of the C-band without their consent would constitute a fundamental change to their license. The C-Band Alliance and the Small Satellite Operators also argue that, even if their existing services could continue after the transition, modifying their licensees would impermissibly alter their ability to expand their services to additional customers. The Commission disagrees. The D.C. Circuit has consistently upheld the Commission's authority to modify licenses where the affected licensee is able to continue providing substantially the same service following the modification. Thus, regardless of the amount of spectrum being repurposed or the licensees' ability to expand its operations after its license is modified, the primary consideration in determining whether a Section 316 modification is valid is whether the licensee will be able to provide substantially the same service after the modification as it was able to provide before. In the case of the C-Band Alliance and Eutelsat, the record clearly demonstrates that C-Band Alliance members will—by their own admission—be able to continue to provide service to their existing customers after the transition. For the Small Satellite Operators, the record clearly demonstrates that their members provide little to no service in the contiguous United States today and, as such, the remaining 200 megahertz of spectrum available after the transition period exceeds any reasonable estimate of their needs.

120. *First,* the amount of spectrum repurposed under a 316 modification is not the controlling factor in determining whether such a modification is valid. The C-Band Alliance and the Small Satellite Operators in particular contend that removing a licensee's rights to operate in 60% of the spectrum covered by its license constitutes a fundamental change to the license on its face. They argue that a reduction in the spectrum use rights afforded a licensee constitutes a fundamental change, regardless of whether the licensee is actually using the spectrum at the time. Both the C-Band Alliance and the Small Satellite Operators point to a decision by the Supreme Court, *MCI Telecommunications Corp.* v. *FCC,* which they assert supports their argument that the reduction of a certain percentage of a licensee's spectrum usage rights has been found to exceed the Commission's ''modification authority.'' [5] However, the Court in *MCI* was addressing a statutory

[5] *MCI Telecommunications Corp.* v. *AT&T,* 512 U.S. 218, 228–29 (1994).

interpretation question under Title II of the Act: Whether ''the statutory phrase 'modify any requirement' gave it authority to eliminate rate-filing requirements, 'the essential characteristic of a rate regulated industry,' for long-distance telephone carriers.'' [6] It was not examining the scope of the Commission's ability to modify a license pursuant to its ''broad authority to manage spectrum'' under Title III [7] including its specific authority under Section 316 to modify the terms of licenses if—''in the judgment of the Commission''—such action ''will promote the public interest, convenience, and necessity.'' [8] Ultimately, the Court concluded that rather than a legitimate exercise of the Commission's authority to make modifications in the tariffing requirement established by the Act, ''[w]hat we have here, in reality, is a fundamental revision of the statute, changing it from a scheme of rate regulation in long-distance common-carrier communications to a scheme of rate regulation only where effective competition does not exist. That may be a good idea, but it was not the idea Congress enacted into law in 1934.''

121. Rather than standing, as the C-Band Alliance and the Small Satellite Operators would have it, for the proposition that a 60% change of anything, under any circumstances, cannot be regarded as a modification, *MCI* represents the Court's view that eliminating a requirement entirely is not a ''modification'' of that requirement. In this context, the Commission agrees that eliminating an incumbent space station operator's right to transmit entirely would not be a modification—but that is not what the Commission does here. Instead, the Commission finds that where an incumbent will be fully reimbursed to upgrade its facilities so that it can provide the same level of service more efficiently using less spectrum, requiring the incumbent to do so falls within the Commission's Title III authority to modify a license. In other words, a 60% reduction in spectrum available to an incumbent space station licensee—under the terms and conditions specified herein that provide the continuation of service throughout and after a transition—would not fundamentally change the overall nature of the rights and privileges originally granted under its license, and that the action therefore falls within the modification authority that Congress intended to bestow upon the Commission in granting this agency its broad Section 316 authority.

122. Indeed, since *MCI,* courts have examined various license modifications that the Commission has ordered under its Section 316 authority under the same basic standard the Commission is applying here—asking whether the modifications have worked a fundamental change in the nature of the license, using as a touchstone whether the licensee can still provide the same basic service under the modified license that it could prior to the modification. This functional test does not apply an arbitrary numerical limit on the amount of spectrum that must be preserved under a license. Thus, the C-Band Alliance and Small Satellite Operators' argument for applying such a test is contrary to both case law and Commission precedent.

123. *Second,* the Commission rejects C-Band Alliance and the Small Satellite Operators' contention that, since they will be foreclosed from transmitting to earth stations below 4.0 GHz, their licenses will be fundamentally altered. To the extent their argument rests on the potential foreclosure of the future reception of their signals by registered earth stations in the 3.7–4.0 GHz band, the Commission finds that any harm is, at best, speculative. The incumbent space station licensees will retain flexibility to expand their business within the 4.0–4.2 GHz band after the transition. With the deployment of compression and other technologies, this block is sufficient to at least serve the licensees' existing customers—which is the relevant standard governing the legality of a 316 modification—and may provide flexibility to obtain additional customers. The Commission notes that the failure of the Small Satellite Operators to demonstrate any significant past, present, or future base of earth station customers makes it reasonable to assume that any opportunities they might be losing as a result of the Commission's actions are, on a practical level, *de minimis.* Moreover, the opportunities they will have to continue to serve existing customers and to obtain new customers are sufficient to support the Commission's determination that the modification the Commission makes to their authorizations does not constitute a fundamental change. The Small Satellite Operators have failed to demonstrate their ability to lure existing customers away from their contracts with other providers or to explain how they had planned to obtain new customers, including how they planned to compete against the growing reliance on fiber delivery services as a high-quality substitute for satellite delivery.

124. *Third,* space station incumbents will not incur any unreimbursed reasonable expenses as a result of this license modification. Under the rules adopted here, the new C-band entrants would pay for the cost of the reconfiguration of all incumbent earth stations, as well as reasonable relocation costs associated with repacking FSS operations into the upper portion of the band. In sum, because the record indicates that space station operators will continue to be able to serve their customers with essentially the same services under very similar terms following the license modification we adopt today, and should not suffer any interruption of service during the repacking process, the Commission concludes that any reduction in spectrum access rights here will not effect a ''fundamental change'' for these companies under Section 316 precedent.[9]

125. The record in this proceeding, which sought comment on this question, supports this conclusion. The Commission also rejects the argument that, by modifying FSS space station licenses to remove their authorization in the lower 300 megahertz, the Commission will establish a ''dangerous precedent about the FCC's ability to unilaterally devalue existing licenses.'' *First,* it is unlikely that the Commission's decision to modify incumbent licenses in a manner that will allow them to continue to provide service to their customers and reimburse them for all of the relocation costs associated with the transition will appreciably devalue other, similarly situated non-exclusive licenses. According to SIA, the C-band satellite industry has been able to realize a return on their investments in the band amounting to an estimated $340 million in revenue per year. Given that incumbent space station operators will be fully reimbursed for the transition, the Commission finds that they will be able to continue to realize such returns after they transition to the upper 200 megahertz of the band, and that the actions the Commission takes here will not have a chilling effect on potential licensees going forward.

[6] *City of Arlington* v. *FCC,* 569 U.S. 290, 304 (2013).

[7] *Cellco P'ship* v. *FCC,* 700 F.3d 534, 541–42 (D.C. Cir. 2012) (D.C. Cir. 2012) (''expansive powers''), quoting *NBC* v. *United States,* 319 U.S. 190, 216 (1943); *see also NTCH, Inc.* v. *FCC,*—F.3d—, 2020 WL 855465 at *6 (D.C. Cir. 2020).

[8] 47 U.S.C. 316(a)(1).

[9] *See Mobile Relay Assocs.* v. *FCC,* 457 F.3d 1, 12 (D.C. Cir. 2006) (upholding the Commission's decision not to compensate a licensee for hypothetical customer loss it might suffer as a result of rebanding).

126. *Second,* by their very nature, these incumbent space station licenses are fundamentally distinct, and easily distinguishable, from the exclusive geographic terrestrial licenses that the Commission issues through competitive bidding both in the rights conferred to the licensees and the method by which they are issued. Incumbent space station licensees have non-exclusive access to the band and did not obtain their current licenses through competitive bidding. Indeed, space station operators with grants of market access did not even have to pay an application fee to receive their license and have not been obligated to pay any regulatory fees as a condition of the authorization. Thus, unlike terrestrial licensees, incumbent space station operators have no expectation of exclusive access to a particular spectrum band and incurred no appreciable costs for use of this valuable public resource beyond investment in their own network. These clear differences are more than sufficient to distinguish incumbent space station licenses from exclusive terrestrial licenses and should reassure terrestrial licensees that their license rights will not be appreciably devalued by our actions in this order.

127. What is more, satellite licensees in this band can effectively reuse spectrum at the same terrestrial location without causing interference to overlapping transmissions. This effectively gives them more capacity than the spectrum in their licenses would provide without these techniques, and this will continue to be the case when they transition to the upper 200 megahertz of the band. Space station operators in the 3.7–4.2 GHz band are authorized to use the entire band exclusively at any orbital slot, but non-exclusively in terms of geographic coverage. Satellites operating in the C-band typically have 24 transponders, each with a bandwidth of 36 megahertz. Thus, the 24 transponders on a given satellite provide capacity that is equivalent to 864 megahertz of spectrum, or 364 megahertz more than the 500 megahertz currently available. This is the result of spectrum reuse—adjacent transponders overlap, and self-interference is avoided by using opposite polarizations. Today, multiple FSS incumbents using satellites deployed at different locations in the geostationary orbit can transmit within the same geographic boundaries over different frequencies or polarizations. After the transition, space station operators will still be able to use the same mechanisms to effectively achieve more capacity than the spectrum in their licenses will provide. In addition, they will be able to take advantage of new technologies to improve spectral efficiency (that will be implemented and funded by the transition), such as improved data compression and modulation techniques to further improve their spectral efficiency.

128. The Commission likewise rejects the argument that a Section 316 modification of FSS space station licenses to remove authorization in the lower 300 megahertz would constitute an unlawful ''taking'' under the Takings Clause of the U.S. Constitution. Commission licenses do not constitute a property right. Section 301 of the Act states that Commission licenses ''provide for the use of [radio] channels, but *not the ownership thereof,* by persons for limited periods of time.'' Section 304 of the Act requires licensees to waive ''any claim to the use of any particular frequency or of the electromagnetic spectrum as against the regulatory power of the United States because of the previous use of the same, whether by license or otherwise.'' Courts have generally affirmed that spectrum rights are not property rights subject to the Takings Clause.[10] The plain language of the Act makes clear that a spectrum license is just that—a license to use spectrum—not a deed of ownership. The mere existence of Section 316 authority to modify licenses, including by removing authorization to operate on certain frequencies, makes clear that a Commission license is not an absolute property right to which the Takings Clause might apply.

129. Furthermore, even if FSS space station authorizations conferred cognizable property rights, which they do not, the license modification the Commission adopts in this *Report and Order* would not amount to a taking. A regulatory taking occurs ''where a regulation denies all economically beneficial or productive use'' of the property.[11] The Commission agrees that, ''because C-band satellites will still have significant economic benefit for the duration of their authorizations despite the C-band transition, the potential for a regulatory taking is significantly diminished.'' The U.S. Supreme Court has explained that a taking is not readily found where ''interference arises from some public program adjusting the benefits and burdens of economic life to promote the common good.'' [12] Here, by the space station operators' own admission, they will be able to continue to provide service to their existing customers after the transition, and the Commission adopts rules ensuring that incumbent FSS licensees are made whole for any costs they incur as a result of the transition. The Commission's modification of incumbent FSS licenses therefore does not amount to a taking under the U.S. Constitution.

130. *Clearing Earth Station Operations.*—Finally, the Commission's public interest analysis for transitioning the 3.7–3.98 GHz band to flexible use and reserving the 3.98–4.0 GHz band as a guard band extends to incumbent earth stations. The Commission reiterates its finding above that earth station registrants are not licensees. The Commission issues licenses pursuant to its authority under Title III of the Act, which requires a license for ''the *transmission* of energy, or communications or signals by radio.'' The Commission has long concluded that, because receive-only earth stations do not transmit, they do not require a license under Section 301 of the Act. In adopting rules providing for earth station registrants to receive interference protection through voluntary coordination, the Commission has done so under its Title I ancillary authority to its ''other regulatory responsibilities to maximize effective use of satellite communications'' over which the Commission has express Title III authority, including its Section 301 licensing and conditioning authority and its Section 303 authority to regulate radio transmissions in various specified ways, and made clear that a receive-only earth station registration does not confer a license. While Section 316 governs the Commission's modification of licenses, the Commission is not required by the Act to license receive-only earth stations and has found that it is not in the public interest to do so. The Commission has therefore relied on its ancillary authority to administer a registration regime for these stations, which it has an ongoing responsibility to modify as appropriate to ensure that it remains consistent with its regulation in the

[10] *See, e.g., NextWave Pers. Commc'ns, Inc.,* 200 F.3d 43, 51 (2d Cir. 1999), *cert. denied,* 531 U.S. 924 (2000) (citing 47 U.S.C. 301 (the purpose of the Communications Act is to ''to provide for the use of [radio] channels, but not the ownership thereof'')).

[11] *See Lucas* v. *South Carolina Coastal Council,* 505 U.S. 1003, 1015 (1992); *Agins* v. *City of Tiburon,* 447 U.S. 255, 260–61 (1980) (balancing the property owner's economic losses and lost reasonable investment-backed expectations against the character of the government action).

[12] *Penn Central Transportation Co.* v. *New York City,* 438 U.S. 104, 124 (1978) (citing *Pennsylvania Coal Co.* v. *Mahon,* 260 U.S. 393, 413 (1991) (''[g]overnment hardly could go on if to some extent values incident to property could not be diminished without paying for every such change in the general law'')).

public interest of the licensed satellite stations. As an exercise of that responsibility, the Commission is thus modifying the earth station registrations to comport with the C-band reconfiguration it is ordering herein, by limiting the frequencies on which these earth stations may receive interference protection to the upper 200 megahertz of C-band spectrum.

131. A relatively small number of earth stations that receive in the 3.7–4.2 GHz band are licensed to transmit in another band (*i.e.,* licensed transmit-receive earth stations). That license to transmit does not provide the earth station operator with the right to transmit in the C-band, where they hold no ''licensed spectrum usage rights.'' To the extent earth stations have licenses to transmit in another band, the Commission finds that it has ample authority to propose to modify their authorizations to eliminate their interference protection rights in the lower 300 megahertz of the band, once cleared of satellite operations under the Commission's Section 316 authority. Like with the space station operators, this proposed modification does not effect a fundamental change because earth stations will continue to receive the same level of service (from satellite providers operating in the upper 200 megahertz of the band) and will remain able to provide the same services to their own customers as before their registration or license modification.

132. *New Earth Stations.*—On April 19, 2018, the staff released the *Freeze and 90-Day Earth Station Filing Window Public Notice (83 FR 35454, July 26, 2018),* which froze applications for new or modified earth stations in the 3.7–4.2 GHz band to preserve the current landscape of authorized operations pending action as part of the Commission's ongoing inquiry into the possibility of permitting mobile broadband use and more intensive fixed use of the band through this proceeding. Given its decision to limit FSS operations in the 3.7–4.0 GHz band in the contiguous United States but not elsewhere, the Commission converts the freeze for new FSS earth stations in the 3.7–4.0 GHz band in the contiguous United States into an elimination of the application process for registrations and licenses for those operations, and the Commission lifts the freeze for new FSS earth stations in the 3.7–4.2 GHz band outside of the contiguous United States as of the publication date of the *Report and Order.*

133. The Commission revises the part 25 rules such that applications for 3.7–4.0 GHz band earth station licenses or registrations in the contiguous United States will no longer be accepted. Several commenters support permanently limiting eligibility to file applications for earth station licenses or registrations to incumbent earth stations. The Commission finds that limiting, as described, the registration of new earth stations in spectrum being transitioned to primary terrestrial use will provide a stable spectral environment for more intensive terrestrial use of 3.7–3.98 GHz and facilitate the rapid transition to terrestrial use.

134. With respect to registered incumbent earth stations that are transitioned to the 4.0–4.2 GHz band, the Commission will permit these earth stations to be renewed and/or modified to maintain their operations in the 4.0–4.2 GHz band. The Commission will not, however, accept applications for new earth stations in the 4.0–4.2 GHz portion of the band for the time being, during this transition period.

135. *New Space Station Operations.*—Consistent with its decision to continue to permit satellite operations in the upper 200 megahertz of the C-band, the Commission modifies its proposal to revise the rules to codify the International Bureau's June 21, 2018 freeze. Specifically, the Commission revises its rules to prohibit new applications for space station licenses and new petitions for market access concerning space-to-Earth operations in the 3.7–4.0 GHz band in the contiguous United States. Outside the contiguous United States for the 3.7–4.2 GHz band and nationwide for the 4.0–4.2 GHz band, these revisions do not apply. For the contiguous United States, allowing new satellite space station applicants to claim access to the 4.0–4.2 GHz FSS band could complicate the transition process. Accordingly, the Commission will continue the freeze on new applicants until the transition is completed, which will allow incumbent space station operators the flexibility to launch additional satellites to achieve an efficient transition to the upper portion of the band. Once the transition is completed, the International Bureau is directed to release a public notice announcing that the freeze is lifted.

136. Several terrestrial wireless operators support limiting new space station operations as proposed by the Commission. The Commission finds its approach strikes the appropriate balance between not allowing new space station applicants to claim access to the band to complicate the transition process and providing incumbent space station operators the flexibility to launch additional satellites to achieve an efficient transition to the upper portion of the band.

3. Transition Schedule

137. Consistent with the *Emerging Technologies* framework, the Commission finds a mix of carrots and sticks best accommodates the need to clear FSS operations out of the lower 300 megahertz as quickly as possible to facilitate new terrestrial, flexible-use operations and the need to preserve the content distribution ecosystem now contained in the C-band. Given the disagreements in the record on how long the transition will take, the Commission finds that a multi-stage transition that offers both positive incentives to operators for clearing early as well as negative incentives for operators that fail to clear by the end of the sunset period will best serve these goals.

138. The Commission establishes a Relocation Deadline of December 5, 2025 to ensure that all FSS operations are cleared in a timely manner, as well as two Accelerated Relocation Deadlines—a Phase I deadline of December 5, 2021 and a Phase II deadline of December 5, 2023—for incumbent space station operators that voluntarily relocate on an accelerated schedule (with additional obligations and incentives for such operators). And the Commission sets forth the consequences for meeting or failing to meet these deadlines.

139. In the *NPRM,* the Commission sought comment on reasonable benchmarks for incumbent space station operators to clear and make C-band spectrum available for flexible use to ensure a timely transition process. Recognizing that spectrum would likely be cleared incrementally over the course of the full clearing process, the Commission sought comment on appropriate periodic reporting requirements, as well as any procedural safeguards or penalties that may be necessary if the transition facilitator is unable to clear the spectrum within the designated clearing time period.

140. The record is divided on how long it will take to clear the lower 300 megahertz for terrestrial operations and relocate incumbent space station operators and incumbent earth stations to the upper 200 megahertz. In the context of proposing a private sale, the C-Band Alliance states that it could clear and repack enough satellite transponders to make 280 megahertz of spectrum available for 5G use in the contiguous United States within 36 months of such a sale in a two-step process. First, within 18 months of Commission action in this proceeding,

the C-Band Alliance would be able to clear 120 megahertz in 46 of the top 50 PEAs. The C-Band Alliance claims it could achieve this benchmark without the need to launch new satellites. To achieve this, the C-Band Alliance proposes to provide passband filters to all earth stations that potentially may be affected by wireless terrestrial operations anywhere within the PEA, including earth stations that are outside of, but near enough to, the PEA to experience harmful interference. Second, within 36 months of its private sale, the C-Band Alliance would be able to clear the remaining PEAs for the first 120 megahertz, as well as an additional 180 megahertz throughout the contiguous United States. Space station operators that are not members of the C-Band Alliance support a rapid transition of C-band spectrum and have put forth similar transition timelines to those proposed by the C-Band Alliance. Eutelsat supports the 18- and 36-month timelines proposed by the C-Band Alliance, and states that, with diligent effort from all interested parties, an auction could commence in 2020, with transition milestones for the release of 100 megahertz and 300 megahertz of spectrum for flexible use at the end of 2021 and 2023, respectively. The Small Satellite Operators agree that 300 megahertz of C-band spectrum could be made available for 5G within 18 to 36 months through the use of non-proprietary, readily available compression technology. And other commenters agree that the proposed 18-month and 36-month timelines are attainable if all stakeholders' incentives are properly aligned.

141. Some commenters express skepticism that a transition of FSS operations can be accomplished under the timelines proposed by the C-Band Alliance. Meanwhile, users of FSS services like broadcasters simply caution that the transition will be enormous and complex.''

142. Given that the members of the C-Band Alliance and Eutelsat manage most of the C-band satellite traffic today and are the most knowledgeable parties about their operations in the C-band, the Commission is inclined to give the C-Band Alliance and Eutelsat the opportunity to make good on their claims that they can relocate existing C-band operations into the upper 200 megahertz quickly and to provide incentives for them to do so. The Commission nonetheless recognizes that the transition may take longer than the C-Band Alliance and Eutelsat claimed was necessary as a technical matter. Given the reasoned skepticism of many in the record and our own agreement with commenters that this transition will be an enormous and complex task, the Commission adopts a somewhat longer Relocation Deadline of five years to ensure the protection of incumbent earth stations should the transition take longer than the C-Band Alliance has forecast.

143. Specifically, the Commission concludes that a Relocation Deadline of December 5, 2025 is in the public interest. In particular, the Commission finds that the December 5, 2025 transition date strikes a fair and appropriate balance between bringing C-band spectrum to market and ensuring space station operators, earth station operators, and other stakeholders have the necessary time to complete this transition in a careful, fair, and cost-effective manner. This date ensures this spectrum will be made available for flexible use, while guaranteeing that vital television and radio services currently provided using the C-band will continue operating without interruption, both during and after the transition.

144. FSS operations in the C-band are critical to the delivery of television and radio programming, as well as many other services, for tens of millions of Americans, and it is in the public interest to ensure that these services are not disrupted. Given this, it is in the public interest to avoid sunsetting FSS operations before all services can be transitioned fully out of this part of the band. And the Commission finds that, even with the uncertainties in the record, a transition period through December 5, 2025 will be sufficient to ensure continued operations throughout the contiguous United States and the relocation of stations to the upper 200 megahertz of the band.

145. In setting the Relocation Deadline, the Commission must also account for the costs to the American public from delays in freeing up this important mid-band spectrum for terrestrial use, including for 5G. The C-Band Alliance itself has claimed that ''[e]ach year of [delaying the deployment of C-band spectrum for flexible use] is value lost forever—here, about $50 billion or more per year in consumer surplus.'' Whatever the merits of that particular valuation, the Commission agrees that delaying the transition of this spectrum longer than necessary will have significant negative effects for the American consumer and American leadership in 5G. The Commission thus finds that because a 2025 deadline is sufficient to relocate existing FSS operations, it is imperative we set the Relocation Deadline no later than 2025 so that we do not delay the use of this valuable public resource any longer than necessary.

146. The Commission notes that a five-year Relocation Deadline is wholly consistent with our precedent and past spectrum transitions. The Commission has overseen several complex transitions in other bands, involving thousands of authorized entities with diverse operational needs, customer bases, and technical requirements. Recent transition timelines have been as short as 39 months—such as in the Broadcast Incentive Auction—or longer than fourteen years—as in the 800 MHz transition.

147. In the *800 MHz Order,* the Commission repacked portions of the 800 MHz band to address a growing problem of harmful interference to 800 MHz public safety communication systems caused by the inherent incompatibility of those systems with high-density commercial wireless systems when situated in an increasingly congested, interleaved spectral environment. The 800 MHz repack has taken over fourteen years to complete, due to the need to ensure public safety transmissions are not disrupted. In contrast, the Commission expects the transition after the Broadcast Incentive Auction, which involves repacking full power and Class A television broadcast facilities, will take only 39 months. The Broadcast Incentive Auction, authorized by Congress, sought to reallocate spectrum used by TV broadcasters in order to provide new spectrum to be used for next generation wireless services. TV broadcasters, who previously used portions of spectrum above Channel 37, ranging from 614 MHz to 698 MHz, were assigned to a channel ranging from Channel 2 to Channel 36, consisting of the VHF low band (between Channel 2 and Channel 6), the VHF high band (between Channel 7 and 13), and the UHF band (between Channel 14 and 36). Additionally, some TV broadcasters operating in channels below Channel 37 were relocated to other channels below Channel 37.

148. The Commission sees this transition as more analogous to the Broadcast Incentive Auction repacking than it is to the 800 MHz transition. Here, unlike the 800 MHz transition, public safety services are not at stake and—although incumbent operations will be protected throughout the transition—moving FSS transmissions will not require the careful incremental adjustments required in the 800 MHz repack. As a result, repacking FSS transmission will not need as much time as has been needed for the repack of the 800 MHz band. However, the

Commission also believes that the C-band transition may take longer than the Broadcast Incentive Auction, as this transition will involve a variety of different and complex elements that may require a longer transition timeline. For example, the transition here will likely require the design, construction, launch, and deployment of additional new satellites. Additionally, that transition involved only 987 TV licenses and not communications and coordination among and reimbursement to thousands of satellite and earth station stakeholders.

149. C-band space station operators do not have direct contractual relationships with many of the earth stations that receive their service transmissions and, as such, it may take additional time and effort to ascertain which FSS earth stations receive content from each incumbent space station operator and to assign responsibility for clearing each earth station. Regardless, the incumbent space station operators are in the best position to expeditiously transition this band to flexible use service and we note that they have already made significant progress in identifying earth stations and developing transition plans.

150. Despite having claimed it can complete the transition in three years, the C-Band Alliance has recently suggested that Commission precedent could require a 10-year (or greater) deadline for relocation under the *Emerging Technologies* precedent. The Commission disagrees. The Commission acknowledges that the Commission can and has set a 10-year deadline before, for example, when it relied on the *Emerging Technologies* framework to transition terrestrial fixed service licensees relocating from the 18.58–18.8 GHz and 18.8–19.3 GHz bands, to the 17.7–18.3 GHz band, in addition to allowing operations in the 18.3–18.58 GHz and 19.3–19.7 GHz bands on a co-primary basis. But in doing so, the Commission expressly found that, based on the circumstances before it, a sunset period of ten years for continued co-primary status of existing terrestrial fixed stations was an appropriate compromise that will allow these systems to continue to operate in these bands, while giving FSS interests the option to pay the cost of relocating such systems if FSS interests want to deploy operations in those areas before the 10-year sunset. But just because the Commission determined a ten-year transition was appropriate under one set of facts does not mean that a ten-year sunset period is appropriate or necessary for clearing the C-band. And the C-Band Alliance fails to acknowledge that involuntary relocation procedures became available after only two years in the precedent it cites—so no incumbent was ''entitled'' to a ten-year transition.

151. *Accelerated Relocation.*—The Commission also adopts two Accelerated Relocation Deadlines—a Phase I deadline of December 5, 2021 and a Phase II deadline of December 5, 2023—for incumbent space station operators that voluntarily relocate on an accelerated schedule (with additional obligations and incentives for such operators). The Commission will provide an opportunity for accelerated clearing by space station operators by making them eligible for accelerated relocation payments, if those space station operators are able to meet certain early clearance benchmarks for the band.

152. The Commission also finds that adopting rules to provide for Accelerated Relocation Deadlines, with incentives for eligible space station operators that voluntarily relocate according to an accelerated schedule, will promote the rapid introduction of a significant tranche of C-band spectrum by leveraging the technical and operational knowledge of space station operators, aligning their incentives to achieve a timely transition, and enabling that transition to begin as quickly as possible. It is undisputed in the record that eligible C-band space station operators are in a unique position to quickly clear a significant portion of this band spectrally by using satellite grooming to repack existing services into the upper portion of the band. Thus, under this scenario, the clearing process would begin much sooner and proceed at a more rapid pace in the years following release of this *Report and Order* than if the Commission relied on the December 5, 2025 sunset date as the sole means of incentivizing space station operators to make C-band spectrum available for flexible use.

153. Specifically, eligible space station operators will have the option to clear according to the following accelerated clearing timeline: (1) Clearing 100 megahertz (3.7–3.8 GHz) by December 5, 2021, and (2) clearing the remaining 180 megahertz (3.8–3.98 GHz) by December 5, 2023. To satisfy the early clearing benchmarks, space station operators would be required to clear an additional 20 megahertz by the end of the clearing period to be used as a guard band to protect FSS users that will continue to operate in the upper portion of the band.

154. In order to satisfy the Phase I Accelerated Relocation Deadline, a space station operator must repack any existing services and relocate associated incumbent earth stations throughout the contiguous United States into the upper 380 megahertz of the C-band (3820–4200 MHz) and must also provide passband filters to block signals from the 3700–3820 MHz band to associated incumbent earth stations in 46 of the top 50 PEAs by December 5, 2021. To satisfy the Phase II Accelerated Relocation Deadline, a space station operator must repack any existing service and relocate associated incumbent earth stations throughout the contiguous United States into the upper 200 megahertz of the C-band (4.0–4.2 GHz), and provide passband filters to block signals from the 3700–4000 MHz band to all associated incumbent earth stations in the contiguous United States by December 5, 2023. In both instances, the space station operator must not knowingly cause the incumbent earth stations that receive its transmission to temporarily or permanently lose service during or after the transition and must take all steps necessary to allow incumbent earth station operators to continue to receive substantially the same service during and after the relocation that they were able to receive before the transition.

155. As discussed below, a space station operator must coordinate with relevant earth station operators to perform any necessary system modifications, repointing, or retuning to receive transmissions that have been migrated to frequencies on new transponders or satellites, and must ensure that any incumbent earth stations currently receiving in the bottom 300 megahertz are able to continue receiving those services once they are transitioned to the upper portion of the band.

156. *Payments and Penalties Related to the Deadlines.*—Incumbent space station and earth station operators that clear their existing services from the lower 300 megahertz by the Relocation Deadline shall be eligible for reimbursement of their reasonable costs to transition.

157. In addition to reimbursement for their relocation costs, incumbent space station operators that satisfy the Accelerated Relocation Deadlines shall be eligible to receive an Accelerated Relocation Payment. A space station operator that elects to accept the Accelerated Relocation Payment for satisfying the Phase I Accelerated Relocation Deadline must also commit to complete the transition of the full 300 megahertz by the Phase II clearing deadline. If a space station operator fails to satisfy either the Phase I or Phase II

deadline, it will not be eligible for the portion of the accelerated relocation payment attributable to the deadline that it missed.

158. Space station operators that fail to clear their existing services from the lower 300 megahertz by the final Relocation Deadline will not receive reimbursement for their reasonable relocation costs or any additional Accelerated Relocation Payments, and will also be subject to penalties for their failure to timely clear. Radio transmissions must be authorized by the FCC pursuant to Section 301, and transmissions sent by space station operators after the Relocation Deadline established above would be unauthorized and a violation of Section 301. Unauthorized transmissions by incumbent space station operators in violation of Section 301 can result in the imposition of sanctions by the FCC on such operators, including forfeiture penalties. Thus, after the Relocation Deadline, a space station operator which continues to operate in the 3.7–4.0 GHz band with the willful purpose of transmitting to earth stations within the contiguous United States, both registered and unregistered, would be ''operat[ing] without an instrument of authorization for the service'' and potentially subject to forfeitures and other sanctions.

159. While the Commission will review any potential violations on a case-by-case basis, unauthorized satellite transmissions to earth stations could result in forfeitures based on each unauthorized satellite operation, each unauthorized earth station operation, or each day of unauthorized operation of such satellites and earth stations. There are approximately 20,000 registered earth stations in the contiguous U.S., and some space station operators—some of whom transmit from multiple satellites—transmit to thousands of earth stations in the contiguous U.S. A space station operator operating in violation of its authorization could be assessed a separate violation on a daily basis for each earth station to which they willfully transmit and for each satellite from which the unauthorized transmission is sent. Alternatively, the Commission may consider each discrete transmission between a satellite and earth station a violation, resulting in a penalty for each of those unauthorized transmissions. Operation without an instrument of authorization for the service carries a base forfeiture of $10,000 per violation.

160. The Commission's rules allow it to adjust forfeiture penalties upward according to a set of criteria. Specifically, in exercising its forfeiture authority, the Commission must consider the ''nature, circumstances, extent, and gravity of the violation and, with respect to the violator, the degree of culpability, any history of prior offenses, ability to pay, and such other matters as justice may require.'' In addition, the Commission has established forfeiture guidelines, under which the Commission may adjust a forfeiture upward for violations that are egregious, intentional, or repeated, or that cause substantial harm or generate substantial economic gain for the violator. Thus, the Commission could potentially upwardly adjust the forfeiture penalties for space station operators if it found that a space station operator's misconduct merited an increase in penalties.

4. Relocation and Accelerated Relocation Payments

161. Under the framework the Commission adopts to facilitate a public auction of 280 megahertz of C-band spectrum, new overlay licensees must pay their share of relocation and accelerated relocation payments to reimburse incumbents for the reasonable costs of transitioning out of the lower 300 megahertz of the C-band in the contiguous United States. In this section, the Commission explains its authority to require such payments, explains what relocation costs are compensable, estimates the total relocation payments, establishes the accelerated relocation payments available to incumbent space stations that elect for an accelerated transition and meet those deadlines, and explains what share of the costs each overlay licensee will bear.

162. *Authority to Require Payments.*— The Commission finds that incumbent space station operators and incumbent earth station operators that must transition existing services to the upper portion of the band should be compensated for the costs of that transition. Because winning bidders will benefit from use of the spectrum, the Commission will condition their licenses on making all necessary relocation and accelerated relocation payments before they are allowed to deploy in the spectrum made available for flexible use.

163. The Commission's broad spectrum management and licensing authority under Section 303 provides it with the ability to ''[m]ake such rules and regulations and prescribe such restrictions and conditions, not inconsistent with law, as may be necessary to carry out the provisions of this [Act.]'' [13] The Commission has repeatedly used this authority to impose conditions on new licensees, including buildout conditions, public safety obligations, and obligations to facilitate the transition of incumbents out of the spectrum at issue before commencing operations.

164. The Commission's authority to require new licensees to make relocation payments to incumbents is well established. Starting in 1992, the Commission adopted a series of rules (known as the *Emerging Technologies* framework) to enable new licensees to enter into voluntary or mandatory negotiations with incumbent operators to clear a spectrum band after which, failing an agreement, the new entrant could involuntarily clear incumbent operations by expressing its intent to commence operations in that band and paying for all reasonable relocation costs. For example, in 2000, the Commission, recognizing that new licensees in a band might be unable to design their systems to avoid interference from incumbent stations, adopted a relocation reimbursement process to ''afford[ ] reasonable flexibility'' for those new licensees ''to roll out their operations in a timely and economic manner.'' Similarly, in 2006, the Commission established procedures for the relocation of Broadband Radio Service and Fixed Microwave Service operation and further adopted cost-sharing rules to identify the reimbursement obligations for new entrants benefitting from the relocation of those incumbent services.

165. Notably, the Commission has taken a flexible approach in applying the *Emerging Technologies* framework, tailoring the particular obligations on incumbents and new licensees to suit the circumstances. And so, for example, the Commission has imposed cost-sharing obligations on incoming licensees to insure that relocation expenses would be borne by all new licensees that would benefit from such clearing—even if one such licensee were to take lead in working with incumbents to facilitate speedier clearing. Indeed, in 2013, the Commission adopted a cost-sharing mechanism for winning bidders to reimburse the entities that had previously cleared incumbents from the band.

166. Courts have upheld the Commission's use of this authority. In 1996, the U.S. Court of Appeals for the D.C. Circuit upheld the Commission's repeal of an exemption, which had previously shielded public safety licensees from a relocation regime in

[13] 47 U.S.C. 303(r).

which new licensees would pay all costs associated with relocating incumbents to comparable facilities.[14] The court found that the Commission had ''adequately articulated a *reasoned* analysis based on studies and comments submitted during the rulemaking process'' that justified its decision to require all incumbent licensees, including public safety licensees, to mandatory relocation. In the 2001 *Teledesic* case, the D.C. Circuit, in affirming the Commission's authority to adopt such relocation compensation mechanisms, noted that the Commission's ''consistent policy has been to prevent new spectrum users from leaving displaced incumbents with a sum of money too small to allow them to resume their operations at a new location.'' [15] The court observed that it previously had approved aspects of a similar relocation scheme, in a decision upholding the elimination of an exemption for public safety incumbents from a relocation regime in which new licensees would pay all costs associated with relocating incumbents to comparable facilities.

167. That same authority also allows the Commission to require overlay licensees to make accelerated relocation payments—payments designed to expedite a relocation of incumbents from a band. The Commission starts again with the *Emerging Technologies* framework, in which the Commission expressly allowed new licensees to make relocation payments separate and above relocation expenses ''as an incentive to the incumbent to locate quickly.'' For example, in reallocating certain bands for PCS operations in the 1990s, the Commission provided that incoming licensees could offer ''premium payments or superior facilities, as an incentive to the incumbent to relocate quickly.'' Ten years later, the Commission expressly authorized incentive payments to incumbent operators to expedite clearing. In those transitions, the Commission found that such acceleration agreements not only benefitted both entrants and incumbents, but, more importantly, served the public interest by significantly expediting transitions to flexible use.

168. Given the significant public interest benefits of clearing terrestrial, mid-band spectrum more quickly, which would bring next-generation services like 5G to the American public years earlier and help assure American leadership in the 5G ecosystem, the Commission finds that requiring overlay licensees to make accelerated relocations is in the public interest. The Commission starts by noting the significant benefits of accelerating a transition of this spectrum. Studies in the record indicate that licensing mid-band spectrum will lead to substantial economic gains. Economist Jeffrey Eisenach points to ''consumer welfare gains from rapid allocation of C-band spectrum to mobile broadband carriers,'' and he estimates that the ''*annual* increase in consumer surplus is approximately equal to the total amount paid by the purchasers.'' Eisenach also notes that ''for every year of delay'' in making the C-band spectrum available, ''consumer welfare is reduced by $15 billion.'' Similarly, Coleman Bazelon estimates that just one year of delay in transitioning the spectrum would reduce the value of repurposing the C-band by between 7% and 11%. Noting that the ''economic value of spectrum is only a fraction of its total social value, the Brattle Group notes that ''every $1 billion in delay costs would create total social costs of $10 billion to $20 billion.'' These studies underscore the importance of incentivizing incumbents to clear the band for 5G use as quickly as possible.

169. Next, the Commission finds that simply allowing overlay licensees to negotiate with incumbent space station operators and incumbent earth station operators for an expedited departure from the band likely would prove ineffective in ensuring a speedy transition. *First,* incumbent space station operators face holdout problems. The complex nature of spectrum-sharing in the band (including the non-exclusive, non-terrestrially-bound, full band, full arc transmission rights held by each incumbent space station operator) poses one hurdle, since persuading a single operator to accelerate relocation may have no impact on expedited clearing of the band because other operators have not relocated (for example, a single incumbent earth station operator may have multiple earth stations clustered together, each pointing at a different satellite owned by a different incumbent space station operator). Because of this regulatory structure, each incumbent space station operator has strong incentives to holdout to extract a disproportionate premium for its participation. *Second,* overlay licensees face free rider problems. If one flexible-use licensee pays to clear a single PEA (let alone the contiguous United States), other licensees could benefit significantly from the clearing without paying their fair share. *Third,* numerous coordination problems exist. Transitioning the C-band satellite ecosystem to the upper part of the band will require communication and coordination with a large and diverse group of entities with different interests, including multiple incumbent space station operators and thousands of incumbent earth stations. *Fourth,* to meet the clearing deadlines set by the Commission and, in so doing, maximize the economic and social benefits of providing spectrum for next generation wireless services, space station operators will need to begin the clearing process immediately. To accomplish an early transition via negotiation, however, the satellite licensees would need to know the identities of each of the overlay licensees in the band and those will not be known until after the completion of the auction, sometime in 2021. Thus, relying solely on individual negotiations between licensees to accomplish earlier transition would be incompatible with the clearing deadlines established by the Commission.

170. Based on the unique circumstances of the band, the Commission therefore finds that it would best serve the public interest, consistent with the *Emerging Technologies* framework, to condition new licenses on making acceleration payments to satellite incumbents that voluntarily choose to clear the band on an expedited schedule. Like relocation payments, the Commission finds that requiring such mandatory payments is both in the public interest and within our Title III authority.

171. The Commission finds its decision to require new terrestrial licensees to pay relocation costs is broadly supported by the record. Commenters overwhelmingly urge the Commission to require new licensees to reimburse incumbents' costs to clear the band for flexible use.

172. Commenters also agree that it is appropriate to require new terrestrial licensees to make additional payments above relocation costs to incumbents that clear on accelerated timelines.

173. The vast majority of stakeholders that have submitted filings in the record on this issue agree that the Commission has the authority to require the new flexible use licensees both to pay the relocation costs of the incumbent space station operators and to make an accelerated relocation payment when certain conditions are met. The Commission's long practice of

[14] *Ass'n of Public Safety Communications Officials-Int'l, Inc.* v. *FCC,* 76 F.3d 395, 397, 400 (D.C. Cir. 1996).

[15] *Teledesic LLC* v. *FCC,* 275 F.3d 75, 84–86 (D.C. Cir. 2001).

permitting voluntary relocation payments was affirmed by the D.C. Circuit in *Teledesic.* In the proceeding underlying that decision, the Commission followed its *Emerging Technologies* precedent and adopted rules that allowed new licensees to compel incumbents to relocate from the 18 GHz band and required such licensees to negotiate with incumbents prior to requiring them to leave the band and to pay reasonable relocation expenses. The SSOs similarly agree that the Commission's exercise of its general Title III authority to condition wireless licenses would include a mandatory acceleration payment and would constitute a reasonable extension of the Commission's *Emerging Technologies* precedent. Still other reports focus on the value of accelerating the clearing of this band. Coleman Bazelon estimates that a one year of delay in transitioning the spectrum would reduce the economic value of repurposing this band by between 7% and 11%. Additionally, Bazelon highlights the importance of consumer surplus, or social value, associated with accelerated clearing. He notes that ''every $1 billion in delay costs would create total social costs of $10 billion to $20 billion.'' Similarly, Dr. Eisenach, citing a study by Hazlett and Munoz, states that the ''*annual* increase in consumer surplus is approximately equal to the total amount paid by the purchasers.''

174. Some commenters argue that the Communications Act prohibits the Commission from requiring overlay licensees to make accelerated relocation payments because Section 309(j) of the Act requires that ''all proceeds from the use of a competitive bidding system under this subsection shall be deposited in the Treasury.'' The Commission disagrees that this statutory provision would preclude such relocation payments. Under the rules the Commission adopts, all proceeds from the public auction will indeed be deposited in the Treasury in accordance with the requirements of the Act. By contrast, accelerated relocation payments are not ''proceeds'' of the auction. Instead, they will flow from the new licensees to the incumbents. This is precisely the arrangement that courts have upheld in the *Emerging Technologies* framework, and precisely the framework that allows us to require incumbents to make *any* relocation payments. The Commission does not read OTI as arguing that *all* relocation payments are prohibited—doing so would significantly hinder the Commission's work to manage spectrum in the public interest in a variety of bands and contexts (and would contradict the clear line of judicial precedent that has affirmed the Commission's authority to require such payments). And we cannot see why the language of Section 309(j) should treat one form of relocation payment as proceeds but not another, so long as all are tied to facilitating the swift and efficient transition of incumbents out of the band.

175. Some parties argue that earth station operators should receive accelerated relocation payments in exchange for expedited clearing as well. The Commission finds such arguments unavailing. Based on the record, the Commission anticipate that clearing any given incumbent earth station will be a relatively quick process—and will take far less time than the deadlines we establish for the transition. Instead, it is the fact that incumbent space station operators must account for the operational logistics of hundreds if not thousands of incumbent earth stations that make the overall transition significantly longer than it would take to transition a single earth station. And indeed, the Commission already requires incumbent space station operators that elect Accelerated Relocation to take upon themselves responsibility for transitioning all incumbent earth station operators that receive their services—they must coordinate with incumbent earth station registrants to perform any necessary system modifications, repointing, or retuning to receive transmissions that have been migrated to the upper portion of the band. The Commission thus finds that incumbent earth station operators can and will transition in a timely manner without the need for accelerated relocation payments.

176. *Compensable Relocation Costs.* The Commission next sets forth guidelines for compensable costs, *i.e.,* those reasonable relocation costs for which incumbent space station operators and incumbent earth station operators can seek reimbursement. Consistent with Commission precedent, compensable costs will include all reasonable engineering, equipment, site and FCC fees, as well as any reasonable, additional costs that the incumbent space station operators and incumbent earth station operators may incur as a result of relocation.

177. The Commission expects incumbents to obtain the equipment that most closely replaces their existing equipment or, as needed, provides the targeted technology upgrades necessary for clearing the lower 300 megahertz, and all relocation costs must be reasonable. ''Reasonable'' relocation costs are those necessitated by the relocation in order to ensure that incumbent space station operators continue to be able to provide substantially the same or better service to incumbent earth station operators, and that incumbent earth station operators continue to be able to provide substantially the same service to their customers after the relocation compared to what they were able to provide before. For example, parties have indicated that upgrades such as video compression, modulation/coding, and HD to SD down-conversion at downlink locations, may be necessary to accomplish efficient clearing—particularly in an accelerated timeframe. So long as the costs for which incumbents are seeking reimbursement are reasonably necessary to complete the transition in a timely manner (and reasonable in cost), such expenses would be compensable. Similarly, the Commission expects that some incumbents will not be able to replace older, legacy equipment with equipment that is exactly comparable in terms of functionality and cost because of advances in technology and because manufacturers often cease supporting older equipment. Incumbents may receive the reasonable replacement cost for such newer equipment to the extent it is needed to carry out the transition—and the Commission intends to allow reimbursement for the cost of that equipment and recognize that this equipment necessarily may include improved functionality beyond what is necessary to clear the band. In contrast, the Commission does not anticipate allowing reimbursement for equipment upgrades beyond what is necessary to clear the band. For example, if an incumbent builds additional functionalities into replacement equipment that are not needed to facilitate the swift transition of the band, it must reasonably allocate the incremental costs of such additional functionalities to itself and only seek reimbursement for the costs reasonably allocated to the needed relocation.

178. The Commission recognizes that incumbents may attempt to gold-plate their systems in a transition like this. Incumbents will not receive more reimbursement than necessary, and the Commission requires that, to qualify for reimbursement, all relocation costs must be reasonable. This requirement should give incumbents sufficient incentive to be prudent and efficient in their expenditures. If a particular expenditure is unreasonable, the incumbent will only receive compensation for the reasonable costs that the incumbent

would have incurred had it made a more prudent decision.

179. Similarly, the Commission will not reimburse incumbent licensees for the speculative value of any business opportunities that they claim they would lose as a result of the transition. Since the incumbent space station operators will be able not only to maintain their current level of service after the transition, but to potentially serve new clients by employing point technology and adopting other network efficiencies, the Commission finds that there will be no compensable loss of business opportunity over and above their actual costs associated with the transition. Compensating licensees for speculative claims of future loss would be inconsistent with established Commission precedent and would not serve the public interest.

180. As in prior cases, the Commission will allow reimbursement of some ''soft costs''—''legitimate and prudent transaction expenses'' incurred by incumbents ''that are directly attributable'' to relocation. The Commission defines soft costs as transactional expenses directly attributable to relocation, to include engineering, consulting, and attorney fees, as well as costs of acquiring financing for clearing costs. This is consistent with suggestions from some commenters that the Commission should allow recovery of soft costs for relocation expenses.

181. In some prior proceedings, the Commission has subjected ''soft'' costs to a cap of 2% of the hard costs involved. Without a limit, ''soft cost'' transaction expenses such as engineering and attorney fees, could easily eclipse the ''hard costs'' of relocation, particularly for the thousands of incumbent earth stations that must be filtered, retuned, or repointed. A limit on transaction expenses can encourage transition efficiency, as many incumbent earth station operators own or manage multiple incumbent earth stations and thus have the ability to identify and implement economies of scale. Rather than a hard cap, the Commission finds it reasonable to establish a rebuttable presumption that soft costs should not exceed 2% of the relocation hard costs. This way, an incumbent may demonstrate that any fees in excess of 2% were reasonably and unavoidably incurred—and thus properly compensable. Establishing a rebuttable presumption is consistent with the Commission's approach in the 800 MHz Rebanding proceeding, in which the Commission used 2% of the hard costs as a ''useful guideline for determining when transactional costs are excessive or unreasonable and charge[d] the Transition Administrator to give a particularly hard look at any request involving transactional costs that exceed two percent.'' As discussed below, the Commission will establish a Relocation Payment Clearinghouse that can serve ''as a watchdog over excess transactional costs.'' Parties seeking reimbursement for soft costs that exceed 2% shall bear the burden of justifying these expenses.

182. For incumbent space station operators, flexible-use licensees will be required to reimburse eligible space station operators for their actual relocation costs, as long as they are not unreasonable, associated with clearing the lower 300 megahertz of the band while ensuring continued operations for their customers. First, the Commission expects that procuring and launching new satellites may be reasonably necessary to complete the transition. These new satellites will support more intensive use of the 4.0–4.2 GHz band after the transition. Second, incumbent space station operators will also need to consolidate their TT&C sites—to a maximum of four facilities in the contiguous United States—and reduce the number of gateway facilities. The costs involved with this consolidation process may include the installation of additional antennas at these facilities, procurement of new real estate, and support for customer migration to the relocated facilities. Third, the Commission expects that incumbent space station operators will need to install compression and modulation equipment at their terrestrial facilities to make more efficient use of spectrum resources and ensure that they are able to provide a consistent level of service after the transition. All of these migration tasks must be coordinated with the earth station transition process to ensure that earth stations are able to receive existing C-band services during and after the transition.

183. The Commission reiterates that compensable relocation costs are only those that are reasonable and needed to transition *existing* operations in the contiguous United States out of the lower 300 megahertz of the C-band. In order to meet this standard and qualify as eligible for relocation cost reimbursements, an incumbent space station operator must have demonstrated, no later than February 1, 2020, that it has an existing relationship to provide service via C-band satellite transmission to one or more incumbent earth stations in the contiguous United States. These existing relationships could include, for example, contractual obligations to provide C-band service to be received at a specific earth station location. And these existing relationships need not be direct but could include indirect relationships through content distributors or other entities, so long as the relationship requires the provision of C-band satellite services to one or more specific incumbent earth stations in the contiguous United States. Based on the record, only five incumbent space station operators have such operations: Eutelsat, Intelsat, SES, Star One, and Telesat. The Commission does not expect any other incumbent space station operators to need to incur any relocation costs, and thus the Commission does not expect them to be eligible for relocation payments. Nonetheless, such operators may be compensated for reasonable relocation costs should they demonstrate that those costs were truly required as a direct result of the transition of existing C-band services provided to one or more incumbent earth stations in the contiguous United States.

184. For incumbent earth station operators, the Commission expects the transition will require two types of system changes that may occur separately or simultaneously: Earth station migration and earth station filtering. First, earth station migration includes any necessary changes that will allow the earth stations to receive C-band services on new frequencies or from new satellites once space station operators have relocated their services into the upper portion of the band. For example, in instances where satellite transmissions need to be moved to a new frequency or to a new satellite, earth stations currently receiving those transmissions may need to be retuned or repointed in order to receive on the new frequencies or from the new satellite. Such a transition requires a ''dual illumination'' period, during which the same programming is simultaneously downlinked over the original frequency or satellite and over the new frequency or satellite so that the receiving earth station can continue receiving transmissions from the original frequency or satellite until it retunes or repoints the antenna to receive on the new frequency or satellite. Earth station migration may also require the installation of new equipment or software at earth station uplink and/or downlink locations for customers identified for technology upgrades necessary to facilitate the repack, such as compression technology or modulation. Second, passband filters must be installed on all existing earth

stations to block signals from adjacent channels and to prevent harmful interference from new flexible-use operations. Earth station filtering can occur either simultaneously with, or after, the earth station migration. All of these earth station migration actions must be coordinated with satellite transponder clearing in order for earth stations to continue receiving existing C-band services during and after the transition. As such, the Commission expects relocation costs to include the cost to migrate and filter earth stations, including costs to retune, repoint, and install new antennas and install filters and compression software and hardware. The Commission clarifies that incumbent earth station operators will include some gateway earth station operators who are likewise eligible for reasonable relocation costs, and the Commission recognizes that their reasonable relocation costs may differ from those of non-gateway earth stations.

185. Some commenters request that the Commission give incumbent earth station operators flexibility to replace existing earth stations with fiber in their transition planning. The Commission agrees that providing incumbent earth station operators flexibility may allow them to make efficient decisions that better accommodate their needs. But the Commission also recognizes that replacing existing C-band operations with fiber or other terrestrial services may be, for some earth stations, more expensive by an order of magnitude. As such, incumbent earth station operators will have a choice: They may either accept reimbursement for the reasonable relocation costs by maintaining satellite reception or they may accept a lump sum reimbursement for *all* of their incumbent earth stations based on the average, estimated costs of relocating all of their incumbent earth stations. Incumbent earth station owners that elect the lump sum payment will not be eligible to submit estimated or actual reasonable relocation costs to the Clearinghouse. The Commission requires incumbent earth station operators (including any affiliates) to elect one of these two options, which must apply to all of each earth station operator's earth stations in the contiguous United States in order to prevent any improper cost shifting. And the Commission requires the decision to accept a lump sum reimbursement to be irrevocable—by accepting the lump sum, the incumbent takes on the risk that the lump sum will be insufficient to cover all its relocation costs—to ensure that incumbents have the appropriate incentive to accept the lump sum only if doing so is truly the more efficient option. While earth station operators that elect the lump sum payment will be responsible for performing any necessary transition actions, earth station operators that elect the lump sum payment must complete relocation consistent with the space station operator's deadlines (Phase I and Phase II Accelerated Relocation Deadlines to the extent applicable) for transition.

186. The Commission directs the Wireless Telecommunications Bureau to announce the lump sum that will be available per incumbent earth station as well as the process for electing lump sum payments. The Bureau should identify lump sum amounts for various classes of earth stations—*e.g.,* MVPDs, non-MVPDs, gateway sites—as appropriate. Incumbent earth station owners must make the lump sum payment election no later than 30 days after release of the announcement, and must indicate whether each incumbent earth station for which it elects the lump sum payment will be transitioned to the upper 200 megahertz in order to maintain C-band services or will discontinue C-band services.

187. The Commission reiterates that compensable relocation costs are only those that are reasonable and needed to transition *existing* operations in the contiguous United States out of the lower 300 megahertz of the C-band. The Commission stresses that, parties should seek cost reimbursement pursuant to the process outlined in this *Report and Order* for relocation costs outside of the contiguous United States, they must demonstrate that they were required to make the system modifications for which they seek reimbursement as a direct result of the transition in the contiguous United States to make spectrum available for flexible use.

188. *Estimated Relocation Costs of the FSS Transition.*—The Commission finds it appropriate to provide potential bidders in its public auction with an estimate of the relocation costs that they may incur should they become overlay licensees. The Commission cautions that its estimates are estimates only, and the Commission makes clear that overlay licensees will be responsible for the entire allowed costs of relocation—even to the extent that those costs exceed the estimated range of costs.

189. The record contains estimates of the total clearing cost ranging from about $3 billion to about $6 billion. Based on the current record, the Commission believes that reasonable estimated costs will include the following ranges, subject to further reevaluation when the Commission creates and releases the cost category schedule. With respect to satellite procurement and launch costs, the Commission believes that $1.28 billion to $2.5 billion is a reasonable estimated range. This accounts for $160–$250 million in capital costs for each satellite, the high and low ranges provided by the C-Band Alliance and SES, respectively, and the estimated range of eight to ten additional satellites. With respect to earth station costs, the Commission finds that a range of $1 billion to $2 billion is a reasonable estimate for repacking transponders, filter installing, re-pointing earth station dishes, and antenna feeding. This would account for the lower-end estimates provided by the C-Band Alliance and the upper-end estimates provided by ACA Connects. With respect to MVPD compression hardware, the Commission finds $500–$520 million to be a reasonable estimated range. This is consistent with ACA Connects' estimate of about $10,000 per transcoder and its claim that about 20 transcoders will be needed at each of 2,600 MVPD locations. It is also consistent with the C-Band Alliance's estimate of $500 million for compression costs. This leads to a total clearing cost estimate ranging from about $3.3 billion to $5.2 billion.

190. *Accelerated Relocation Payments.*—The Commission next addresses the amount of accelerated relocation payments that each eligible incumbent space station operator would receive if the Accelerated Relocation Deadlines are met.

191. The Commission starts by noting that predictions of the prices that will be paid for licenses to operate on this spectrum vary widely both in the record and in publicly available reports. On the low side, the Public Interest Spectrum Coalition estimates a range of $0.065 to $0.196 per MHz-pop and the Brattle Group suggests a range of $0.003 to $0.415 per MHz-pop from recent international C-band auctions. On the high side, the C-Band Alliance recently submitted a report by NERA Economic Consulting that estimates $0.50 to $0.90 per MHz-pop. In the middle, Kerrisdale Capital Management analyzed C-band auction revenues in three other advanced industrial economies to estimate $0.50 per MHz-pop and the American Action Forum estimate a range topping out at $0.597 per MHz-pop based on an econometric analysis of previous auctions.

192. It is thus no surprise that the commenters have proposed a wide range of values for accelerated relocation payments. On the low side, Eutelsat proposes making $2.75 billion

available for ''premium'' payments for accelerated relocation. On the high side, the C-Band Alliance essentially argues that incumbent space station operators should receive a 50–50 split of auction revenues, or a $21.5 to $38.5 billion accelerated relocation payment, on the theory that incumbent space station operators should receive an equal part given the sale of their ''asset.'' The Commission notes, however, that the C-Band Alliance's analysis is based on the assumption that the Commission otherwise set a relocation deadline for FSS operations of 10 years.

193. The Commission notes, as a preliminary matter, that the C-Band Alliance's proposal seems to misunderstand the purpose of accelerated relocation payments. Incumbent space station operators are not ''selling'' their spectrum usage rights—instead they have the right to provide the services they currently offer going forward. Indeed, they have no terrestrial spectrum usage rights to ''sell.'' Furthermore, the transition we adopt, including relocation payments, will make them whole during and after that transition. The Commission's responsibility is to set an accelerated relocation payment that fairly incentivizes incumbent space station operators to expedite the transition while increasing the value of the entire transition effort for the American public.

194. The Commission starts by examining the value to the American public of an accelerated transition. Specifically, if all eligible space station operators are able to hit the Phase I Accelerated Relocation Deadline, then terrestrial operations by overlay licensees can commence in the lower 100 megahertz of the band in 46 PEAs (covering 58% of the population of the contiguous United States) by December 5, 2021 rather than December 5, 2023 (the Phase II deadline). And if all eligible space station operators are able to hit the Phase II Accelerated Relocation Deadline, then terrestrial operations by overlay licensees can commence throughout the contiguous United States by December 5, 2023 rather than by December 5, 2025 (the Relocation Deadline).

195. One useful exercise to frame an appropriate accelerated relocation payment would be to estimate the price that overlay licensees would willingly pay for an earlier transition, assuming that the free-rider and holdout problems could be overcome. Making the spectrum available to a licensee earlier increases the potential producer surplus earned by the licensee because it can begin to provide services to consumers on that spectrum sooner, thereby granting a specific commercial benefit to a new overlay licensee. So long as the Commission sets the accelerated relocation payment as a fraction of the bidder's expected incremental profits from deploying spectrum earlier, overlay licensees will themselves benefit even after making the accelerated relocation payment. In other words, if the Commission treats an estimated willingness to pay as an upper bound, allowing for an accelerated relocation payment in the amount specified would make overlay licensees no worse off and would likely make them better off for each year they received their new licenses earlier.

196. To establish a reasonable estimate of the price that overlay licensees would willingly pay to accelerate relocation, the Commission extrapolates the increase in expected profits from having access to the spectrum and the ability to deploy earlier than the Relocation Deadline. To do this, the Commission observes that the difference between an amount of money received at date T_2 and the same amount received at an earlier date T_1 is simply the accumulated interest that can be earned by investing the amount at date T_1, and holding it until date T_2.[16] If S is the present value of an infinite stream of profits associated with deploying a spectrum license, then the additional value, A, of accelerating the date when spectrum license is available to T_1, as opposed to T_2, is the accumulated interest earned from the stream S between those two periods. Mathematically, the additional value of accelerating an income stream, S, by m months, where the industry annual weighted average cost of capital is r with interest compounded monthly is given by: $A = [(1+r/12)^m - 1]S$.[17]

197. To apply these observations in this context, the Commission uses a weighted average cost of capital of 8.5%, consistent with our precedent. The Commission also uses the index of PEA weights adopted by the Commission in the 39 GHz reconfiguration proceeding that were based on the 600 MHz, 700 MHz, and AWS–3 auctions to estimate that the 46 PEAs that are cleared by the Phase I Accelerated Relocation Deadline account for 77% of the total value of the first 100 megahertz cleared. Finally, the Commission estimates the present value of future profits that licensees expect to receive from their overlay licenses in 2025 (the Relocation Deadline) to be $0.50 per MHz-pop. The Commission finds this to be a reasonable estimate given the wide range of valuations in the record—which notably do not account for the spectrum potentially not becoming available until the Relocation Deadline nor for the additional costs of clearing this spectrum in the contiguous United States. Applying the general formula to the facts at hand then yields an estimated increase in economic profits for an accelerated relocation of approximately $10.52 billion.

198. Given the record, the Commission finds that a $9.7 billion accelerated relocation payment is reasonable and will serve the public interest. The Commission recognizes that the Commission could find reasonable several of the methods advocated in the record for calculating the total size of the accelerated relocation payment, and in doing so, it would need to rely on estimates on several variables such as increased willingness to pay for the spectrum, potential future industry profits for flexible use licensees, spectrum valuation, and the costs of accelerated transitioning. Ultimately, the Commission recognizes that this determination is a line-drawing exercise, in which it must attempt to establish an amount that is less than the incremental value to new entrants of accelerating the clearing deadline but large enough to provide an effective incentive to incumbent space station operators to complete such accelerated clearing. The Commission finds that a $9.7 billion accelerated relocation payment strikes the appropriate balance between these considerations and the amounts advocated in the record. Although some incumbent space station operators have argued for significantly more, the Commission finds that $9.7 billion is reasonably close—but still falls below the total amount we conservatively estimate that overlay licensees themselves would be willing to pay to clear this spectrum early and less than the additional profits overlay licensees expect to earn as a result of the accelerated clearing. This helps ensure that the Commission does not impose an obligation on overlay licensees that the

[16] For example, the additional benefit of receiving $100 at the beginning of year 4 instead of year 5 if the interest rate were, say, 3% compounded annually, is simply $.03 \times \$100 = \$3$, and the total value of receiving that amount at the start of year 4 is simply $(1 + .03) \times \$100 = \$103$. Similarly, the total value of receiving $100 in year 3 instead of year 5 would be $(1 + .03)^2 \times \$100 = \$106.10$, and the incremental value of receiving the $100 two years early would be $[(1 + .03)^2 - 1] \times \$100 = \$6.10$.

[17] As an example, if a portion of a profit stream that was worth say $15 was accelerated by 42 months, and the weighted cost of capital was 7%, then the benefit from accelerating that payment is given by: $A = [(1+.07/12)^{42} - 1] \times \$15 = \$4.15$. For ease of calculation, we assume monthly compounding.

Commission is not convinced they would have assumed on their own in the typical *Emerging Technologies* scenario in which voluntary accelerated relocation payments would be feasible.

199. Commenters challenge our decision to establish a $9.7 billion payment for accelerated relocation from two directions. Intelsat argues the amount is too low, while the Small Satellite Operators argue that the amount of the payment is too high. The Commission rejects these arguments. Set against one another, these competing arguments illustrate the complex policy considerations at issue and how our chosen accelerated relocation payment balances these competing concerns.

200. At the outset, each party questions how long relocation should take without any accelerated relocation payments. The Commission has already explained at length our reasoning for selecting the deadlines we do: The Relocation Deadline the Commission chooses reflects the balance between bringing C-band spectrum to market quickly (and thus not setting an excessively long transition) and ensuring no disruption to the C-band content distribution market that hundreds of millions of Americans currently rely on C-band services (and thus not setting a too short mandatory transition). Hence the Commission disagrees with each party that we should adjust the acceleration periods at issue in calculating accelerated relocation payments.

201. Next, parties challenge the decision to establish an upper bound at the overlay licensees' willingness to pay for the early clearing of spectrum. On the one hand, Intelsat argues that this ceiling is too low—and that focusing only on the economic benefit to new licensees ignores potential benefits to American consumers from the rapid deployment of 5G. The Small Satellite Operators, on the other hand, argue that this willingness-to-pay ceiling is too high. They argue that the upper bound must be ''proportionate to the cost of providing comparable facilities.'' The Commission finds that both parties misunderstand the *Emerging Technologies* framework.

202. The Commission agrees that it must take into account the tremendous public benefits of authorizing terrestrial use of this mid-band spectrum—but that does not mean the Commission's ability to impose obligations on overlay licensees is unbounded. Instead, the Commission reads its precedent as recognizing the justification for accelerated relocation payments only to the extent that willing market actors (free from holdout and free-rider problems) would pay for accelerated relocation. And in the end, no rational licensee would pay *more* than the amount they stood to gain from earlier access to the spectrum—regardless of whatever value was created for third parties.

203. The Commission does not read the language quoted as limiting the Commission's authority under the *Emerging Technologies* framework but instead just recognizing how the Commission applied that framework in one particular context. In that case the Commission had established guidelines for good-faith negotiations that limited incumbents' ability to demand ''premium payments'' that were not proportionate to the cost of providing comparable facilities. But as the court recognized in *Teledesic,* the Commission added that limitation as a check against holdout problems created by mandatory good-faith negotiations. Here the Commission chooses a different approach to address the problem of holdouts as well as the free-rider problem inherent to this transition. And by estimating the willingness of overlay licensees to make accelerated relocation payments, the Commission avoids the need for a lengthy period of mandatory negotiations before mandatory relocation—which the Commission estimates will bring about significant benefits to the public of making this spectrum available for terrestrial use much sooner.

204. Parties challenge the determination that an acceleration payment total of $9.7 billion strikes the appropriate balance. The Small Satellite Operators argue that it is too much, while Intelsat argues that it is not enough. To some extent both parties are correct: There is no precise science that allows the Commission to arrive at the ''right'' accelerated relocation payment total. But that is in large part because eligible space station operators have had every incentive not to disclose precisely how high an accelerated relocation payment must be for them to accept it. As these arguments make plain, the Commission's determination of an acceleration payment is a line-drawing exercise that balances a number of competing considerations. The accelerated relocation payment of $9.7 billion is an $800 million reduction from the estimated total willingness of flexible use licensees to pay $10.52 billion for earlier access to this spectrum. Allocating the vast majority of the estimated total willingness to pay to satellite operators (1) maximizes the possibility that such a payment will be sufficient to incent early clearing (2) while not exceeding the estimated value of acceleration to new licensees, and (3) accounts, to some extent, for a relatively conservative estimate of the value of the underlying spectrum. Of course, the Commission might have chosen a number lower than $9.7 billion, to gamble that space station operators might accept a lower price. But the smaller the payment the greater the risk that such a payment will be insufficient to incent earlier clearing. In light of the enormous benefit that the rapid deployment of 5G will confer on American consumers, and the costs of delaying such deployment for even one additional year, the Commission has chosen the figure that most minimizes that risk. While this exercise is necessarily imprecise, the Commission believes that $9.7 billion threads the needle through all of the considerations raised by the Small Satellite Operators, Intelsat, others in the record, as well as its own predictive judgment on what is necessary here.

205. The Commission also finds it necessary to specify the specific accelerated relocation payments that will be offered to each of the eligible space station operators so that each can make an intelligent decision whether to elect to participate in the accelerated relocation process. To accelerate clearing, each space station operator will need to engage in a complex and iterative process of coordinating between its programmer customers and incumbent earth stations, allocating resources to effectuate changes in both the space station and earth station segments of the FSS network, and orchestrating changes both in space and on the ground in order to ensure continuous and uninterrupted delivery of content. Given that these burdens will fall more heavily on some space station operators than others, the Commission finds that the most appropriate basis on which to allocate accelerated relocation payments among eligible space station operators is to estimate the relative contribution that each eligible space station operator is likely to make towards accelerating the transition of the 3.7–3.98 GHz band to flexible use and clearing the 3.98–4.0 GHz band, assuming all other operators accelerate their clearing. To that end, the Commission examines several pieces of evidence in the record.

206. To start, the Commission finds the best evidence in the record is a confidential 2019 report prepared by an independent accounting firm on behalf of the C-Band Alliance, which SES has submitted into the record. Based on data provided by C-Band Alliance members, this report purports to calculate each member of the C-Band Alliance's

contribution to clearing (based in part on qualifying 2017 revenue) for the purpose of determining the share that each C-Band Alliance member would receive as a result of this proceeding. The Commission can think of no better evidence of the C-Band Alliance members' own understanding of their relative contribution to clearing than their own market-based assessment of the relative value that each member should derive from the process of freeing up this spectrum for flexible use. While many variables might enter into any valuation of contribution to clearing—such as each operator's relative number of earth stations, transponder usage, revenue, coverage, or other factors—the C-Band Alliance members were best situated to take all those variables into account in assigning allocations representing each member's valuation of its entitlement to a percentage of the proceeds from a private sale. The Commission calls this the ''the market-based agreement'' factor (note the Commission does not apply this factor to Star One, which was not a party to this agreement).

207. Intelsat objects to any reliance on this report and its prior agreement with SES, Eutelsat, and Telesat on how to approach a swift transition of the C-band. The Commission finds Intelsat's objections to the 2019 report unpersuasive. For one, Intelsat objects that the methodology of the report was premised largely on an assumption that SES and Intelsat had equal market share. That may be true—but that does not explain why Intelsat agreed to such an assumption just last year (nor what it has learned since then). Indeed, whatever the precise inputs underlying the confidential 2019 report, the ultimate findings were ratified by each member of the C-Band Alliance at the time—including Intelsat. For another, Intelsat points out that the confidential report was developed in the context of a private sale proposal in which the C-Band Alliance would receive a single payment for both clearing in an accelerated manner and relocation costs. But the Commission fails to see the relevance of these distinctions. For example, the Commission separately accounts for relocation payments from accelerated relocation payments in this *Report and Order*—but Intelsat provides no evidence, nor does any appear on the face of the report, that the relative contributions of each operator depended on relative relocation costs (nor does Intelsat explain why the separate treatment of such costs merits greater (or lesser) allocation of accelerated relocation payments). As another example, the Commission does not see why the negotiation of these allocations in the context of a private sale approach would fail to capture the contributions of the various signatories to another approach—like the public auction approach the Commission adopts herein. Indeed, the Commission finds the fact that these numbers were negotiated between experienced space station operators in the context of a concrete plan to clear the C-band for terrestrial use makes them more reliable, not less, as evidence of relative contribution to clearing. In short, despite Intelsat's recent protestations, the Commission finds the report is the single best proxy that we have for determining the relative contribution of each eligible space station operator (at least those four that signed the agreement) to accelerating the process of repurposing this spectrum.

208. Next, the Commission finds that transponder usage provides another proxy for the relative contributions of each space station operator to clearing. At a high level, the amount of transponder usage should correspond to the amount of traffic that the operator needs to repack—and space station operators with more traffic are likely to serve a greater number of earth stations with more content. And the Commission has reliable data for relative transponder usage: Satellite operators submitted confidential usage information in response to the Commission's May 2019 request for information on satellite use of the C-band. FSS space station licensees with C-band coverage of the United States or grants of market access were required to submit the average percentage of each transponder's capacity (megahertz) used and the maximum percentage of capacity used for each day in March of 2019. From this data the Commission can calculate the average megahertz of transponder usage as well as the usage shares for each satellite operator. The Commission thus includes transponder usage in its calculations because the Commission believes that it is a reliable proxy of the amount of traffic all eligible incumbent space station operators need to repack, as well as their relative contribution to accelerated clearing.

209. Third, the Commission takes into account each eligible space station operator's coverage of the contiguous United States with its C-band satellites. All operators with existing FSS space station licenses or grants of United States market access in the 3.7–4.2 GHz band also have equal access to the 280 megahertz of spectrum designated to transition to flexible use and the 20-megahertz guard band and an equal ability to serve customers in this band. Due to this shared licensing structure, all eligible space station operators serving incumbent earth stations in the contiguous United States will need to play a role in the transition and must cooperate to transition the spectrum successfully. This factor is, therefore, a very rough proxy for the myriad tasks that all eligible space station operators must undertake to clear the spectrum and for the fact that one of the eligible space station operators does not transmit to the full contiguous United States.

210. Finally, the Commission notes that there is no single correct weight to apply to each of these three factors. The Commission places the most significant weight on the market-based agreement factor because it reflects the parties' own valuation of each operator's relative contribution to clearing. But in acknowledgment of Intelsat's reservations about using the 2019 report, the fact that the report does not consider one eligible space station operator (Star One) because it wasn't a member of the C-Band Alliance, and the fact that the Commission does not have access to the underlying inputs evaluated by the independent auditor, the Commission is also assigning some weight to transponder usage and coverage separately. Among these two factors, the Commission finds that transponder usage, which reflects actual usage of the band, greatly outstrips (by an order of magnitude) the value of the third factor (coverage).[18] Thus, the Commission specifies the allocations as follows:

[18] We round all payments to the nearest thousand dollars and therefore the payment total does not sum exactly to $9.7 billion. Because we rely on confidential information in calculating these allocations and find that disclosing the relative weights placed on each factor could inadvertently disclose that confidential information to operators with knowledge of their own information, we reserve our discussion of the precise numbers involved in our calculations to a confidential appendix. And because Star One was not a signatory of the market-based agreement, we allocate the weight that would otherwise apply to that factor to the second most important factor (transponder usage) for its calculation and normalize all calculations to take this into account.

ACCELERATED RELOCATION PAYMENT BY OPERATOR

	Payment	Phase I payment	Phase II payment
Intelsat	$4,865,366,000	$1,197,842,000	$3,667,524,000
SES	3,968,133,000	976,945,000	2,991,188,000
Eutelsat	506,978,000	124,817,000	382,161,000
Telesat	344,400,000	84,790,000	259,610,000
Star One	15,124,000	3,723,000	11,401,000
Totals	9,700,001,000	2,388,117,000	7,311,884,000

211. The Clearinghouse will distribute the accelerated relocation payments to each eligible space station operator according to the amounts provided in the table. The Commission allocates roughly 25% of each operator's accelerated relocation payment to the completion of Phase I and 75% to the completion of Phase II. This split corresponds to the value of accelerated relocation that space station operators will need to make at each respective deadline. To be specific, the value of Phase II accelerated relocation (vis-à-vis relocation by the Relocation Deadline) is accelerating relocation of all 280 megahertz of spectrum across the contiguous United States by two years. Using the acceleration formula discussed above, this represents 75.38% of the total value to bidders of accelerated relocation. The value of Phase I accelerated relocation (vis-à-vis relocation by the Phase II Accelerated Relocation Deadline) is accelerating the relocation of 100 megahertz of spectrum in the 46 Phase I PEAs by two additional years. This represents 24.62% of the total value of bidders of accelerated relocation. The Commission notes that allocating the Phase I and Phase II payments this way maximizes the incentive for incumbent space station operators to complete the full Phase II transition in a timely manner, ensuring that all Americans get early access to next-generation uses of the 3.7 GHz band.

212. Taken together, the Commission finds that the three measures above should reflect—directly or by proxy—a variety of inputs, including relative contribution shares to relocation, population coverage in the contiguous United States, traffic, and number of earth stations served. These measures incorporate the best data presently available to the Commission on which to estimate the contributions of each eligible space station operator to the accelerated relocation process. Whatever the shortcomings of each individual measure or dataset, the Commission finds that these three measures considered together provide a reasonable approximation of the eligible space station operators' respective contributions, and therefore a reasonable basis on which to apportion accelerated relocation payments.

213. The Commission also finds that several alternative methods advocated by space station operators for allocating accelerated relocation payments are less reliable and objective than those the Commission relies on. For example, several parties suggest that the Commission should rely upon C-band revenues in measuring relative contributions, with Intelsat claiming that ''revenue earned with respect to the current use of C-band spectrum in the contiguous 48 states provides a reasonable proxy for every one of the factors cited by the FCC for value being created by accelerated clearing: The number of customers, the amount of encumbered spectrum; the scope of incumbent earth stations served; content-distribution revenues; population of the United States; and traffic.'' Although the Commission agrees that such revenues ordinarily would be closely correlated with traffic and a good proxy for a variety of other factors relevant to an eligible space station operator's estimated contribution—the record is largely bereft of such data. Intelsat itself, for example, has failed to file any reliable revenue or revenue share data. Instead, it estimates its own C-band revenues based on average usage as well as its own assertion that it has higher average wholesale prices than its competitors. The only other source evident of Intelsat's market share is a public report from Kerrisdale Capital Management that estimates Intelsat to have a roughly equal share with SES—although that report did not claim its estimates were particularly precise. In short, the Commission fails to see the value in relying on these incomplete and not-particularly-reliable proxies for revenue shares, especially given that actual revenue share itself is but a proxy for each operator's relative contribution to accelerated relocation.[19]

214. Or consider the C-Band Alliance's suggestion to allocate based on the number of incumbent earth station C-band feeds in the contiguous United States. Whatever the merits of such an approach (including the decision to count feeds, not incumbent earth stations), the Commission finds the record evidence insufficiently reliable to incorporate this metric into our analysis. Rather than pick and choose amongst this chaff of last-minute calculations that inevitably favor the filer, the Commission finds little evidence that relying on these estimates would produce a more accurate estimate of each operator's relative contribution to clearing (and we cannot find that a significant delay as initially suggested by the C-Band Alliance to create a new dataset would be in the public interest).

215. The Commission also rejects Eutelsat's proposal to allocate accelerated relocation payments not by relative contributions to a successful accelerated transition but instead based on ''stranded capacity,'' *i.e.,* the proportion of C-band satellite capacity that will be rendered unusable for protected FSS downlink services during the remaining useful lifetime of each relevant satellite. Eutelsat's proposal represents a significant departure from the *Emerging Technologies* precedent, fundamentally misinterprets the Commission's basis for the allocation of accelerated relocation payments among eligible space station operators, and lacks any economic rationale.

216. *First,* Eutelsat argues that allocation of accelerated relocation payments must be ''reasonably related to the cost of relocation'' and that the

[19] Ironically enough, the confidential report filed by SES does contain estimated (and audited) revenue shares for one space station operator, SES Feb. 20, 2020 *Ex Parte,* Attach. B (confidential), and to its credit, Intelsat does acknowledge as such, Intelsat Feb. 21, 2020 *Ex Parte* at 3. But to the extent such information is valuable, we find it better to incorporate it directly through the market-based agreement factor described above rather than by placing this information on par with other unreliable information about revenue shares from elsewhere in the record.

Commission's focus on the relative contribution of each operator to a successful transition is inconsistent with the *Emerging Technologies* framework. The Commission disagrees. Contrary to Eutelsat's claim, the basis of the Commission's allocation method is designed specifically to capture the relative contribution, in terms of both effort and cost, that each eligible space station operator will make to meet the Accelerated Relocation Deadlines based on three objective factors related to each space station operator's relative contribution: A market-based agreement reflecting space station operators' assessment of their own relative contribution to clearing; transponder usage; and satellite coverage in the contiguous United States. Each of these factors reflects both the effort that it will take to accelerate relocation and the corresponding costs of each operator to accomplish such acceleration.

217. *Second,* Eutelsat argues that stranded capacity is the better ''proxy'' for calculating relocation costs and thus allocating accelerated relocation payments. Again, the Commission disagrees. For one, stranded capacity is not a proxy for actual relocation costs. Actual relocation costs are those needed to relocate incumbents to comparable facilities that allow them to continue to provide *existing* services. Stranded capacity lacks any consideration of the extent to which existing services are actually provided over such capacity such that they would need to be relocated. Indeed, Eutelsat fails to acknowledge the substantial evidence in the record that the C-band satellite business suffers from significant and increasing excess capacity and rapidly declining revenues or that a space station operator with much stranded capacity but little existing business could likely continue to provide all of its existing services within the contiguous United States at relatively low cost (*e.g.,* without the need for new satellites). In other words, stranded capacity is not a good proxy for space station operator relocation costs. Nor is it a good proxy for the relocation costs of incumbent earth stations (indeed, stranded capacity does not account for such costs at all)—and Eutelsat simply asserts that such costs are not relevant. But of course, such costs *are* relevant to a successful relocation; and of course the Commission has expressly designed accelerated relocation payments to expedite the relocation of incumbent space stations *and* incumbent earth stations, to the benefit of the overlay licensees that require both to be relocated so they can deploy new terrestrial services in the band.

218. *Third,* despite Eutelsat's claim that its proposal is not a request to compensate satellite operators for the ''lost revenues'' or opportunity costs resulting from the transition, allocating relocation payments according to ''lost C-band capacity,'' without any consideration of whether such capacity actually has existing services that will need to be relocated as a result of the transition, as Eutelsat proposes, is precisely the type of opportunity cost calculation for which the Commission's *Emerging Technologies* precedent expressly declines to provide compensation. Rather than compensate space station operators based on the burden they are likely to bear in accelerating the clearing process, Eutelsat's proposal would reward those space station operators with the least-intensive use of existing capacity based on an assumption of future use of such capacity that far exceeds reasonably foreseeable demand. The Commission therefore finds that the formula for allocating accelerated relocation payments among eligible space station operators adopted herein, which provides compensation based on the relative contributions of each eligible space station operator to the accelerated relocation process, is far more grounded in Commission precedent and the underlying rationale for providing accelerated relocation payments than the allocation method proposed by Eutelsat.

219. Finally, the Commission finds that its definition of eligible space station operators appropriately encompasses the incumbent space station operators that will incur costs in order to transition existing U.S. services to the upper portion of the band and are therefore entitled to receive compensation for relocation costs and potential accelerated relocation payments. The Small Satellite Operators argue that any transition of C-band spectrum must provide compensation, including ''premium'' payments above relocation costs, to all space station operators that operate space stations that cover parts of the United States using C-band spectrum. However, the purpose of relocation costs and potential accelerated relocation payments is to compensate authorized space station operators that provide C-band services to *existing* U.S. customers using *incumbent* U.S. earth stations that will need to be transitioned to the upper portion of the band or otherwise accommodated in order to avoid harmful interference from new flexible-use operations. The Commission addresses the arguments of two of the Small Satellite Operators—Hispasat and ABS—that do not satisfy its definition of eligibility for relocation costs.

220. *Hispasat.*—Hispasat recently asked the Commission to make Hispasat eligible for relocation costs and accelerated relocation payments by changing the definition of eligible space station operators to remove the requirement that the incumbent space station operator must provide service to an *incumbent* earth station. The Commission notes that our definition of incumbent earth stations requires that earth stations must have been registered (or licensed as a transmit-receive earth station) by the relevant deadlines to qualify for relocation cost reimbursement. Hispasat states that it ''does currently provide service in the contiguous United States'' to nine earth stations in the contiguous United States operated by an evangelical church that did not register its earth stations with the Commission.

221. The Commission rejects Hispasat's request. *First,* the Commission is somewhat skeptical of Hispasat's apparently recent discovery that it serves earth stations using C-band spectrum in the contiguous United States. In its October 2018 comments in this proceeding, Hispasat made no mention of providing service to those or any other earth stations—indeed, Hispasat there claimed its plans to provide C-band services to the United States were placed on hold pending the outcome of the July 2018 *NPRM.* And so The Commission puts little weight in Hispasat's recent claim to have generated ''U.S. C-band revenue'' in 2017 from services provided to the ''at least nine'' earth station locations that it claims it still currently serves (a claim unsupported by any further documentation). And the Commission declines to accept Hispasat's revisions to history that its prior filings in this proceeding demonstrate (rather than disclaim) that it has been providing satellite service in the contiguous United States for some time.

222. *Second,* although Hispasat makes much of its speculation that the owner of these nine earth stations lacked the sophistication or knowledge to register by the relevant deadlines and qualify as incumbent earth stations, the Commission finds that Hispasat has not even shown that these nine earth stations were eligible to register. For one, Hispasat appears to be careful in its filings not to claim that it uses the *C-band* spectrum to provide service to all those earth stations. Indeed, the Commission does not see how it could given that publicly-available coverage

data for the Amazonas-3 satellite C-band beam footprint indicate that it is not capable of providing service to several of those earth station locations.[20] (In contrast, that same satellite's *Ku-band* North America beam does cover the entire contiguous United States.) For another, Hispasat does not provide any specific information regarding *when* the earth stations it claims to serve began using C-band spectrum—they had to have been operational as of April 19, 2018, if they were going to be eligible to be registered.[21] For yet another, Hispasat provides no explanation of unique circumstances that might merit consideration of these stations—and the Commission declines to adopt a different standard for the earth stations Hispasat claims to serve than the Commission does for any other existing C-band earth stations that were not registered by the relevant deadlines. Indeed, Hispasat fails to address one of the primary reasons the Commission froze new earth station authorizations and required existing earth stations to register by a fixed deadline in the first place: To avoid gamesmanship and stop operators from establishing new C-band operations or earth stations for the purpose of obtaining monies from the transition to new terrestrial, flexible-use operations in the band. It appears that Hispasat's entire premise is that it, and it alone, should be able to engage in that type of last-minute gamesmanship. The Commission does not accept that premise.

223. *Third,* the Commission rejects Hispasat's request because even if the Commission accepted it, Hispasat would not be an eligible incumbent space station operator. Specifically, the Commission limits relocation and accelerated relocation payments to those space station operators that had demonstrated, as of February 1, 2020, that they would incur any eligible costs as a result of the transition. Because Hispasat under its own proposal would not be able to recover any costs for transitioning incumbent earth stations (it makes clear that it is not asking to obtain incumbent status for the nine earth stations it now claims to serve), the only eligible costs it might have would be to transition transponder usage to the upper 200 megahertz. And Hispasat does not provide any information regarding what, if any, steps it would need to take to transition these alleged C-band services to the upper 200 megahertz; indeed it does not explicitly claim that those services are provided over frequencies in the lower 300 megahertz such that they would need to be transitioned *at all.*

224. Because the purpose of relocation and accelerated relocation payments is to compensate eligible space station operators for actually relocating their existing services to the upper 200 megahertz, Hispasat has failed to demonstrate that the Commission's definition of ''eligible space station operators'' unduly excludes it from the class of incumbent space station operators entitled to relocation and accelerated relocation payments.

225. *ABS.*—ABS asks the Commission to make incumbent space station operators eligible for reimbursement of space station facilities that ''will not remain comparable after the transition.'' Specifically, to be eligible for such reimbursement, ABS proposes that an incumbent space station operator must operate a non-replacement satellite that gained its FCC authorization to provide service to any part of the contiguous United States within 12 months of the announcement of the freeze on C-band earth station applications or, alternatively, within 18 months of the issuance of the *NPRM* in this proceeding. ABS argues that the *NOI,* freeze on new earth station applications, and the *NPRM* in this proceeding ''undermined ABS's reasonable efforts to commercialize the newly licensed satellite—and thus the Commission cannot know how much bandwidth ABS would have needed (but for the Commission's actions) to avoid an impairment of its C-band authorization.'' As a result, ABS argues that it should be compensated for the proportion of the costs of launching its ABS–3A satellite attributable to eight transponders that will be effected by the transition.

226. The Commission rejects ABS's argument that uncertainty about the outcome of this proceeding resulted in its failure to commercialize any of its ABS–3A capacity, as the Commission finds this argument both unconvincing and irrelevant. The only ABS satellite capable of serving the United States has been operational since 2015. The ABS–3A satellite is positioned just south of the Ivory Coast of northwest Africa, and both its global and western hemisphere C-band beams provide only edge coverage to portions of the Eastern United States.[22] ABS did not seek market access in the United States until March 2017, and only after the Commission released the *NOI* in this proceeding in August 2017 did ABS seek Commission authorization to construct an earth station in Hudson, NY in February 2018. Despite being granted such authorization in March 2018, ABS failed to construct and commence operations on the Hudson, NY earth station. In sum, ABS's satellite was operational for a year-and-a-half before it sought U.S. market access, for two years prior to the *NOI,* and nearly three years prior to the freeze on new C-band earth station registrations and the subsequent *NPRM.* The notion that ABS made significant investments in launching this satellite with the specific intent of providing robust services in the United States and that it must be compensated for the loss of those investments is contradicted both by its inaction in the United States in the four-and-a-half years since it launched ABS–3A and the actual capabilities of ABS–3A to provide service outside the United States. Indeed, the satellite's global and western hemisphere C-band beams target all or most of the South Atlantic Ocean, Africa, the Middle East, Europe, and South America and the eastern hemisphere C-band beam covers all or most of Africa, Europe, the Mediterranean Sea, and the Middle East.[23]

227. In any event, the requirement that new licensees reimburse incumbents for relocation costs applies to reasonable actual costs incurred in clearing the spectrum. This obligation does not include reimbursement of space station operators on an assumption of future use of currently unused capacity that far exceeds reasonably foreseeable demand—the loss of capacity that has not been used, is not used, and not likely to ever be used given the significant unused capacity that remains available to ABS is not a cognizable expense. Thus, the Commission rejects ABS's claim.

228. *Allocating Payment Obligations Among Overlay Licensees.*—Finally, the Commission explains the financial responsibilities that each flexible-use licensee will incur to reimburse the space station operators. The Commission finds it reasonable to base the share for each overlay licensee on the licensee's *pro rata* share of gross winning bids. This approach is similar to the Commission's approach in the H-Block proceeding, where the

[20] *See https://www.satbeams.com/footprints?beam=7690* (last visited Feb. 23, 2020).

[21] Beginning April 19, 2018, the Commission placed a freeze on all FSS earth station registrations for earth stations that were not operational as of that date.

[22] *See* Satbeams Coverage Report, *https://www.satbeams.com/footprints?beam=8203* (last visited Feb. 23, 2020).

[23] *See http://www.absatellite.com/satellite-fleet/abs-3a/* (last visited Feb. 23, 2020); *accord https://www.satbeams.com/footprints?beam=8203* (last visited Feb. 23, 2020).

Commission likewise used a *pro rata* cost-sharing mechanism based on gross winning bids. Indeed, several commenters in this proceeding proposed the H-Block *pro rata* calculation as a model for determining winning bidders' shares here.

229. Specifically, for space station transition and Relocation Payment Clearinghouse costs, and in the event the Wireless Telecommunications Bureau selects a Relocation Coordinator, Relocation Coordinator costs, the *pro rata* share of each flexible-use licensee will be the sum of the final clock phase prices (*P*) for the set of all license blocks (*I*) that a bidder wins divided by the total final clock phase prices for all *N* license blocks sold in the auction. To determine a licensee's reimbursement obligation (*RO*), that *pro rata* share would then be multiplied by the total eligible relocation costs (*RC*). Mathematically, this is represented as:

$$RO = \left(\frac{\sum_{i \in I} P_i}{\sum_{j=1}^{N} P_j}\right) \times RC$$

230. For incumbent earth stations and fixed service incumbent licensee transition costs, a flexible-use licensee's *pro rata* share will be determined on a PEA-specific basis, based on the final clock phase prices for the license blocks it won in each PEA. To calculate the *pro rata* share for incumbent earth station transition costs in a given PEA, the same formula above will be used except now *I* will be the set of licenses a bidder won in the PEA, *N* will be the total blocks sold in the PEA and *RC* will be the PEA-specific earth station and fixed service relocation costs.

231. For the Phase I accelerated relocation payments, the *pro rata* share of each flexible use licensee of the 3.7 to 3.8 MHz in the 46 PEAs that are cleared by December 5, 2021, will be the sum of the final clock phase prices (*P*) that the licensee won divided by the total final clock phase prices for all *M* license blocks sold in those 46 PEAs. To determine a licensee's *RO* the *pro rata* share would then be multiplied by the total accelerated relocation payment due for Phase I, *A1.* Mathematically, this is represented as:

$$RO = \left(\frac{\sum_{i \in I} P_i}{\sum_{j=1}^{M} P_j}\right) \times A1$$

232. For Phase II accelerated relocation payments, the *pro rata* share of each flexible use licensee will be the sum of the final clock phase prices (*P*) that the licensee won in the entire auction, divided by the total final clock phase prices for all *N* license blocks sold in the auction. To determine a licensee's *RO* the *pro rata* share would then be multiplied by the total accelerated relocation payment due for Phase II, *A2.* Mathematically, this is represented as:

$$RO = \left(\frac{\sum_{i \in I} P_i}{\sum_{j=1}^{N} P_j}\right) \times A2$$

5. Relocation Payment Clearinghouse

233. Next, the Commission finds that selecting a single, independent Relocation Payment Clearinghouse to oversee the cost-related aspects of the transition in a fair, transparent manner will best serve the public interest. The Commission's experience in overseeing other complicated, multi-stakeholder transitions of diverse incumbents demonstrates the need for an independent party to administer the cost-related aspects of the transition in a fair, transparent manner, pursuant to Commission rules and oversight, to mitigate financial disputes among stakeholders, and to collect and distribute payments in a timely manner.

234. In the *NPRM,* the Commission sought comment on a variety of approaches for expanding flexible use of the band. The Commission noted that, under the private-sale approach, there was record support for a centralized facilitator, and it sought comment on having the relevant space station operators form a transition facilitator as a cooperative entity to coordinate negotiations, clearing, and repacking in the band. The Commission also asked about the role of the transition facilitator and the form of supervisory authority the Commission should maintain over it.

235. In the *July 19 Public Notice,* the Commission specifically sought comment on how the Commission's approaches during the AWS–3 and 800 MHz transitions might inform this proceeding. The Commission asked whether it should designate a transition administrator or require the creation of a clearinghouse to facilitate the sharing of the costs for mandatory relocation and repacking.

236. The Commission agrees with those commenters who contend that, regardless of the approach selected to transition some or all of the band to flexible use, the Commission should ensure that mechanisms exist to guarantee a transparent transition process with appropriate Commission oversight. The Commission has adopted cost-sharing plans that included private clearinghouses to administer reimbursement obligations among licensees, and the Commission finds a similar approach to be in the public interest here. The Clearinghouse must be a neutral, independent entity with no conflicts of interest (organizational or personal) on the part of the organization or its officers, directors, employees, contractors, or significant subcontractors. The Clearinghouse must have no financial interests in incumbent space station operators, incumbent earth station operators, content companies that distribute programming using this band, wireless operators, or any entity that may seek to acquire flexible-use licenses, or to manufacture or market equipment in this band. In addition, the officers, directors, employees, and/or contractors of the Clearinghouse should also have no financial or organizational conflicts of interest. The Clearinghouse must be able to demonstrate that it has the requisite expertise to perform the duties required, which will include collecting and distributing relocation and accelerated relocation payments, auditing incoming and outgoing invoices, mitigating cost disputes among parties, and generally acting as clearinghouse.

237. *Duties of the Clearinghouse.*— The Commission is cognizant of the need to establish measures to prevent waste, fraud, and abuse with respect to reimbursement disbursements. The Commission finds that the record and the Commission's experience in managing other complicated transitions demonstrate that an independent Clearinghouse will ensure that the transition is administered in a fair, transparent manner, pursuant to narrowly-tailored Commission rules and subject to Commission oversight.

238. *First,* the Clearinghouse will be responsible for collecting from all incumbent space station operators and all incumbent earth station operators a showing of their relocation costs for the transition as well as a demonstration of the reasonableness of those costs.[24] In the event a party other than an incumbent earth station operator performs relocation work to transition an earth station (such as an incumbent space station operator or a network performing such work pursuant to an existing affiliation agreement), that party may directly submit the showing of relocation costs and receive reimbursement, provided the parties do not submit duplicate filings for the same earth station relocation work. The Clearinghouse will determine in the first instance whether costs submitted for

[24] When an incumbent space station operator takes responsibility for clearing an incumbent earth station, the incumbent space station operator bears solely the responsibility of showing relocation costs and their reasonableness.

reimbursement are reasonable. Parties seeking reimbursement for actual costs must submit to the Clearinghouse a claim for reimbursement, complete with sufficient documentation to justify the amount. The Clearinghouse shall review reimbursement requests to determine whether they are reasonable and to ensure they comply with the requirements adopted in this *Report and Order.* The Clearinghouse shall give parties the opportunity to supplement any reimbursement claims that the Clearinghouse deems deficient.

239. All incumbents seeking reimbursement for their actual costs shall provide justification for those costs. Entities must document their actual expenses and the Clearinghouse, or a third-party on behalf of the Clearinghouse, may conduct audits of entities that receive reimbursements. Entities receiving reimbursements must make available all relevant documentation upon request from the Clearinghouse or its contractor.

240. To determine the reasonableness of reimbursement requests, the Clearinghouse may consider the submission and supporting documentation, and any relevant comparable reimbursement submissions. The Clearinghouse may also submit to the Wireless Telecommunications Bureau for its review and approval a cost category schedule. Reimbursement submissions that fall within the estimated range of costs in the cost category schedule issued by the Bureau shall be presumed reasonable. If the Clearinghouse determines that the amount sought for reimbursement is unreasonable, it shall notify the party of the amount it deems eligible for reimbursement. The Commission also directs the Wireless Telecommunications Bureau to make further determinations related to reimbursable costs, as necessary, throughout the transition process.

241. *Second,* the Clearinghouse will apportion costs among overlay licensees and distribute payments to incumbent space stations, incumbent earth station operators, and appropriate surrogates of those parties that incur compensable costs. Following the public auction, the Clearinghouse shall calculate the total estimated share of each flexible-use licensee, as well as the estimated costs for the first six months of the transition following the auction. The initial six-month estimate shall incorporate the costs incurred prior to the auction as well as the six months following the auction. Flexible-use licensees shall pay their share of the initial estimated relocation payments into a reimbursement fund, administered by the Clearinghouse, shortly after the auction. The Clearinghouse shall draw from the reimbursement fund to pay approved, invoiced claims.

242. Going forward, the Clearinghouse shall calculate the overlay licensees' share of estimated costs for a six-month period and provide overlay licensees with the amounts they owe at least 30 days before each six-month deadline. Within 30 days of receiving the calculation of their initial share, and then every six months until the transition is complete, overlay licensees shall pay their share of estimated costs into the reimbursement fund. The Clearinghouse shall draw from the reimbursement fund to pay approved reimbursement claims. The Clearinghouse shall pay approved claims within 30 days of invoice submission to flexible-use licensees so long as funding is available. If the reimbursement fund does not have sufficient funds to pay approved claims before a six-month replenishment, the Clearinghouse shall provide flexible-use licensees with 30 days' notice of the additional shares they must contribute. Any interest arising from the reimbursement fund shall be used to defray the costs of the transition for all overlay licensees on a *pro rata* basis. At the end of the transition, the Clearinghouse shall return any unused amounts to overlay licensees according to their shares.

243. As a condition of their licenses, flexible-use licensees shall be responsible collectively for the accelerated relocation payments based on their *pro rata* share of the gross winning bids, similar to the way a flexible-use licensee's space station relocation and Clearinghouse costs are calculated. Where a space station operator has elected to meet the Accelerated Relocation Deadlines, the accelerated relocation payment *pro rata* calculation will be adjusted to reflect the winning bidders of the flexible-use licenses benefitting from the portion of cleared spectrum. Under this scenario, only the flexible-use licensees in the 46 PEAs of the lower 100 megahertz (A block) that are the subject of the Phase I Accelerated Relocation Deadline would pay the Phase I accelerated relocation payment, and all overlay licensees would pay the Phase II accelerated relocation payment.

244. If an overlay license is relinquished to the Commission prior to all relocation cost reimbursements and accelerated relocation payments being paid, the remaining payments will be distributed among other similarly situated overlay licensees. If a new license is issued for the previously relinquished rights prior to final payments becoming due, the new overlay licensee will be responsible for the same *pro rata* share of relocation costs and accelerated relocation payments as the initial overlay license. If an overlay licensee sells its rights on the secondary market, the new overlay licensee will be obligated to fulfill all payment obligations associated with the license.

245. Overlay licensees will, collectively, pay for the services of the Clearinghouse and staff. The Clearinghouse shall include its own reasonable costs in the cost estimates it uses to collect payments from overlay licensees. To ensure the Clearinghouse's costs are reasonable, the Clearinghouse shall provide to the Office of the Managing Director and the Wireless Telecommunications Bureau, by March 1 of each year, an audited statement of funds expended to date, including salaries and expenses of the Clearinghouse. It shall also provide additional financial information as requested by the Office or Bureau to satisfy the Commission's oversight responsibilities and/or agency-specific/government-wide reporting obligations.

246. *Third,* the Clearinghouse will serve in an administrative role and in a function similar to a special master in a judicial proceeding. The Clearinghouse may mediate any disputes regarding cost estimates or payments that may arise in the course of band reconfiguration; or refer the disputant parties to alternative dispute resolution fora.[25] Any dispute submitted to the Clearinghouse, or other mediator, shall be decided within 30 days after the Clearinghouse has received a submission by one party and a response from the other party. Thereafter, any party may seek expedited non-binding arbitration, which must be completed within 30 days of the recommended decision or advice of the Clearinghouse or other mediator. The parties will share the cost of this arbitration if it is before the Clearinghouse.

247. Should any issues still remain unresolved, they may be referred to the Wireless Telecommunications Bureau within 10 days of recommended decision or advice of the Clearinghouse or other mediator and any decision of the Clearinghouse can be appealed to the Chief of the Bureau. When referring

[25] We clarify that the Clearinghouse's dispute resolution role is limited to disputes over cost estimates or payments. Disputes related to the transition itself (*e.g.,* facilities, workmanship, preservation of service) should be reported to the Relocation Coordinator or the Wireless Telecommunications Bureau, as detailed below.

an unresolved matter, the Clearinghouse shall forward the entire record on any disputed issues, including such dispositions thereof that the Clearinghouse has considered. Upon receipt of such record and advice, the Bureau will decide the disputed issues based on the record submitted. The Bureau is directed to resolve such disputed issues or designate them for an evidentiary hearing before an Administrative Law Judge. If the Bureau decides an issue, any party to the dispute wishing to appeal the decision may do so by filing with the Commission, within 10 days of the effective date of the initial decision, a Petition for *de novo* review, whereupon the matter will be set for an evidentiary hearing before an Administrative Law Judge. Parties seeking *de novo* review of a decision by the Bureau are advised that, in the course of the evidentiary hearing, the Commission may require complete documentation relevant to any disputed matters, and, where necessary, and at the presiding judge's discretion, require expert engineering, economic or other reports, or testimony. Parties may therefore wish to consider possibly less burdensome and expensive resolution of their disputes through means of alternative dispute resolution.

248. *Fourth,* the Clearinghouse shall provide certain information and reports to the Commission to facilitate our oversight of the transition. Each quarter, the Clearinghouse shall file progress reports in such detail as the Wireless Telecommunications Bureau may require. Such reports shall include detail on the status of reimbursement funds available for obligation, the relocation and accelerated relocation payments issued, the amounts collected from overlay licensees, and any certifications filed by incumbents. The quarterly progress reports must account for all funds spent to transition the band, including its own expenses (including salaries and fees paid to law firms, accounting firms, and other consultants). The quarterly progress reports shall include descriptions of any disputes and the manner in which they were resolved.

249. The Clearinghouse shall provide to the Wireless Telecommunications Bureau and the Office of the Managing Director additional information upon request. For example, the Bureau may request that the Clearinghouse estimate the average costs of transitioning an incumbent earth station to aid the Bureau's determination of a lump sum payment for such stations that seek flexibility in pursuing the transition. Or the Bureau may require the Clearinghouse to file special reports leading up to or after the Relocation Deadline or the Accelerated Relocation Deadlines, reporting on the status of funds associated with such deadlines so that the Commission can take appropriate action in response. The Commission would anticipate that the Bureau would require the Clearinghouse to issue a special, audited report after the Relocation Deadline, identifying any issues that have not readily been referred to the Commission as well as what actions, if any, need to be taken for the Clearinghouse to complete its obligations (including the estimated costs and time frame for completing that work). And the Commission directs the Wireless Telecommunications Bureau to assign the Clearinghouse any additional tasks as needed to ensure that the transition of the band proceeds smoothly and expeditiously.

250. To the extent commenters argue that an independent Clearinghouse is unnecessary, the Commission disagrees. Allowing incumbent space station operators, or other stakeholders, to determine the reasonableness of their own costs and bill overlay licensees accordingly creates an inherent conflict of interest—one that can be easily mitigated through an independent third-party Clearinghouse.

251. *Selecting the Clearinghouse.*—In the 800 MHz proceeding, the Commission appointed a committee of stakeholders to select an independent Transition Administrator to manage the complicated process of relocating incumbent licensees, including public safety, within the 800 MHz band. The Commission follows suit and finds that the best approach for ensuring that the transition of the band will proceed on schedule is for a committee of stakeholders in the band to select a Relocation Payment Clearinghouse.

252. The search committee will be composed of nine members appointed by nine entities that we find, collectively, reasonably represent the interests of stakeholders in the transition. Specifically, Intelsat, SES, Eutelsat, NAB, NCTA, ACA, CTIA, CCA, and WISPA will each appoint one representative to the search committee. Intelsat, SES, and Eutelsat represent varying views of the space station operators, and Eutelsat shares many views similar to those of the Small Satellite Operators. Although the interests of incumbent earth stations are richly diverse, we find that the membership of NAB, NCTA, and ACA and their positions advocated in this proceeding fairly represent the broad interests of earth stations large and small, including those in rural areas and those that are transportable. The Commission also finds that the membership and advocacy of CTIA, CCA, and WISPA fairly represents the views of prospective flexible-use licensees, including small and rural businesses. The search committee should proceed by consensus; however, if a vote on selection of a Clearinghouse is required, it shall be by a majority vote.

253. The Commission recommends the search committee convene by March 31, 2020; the Commission requires that it shall convene no later than 60 days after publication of this *Report and Order* in the **Federal Register**. Further, it shall notify the Commission of the detailed selection criteria for the position of Clearinghouse by June 1, 2020. Such criteria must be consistent with the qualifications, roles, and duties of the Clearinghouse. The search committee should ensure that the Clearinghouse meets relevant best practices and standards in its operation to ensure an effective and efficient transition.

254. The Clearinghouse should be required, in administering the transition, to (1) engage in strategic planning and adopt goals and metrics to evaluate its performance, (2) adopt internal controls for its operations, (3) use enterprise risk management practices, and (4) use best practices to protect against improper payments and to prevent fraud, waste, and abuse in its handling of funds. The Clearinghouse must be required to create written procedures for its operations, using the Government Accountability Office's (GAO) Green Book [26] to serve as a guide in satisfying such requirements.

255. The search committee should also ensure that the Clearinghouse adopts robust privacy and data security best practices in its operations, given that it will receive and process information critical to ensuring a successful and expeditious transition. The Clearinghouse should therefore also comply with, on an ongoing basis, all applicable laws and Federal government guidance on privacy and information security requirements such as relevant provisions in the Federal Information Security Management Act (FISMA),[27]

[26] GAO, The Green Book: *Standards for Internal Control in the Federal Government,* GAO–14–704G, (rel. Sep 10, 2014). Available at *http://www.gao.gov/greenbook/overview.*

[27] Federal Information Security Management Act of 2002 (FISMA 2002), enacted as Title III, E-Government Act of 2002, Public Law 107–347, 116 Stat. 2899, 2946 (Dec. 17, 2002) was subsequently modified by the Federal Information Security Modernization Act of 2014 (Pub. L. 113–283, Dec. 18, 2014). As modified, FISMA is codified at 44 U.S.C. 3551 *et seq.*

National Institute of Standards and Technology (NIST) publications, and Office of Management and Budget guidance. The Clearinghouse should be required to hire a third-party firm to independently audit and verify, on an annual basis, the Clearinghouse's compliance with privacy and information security requirements and to provide recommendations based on any audit findings; to correct any negative audit findings and adopt any additional practices suggested by the auditor; and to report the results to the Bureau.

256. The Wireless Telecommunications Bureau is directed to issue a Public Notice notifying the public that the search committee has published criteria for the selection of the Clearinghouse, outlining the submission requirements, and providing the closing dates for the selection of the Clearinghouse.

257. The search committee shall notify the Commission of its choice for the Clearinghouse no later than July 31, 2020. This notification shall: (a) Fully disclose any actual or potential organizational or personal conflicts of interest or appearance of such conflict of interest of the Clearinghouse or its officers, directors, employees, and/or contractors; and (b) set out in detail the salary and benefits associated with each position. Additionally, the Commission expects that the Clearinghouse will enter into one or more appropriate contracts with incumbent space station operators, overlay licensees, and their agents or designees. The Clearinghouse shall have an ongoing obligation to update this information as soon as possible after any relevant changes are made.

258. After receipt of the notification, the Bureau is hereby directed to issue a Public Notice inviting comment on whether the entity selected satisfies the criteria set out here. Following the comment period, the Bureau will issue a final order announcing that the criteria established in this *Report and Order* either have or have not been satisfied; should the Bureau be unable to find the criteria have been satisfied, the selection process will start over and the search committee will submit a new proposed entity. During the course of the Clearinghouse's tenure, the Commission will take such measures as are necessary to ensure a timely transition.

259. In the event that the search committee fails to select a Clearinghouse and to notify the Commission by July 31, 2020, the search committee will be dissolved without further action by the Commission. In the event that the search committee fails to select a Clearinghouse and to notify the Commission by July 31, 2020, two of the nine members of the search committee will be dropped therefrom by lot, and the remaining seven members of the search committee shall select a Clearinghouse by majority vote by August 14, 2020.

260. To ensure the timely and efficient transition of the band, the Commission directs the Wireless Telecommunications Bureau to provide the Clearinghouse with any needed clarifications or interpretations of the Commission's orders. The Bureau, in consultation with the Office of the Managing Director, may request any documentation from the Clearinghouse necessary to provide guidance or carry out oversight. And to protect the fair and level playing field for applicants to participate in the Commission's auction, beginning on the initial deadline for filing auction applications until the deadline for making post-auction down payments, the Clearinghouse must make real time disclosures of the content and timing of, and the parties to, communications, if any, from or to applicants in the auction, as applicants are defined by the Commission's rule prohibiting certain auction-related communications.[28]

261. The Wireless Telecommunications Bureau is hereby directed to issue a Public Notice upon receipt of a request of the Clearinghouse to wind down and suspend operations. If no material issues are raised within 15 days of the release of said Public Notice, the Bureau may grant the Clearinghouse's request to suspend operations on a specific date. Overlay licensees must pay all costs prior to the date set forth in the Public Notice.

6. The Logistics of Relocation

262. The Commission next addresses the logistics of relocating FSS operations out of the lower 300 megahertz of the C-band spectrum. The Commission discusses the obligations for eligible space station operators that select to clear by the Accelerated Relocation Deadlines and adopts filing requirements and deadlines associated with those obligations. The Commission also adopts additional requirements for eligible space station operators that do not elect to clear by the Accelerated Relocation Deadlines in order to ensure that incumbent earth station operators, other C-band satellite customers, and prospective flexible-use licensees are adequately informed and accommodated throughout the transition. Finally, the Commission finds it in the public interest to appoint a Relocation Coordinator to ensure that all incumbent space station operators are relocating in a timely manner.

263. In the *NPRM,* the Commission sought comment on the logistics of relocating FSS operations. The Commission sought comment on having the relevant space station operators form a transition facilitator as a cooperative entity to coordinate negotiations, clearing, and repacking in the band. The Commission also asked about the role of the transition facilitator and the form of supervisory authority the Commission should maintain over it. The Commission also sought comment on a process whereby, after the transition facilitator has coordinated with relevant stakeholders regarding the transition of services to the upper portion of the band, it would file with the Commission a transition plan describing the spectrum to be made available for flexible use, the timeline for completing the transition, and the commitments each party has made to ensure that all relevant stakeholders are adequately accommodated and able to continue receiving existing C-band services post-transition. The Commission sought comment on whether to require that the transition plan explain how the spectrum will be cleared, what types of provisions should be required to ensure that relevant stakeholders are adequately accommodated, and whether to set a deadline for the submission of a transition plan. To facilitate transparency in the transition process, the *NPRM* sought comment on whether the transition plan should be subject to Commission approval, and on whether it should be made available for public review and comment.

264. Several commenters argue for a centralized transition facilitator to guarantee a transparent transition process with appropriate Commission oversight. Several incumbent space station operators argue that a transition facilitator to coordinate relocation is either unnecessary or that incumbent space station operators should coordinate the relocation of their own customers. Several commenters in turn support requiring the submission of a transition plan to be made available for public review and comment. Commenters ask the Commission to require that the transition plan describe

[28] See 47 CFR 1.2105(c). Because all applicants' communications with the Clearinghouse will be public as a result of this requirement and therefore available to other applicants, applicants must take care that their communications with the Clearinghouse do not violate the prohibition against communications by revealing bids or bidding strategies. Applicants further will have to consider their independent obligation to report potential violations to the Commission pursuant to auction rules.

in detail the estimated costs to transition the band, including reimbursement of reasonable costs to incumbent earth station operators and satellite customers, the schedule for clearing and deadlines for a completed transition, and plans for how incumbents will be accommodated and continue to receive existing C-band services.

265. The Commission finds that making eligible space station operators individually responsible for all space station clearing obligations will promote an efficient and effective space station transition process. In light of the complicated interdependencies involved in transitioning earth station operations to the upper 200 megahertz of C-band spectrum, as well as the extensive number of registered incumbent earth stations, incumbent space station operators are best positioned to know when and how to migrate incumbent earth stations and when filtering incumbent earth stations is feasible. Incumbent space station operators have the technical and operational knowledge to perform the necessary satellite grooming to transition C-band satellite services into the upper 200 megahertz of the band. This approach will leverage space station operators' expertise, as well as their incentive to achieve an effective transition of space station operations, in order to maintain ongoing C-band services in the future.

266. The Commission nonetheless agrees with commenters that the Commission must maintain oversight of the transition throughout. The Commission tailors this transition plan to whether incumbent space station operators elect to meet the Accelerated Relocation Deadlines in recognition that such an election would align the incentives of the incumbent space station operators with the Commission's goal of rapidly introducing mid-band spectrum into the marketplace. The Commission starts with that election.

267. *Transition for Operators that Elect Accelerated Relocation.*—If space station operators choose to clear on the accelerated timeframe in exchange for an accelerated relocation payment, they must do so via a written commitment by filing an Accelerated Relocation Election in this docket by May 29, 2020. Commitments to early clearing will be crucial components of prospective flexible-use licensees' decisions to compete for a particular license at auction. The Commission therefore finds it appropriate to require space station operators to commit to early clearing as soon as possible to provide bidders with adequate certainty regarding the clearing date and payment obligations associated with each license. Such elections shall be public and irrevocable, and the Commission directs the Wireless Telecommunications Bureau to prescribe the precise form of such election via Public Notice no later than May 12, 2020.

268. Because the Commission finds that overlay licensees would only value accelerated relocation if a significant majority of incumbent earth stations are cleared in a timely manner, the Commission finds that at least 80% of accelerated relocation payments must be accepted via Accelerated Relocation Elections in order for the Commission to accept elections and require overlay licensees to pay accelerated relocation payments.[29] The Commission accordingly directs the Wireless Telecommunications Bureau to issue a Public Notice by June 5, 2020, announcing whether sufficient elections have been made to trigger early relocation or not.

269. By electing accelerated relocation, an eligible space station operator voluntarily commits to paying the administrative costs of the Clearinghouse until the Commission awards licenses to the winning bidders in the auction, at which time those administrative costs will be repaid to those space station operators.

270. By electing accelerated relocation, an eligible space station operator voluntarily commits not only to relocating its own services out of the lower 300 megahertz by the Accelerated Relocation Deadlines (both Phase I and Phase II) but also to take responsibility for relocating its associated incumbent earth stations by those same deadlines. A space station operator must plan, coordinate, and perform (or contract for the performance of) all the tasks necessary to migrate any incumbent earth station that receives or sends signals to a space station owned by that operator, whether the satellite service provider is in direct privity of contract with the earth station operator or indirectly through another entity; in short, the space station operator must provide a turnkey solution to the transition. When a space station operator takes responsibility, its associated incumbent earth station operators need only facilitate the space station operator's completion of that earth station's relocation, for example, by helping with scheduling, providing access to facilities, and confirming the work performed.

271. The one exception to the rule is for incumbent earth station operators that choose to opt out of the formal relocation process by taking the lump sum relocation payment in lieu of its actual relocation costs. Such an incumbent earth station operator would then be responsible for coordinating with the relevant space station operator as necessary and performing all relocation actions on its own, including switching to alternative transmission mechanisms such as fiber.

272. Only incumbent earth station transition delays that are beyond the control of the incumbent space station operators will not impact their eligibility for the accelerated relocation payment. However, to partake of this exception, the Commission requires that any eligible space station operator submit a notice of any incumbent earth station transition delays to the Wireless Telecommunications Bureau within seven days of discovering an inability to accomplish the assigned earth station transition task. Such a request must include supporting documentation to allow for resolution as soon as practicable and must be submitted before the Accelerated Relocation Deadlines. To be clear, a space station operator's associated incumbent earth stations will lose their interference protection for the relevant band once the space station operator has met its obligations under the Accelerated Relocation Deadline for Phase I or Phase II.

273. The Commission will determine whether an eligible space station operator has met its accelerated benchmark on an individual basis in order to protect such operators from potential holdout from other operators. Maintaining individualized eligibility can facilitate competition among space station operators—after all, content distributors and incumbent earth stations are more likely to choose to use operators that can meet their publicly elected deadlines for the transition than those that fail to do so. And even if some eligible space station operators have not relocated by the Accelerated Relocation Deadlines, the Commission finds that value still exists for flexible-use licensees to be able to start deploying terrestrial operations in some areas before the final Relocation Deadline.[30]

[29] We make clear that if the accelerated elections meet the 80% threshold, only those space station operators that chose to clear on an accelerated timeframe will be expected to meet the accelerated deadlines.

[30] Although we anticipate that flexible-use licensees may begin deploying and constructing their networks before all incumbents have cleared the band, we clarify that—absent the consent of affected incumbent earth stations—flexible-use

Continued

274. By providing Accelerated Relocation Deadlines that eligible space station operators can commit to meet in order to receive accelerated relocation payments, the Commission will align the space station operators' incentives with the Commission's goal of rapidly introducing mid-band spectrum into the marketplace.

275. The Commission's goal is to facilitate the expeditious deployment of next-generation services nationwide across the entire 280 megahertz made available for terrestrial use, and the Commission's rules must properly align the incentives of eligible space station operators to hit that target. To the extent eligible space station operators can meet the Phase I and Phase II Accelerated Relocation Deadlines, they will be eligible to receive the accelerated relocation payments associated with those deadlines. And the Commission agrees with commenters that electing space station operators should receive reduced, but non-zero, accelerated relocation payments should they miss the specific deadlines. Indeed, commenters rightly argue that creating a ''cliff'' on the first day beyond the relevant deadline could create perverse incentives for space station operators to rush the relocation process at the expense of their customers (to avoid the loss of the entire payment), or to stop transition work entirely (since they could not get any accelerated relocation payment if they miss the deadline even by a day or a month). The Commission thus adopts a sliding scale of decreasing accelerated relocation payments that will provide enough of a ''carrot'' for space station operators to continue to accelerate their relocation even where they miss the relevant deadline while also maintaining a ''stick'' that does not render the accelerated relocation deadlines meaningless. Specifically, the Commission adopts the following schedule of declining accelerated relocation payments for the six months following each Accelerated Relocation Deadline. If an incumbent space station operator cannot complete the transition within six months of the relevant Accelerated Relocation Deadline, its associated payment will drop to zero.

Date of completion	Incremental reduction (%)	Accelerated relocation payment (%)
By Deadline	.....	100
1–30 Days Late	5	95
31–60 Days Late	5	90
61–90 Days Late	10	80
91–120 Days Late	10	70
121–150 Days Late	20	50
151–180 Days Late	20	30
181+ Days Late	30	0

276. Subject to confirmation as to the validity of the certification, an eligible space station operator's satisfaction of the Accelerated Relocation Deadlines will be determined by the timely filing of a Certification of Accelerated Relocation demonstrating, in good faith, that it has completed the necessary clearing actions to satisfy each deadline. An eligible space station operator shall file a Certification of Accelerated Relocation with the Clearinghouse and make it available for public review in this docket once it completes its obligations but no later than the applicable relocation deadline. The Commission directs the Wireless Telecommunications Bureau to prescribe the form of such certification.

277. The Bureau, Clearinghouse, and relevant stakeholders will have the opportunity to review the Certification of Accelerated Relocation and identify potential deficiencies. The Commission directs the Wireless Telecommunications Bureau to prescribe the form of any challenges by relevant stakeholders as to the validity of the certification, and to establish the process for how such challenges will impact the incremental decreases in the accelerated relocation payment. If credible challenges as to the space station operator's satisfaction of the relevant deadline are made, the Bureau will issue a public notice identifying such challenges and will render a final decision as to the validity of the certification no later than 60 days from its filing. Absent notice from the Bureau of any such deficiencies within 30 days of the filing of the certification, the Certification of Accelerated Relocation will be deemed validated.

278. An eligible space station operator that meets the Phase I Accelerated Relocation Deadline and files the appropriate Certification of Accelerated Relocation may request its Phase I accelerated relocation payment for disbursement. The Clearinghouse will collect and distribute the accelerated relocation payments. The Clearinghouse shall promptly notify overlay licensees following validation of the Certification of Accelerated Relocation. Overlay licensees shall pay the accelerated relocation payments to the Clearinghouse within 60 days of the notice that eligible space station operators have met their respective accelerated clearing benchmark.[31] The Clearinghouse shall disburse accelerated relocation payments to relevant space station operators within seven days of receiving the payment from overlay licensees. Overlay licensees may begin operations in their respective blocks and PEAs upon notice of a validated Certification of Accelerated Relocation, and, as relevant, following payment of any required accelerated relocation payments.[32]

279. *Transition for Non-Electing Operators.*—By declining to elect for accelerated relocation payments, an incumbent space station operator is irrevocably forfeiting any right to accelerated relocation payments, even if it completes all tasks by the Accelerated Relocation Deadlines and files a Certification of Accelerated Relocation. This is so because bidders in the public auction must know what obligations they will incur if they become overlay licensees, and the commitment to accelerated relocation therefore must

licensees may not begin operations until either the filing of a validated Certification of Accelerated Relocation or the lapse of the Relocation Deadline.

[31] We note that overlay licensees that fail to submit timely payment would be in violation of a condition of their license and therefore be subject to enforcement action, including potential monetary forfeitures, as well as loss of the license.

[32] To the extent overlay licensees negotiate to clear incumbents from the band earlier than any deadlines, they may deploy service with the consent of affected incumbent earth stations earlier than the deadline—but only so long as they make all required payments to the Clearinghouse in a timely manner.

come well in advance of the auction. The Commission therefore finds it appropriate to limit eligible space station operators' ability to make such an election in the Accelerated Relocation Election filed no later than May 29, 2020.

280. *Transition Plan.*—The Commission requires each eligible space station operator to submit to the Commission and make available for public review a Transition Plan describing the necessary steps and estimated costs to transition all existing services out of the lower 300 megahertz of C-band spectrum. Such plans must be filed by June 12, 2020. The Transition Plan must describe in detail the necessary steps for accomplishing the complete transition of existing C-band services to the upper 200 megahertz of the band by the Relocation Deadline or, as applicable, by the Accelerated Relocation Deadlines.[33] Except where an incumbent earth station owner elects the lump sum payment and assumes responsibility for transitioning its own earth stations, eligible space station operators that elect Accelerated Relocation Payments are responsible for relocating all associated incumbent earth stations, and therefore must detail the details of such relocation in the Transition Plan.[34] To the extent an incumbent space station operator does not elect Accelerated Relocation Payments but nevertheless plans to assume responsibility for relocating its own associated incumbent earth stations, it must make that clear in the Transition Plan (the responsibility otherwise falls on incumbent earth station owners to work with overlay licensees to facilitate an appropriate transition). The Transition Plan must also state a range of estimated costs for the transition, with appropriate itemization to allow reasonable review by overlay licensees, the Clearinghouse, and the Commission.

281. To ensure that incumbent earth station operators, other C-band satellite customers, and prospective flexible-use licensees are adequately informed regarding the transition, the Transition Plan must describe in detail: (1) All existing space stations with operations that will need to be repacked into the upper 200 megahertz; (2) the number of new satellites, if any, that the space station operator will need to launch in order to maintain sufficient capacity post-transition, including detailed descriptions of why such new satellites are necessary; (3) the specific grooming plan for migrating existing services to the upper 200 megahertz, including the pre- and post-transition frequencies that each customer will occupy; [35] (4) any necessary technology upgrades or other solutions, such as video compression or modulation, that the space station operator intends to implement; (5) the number and location of earth stations antennas currently receiving the space station operator's transmissions that will need to be transitioned to the upper 200 megahertz; (6) an estimate of the number and location of earth station antennas that will require retuning and/or repointing in order to receive content on new transponder frequencies post-transition; and (7) the specific timeline by which the space station operator will implement the actions described in items (2) through (6).

282. The Commission recognizes that certain space station operators may find it advantageous or necessary to develop a combined space station grooming plan that allows for more efficient clearing by, for example, migrating customers to excess capacity on another space station operator's satellites. Such space station operators are free to file either individual or joint Transition Plans, so long as any combined plan separately identifies and describes all required information (*i.e.,* items 1 through 7) as it pertains to each individual operator.

283. Incumbent earth station operators, programmers, and other C-band stakeholders will have an opportunity to file comments on each Transition Plan by July 13, 2020. The Wireless Telecommunications Bureau is directed to issue a Public Notice detailing the process for such notice and comment.

284. The Commission also recognizes that there may be a need for an incumbent space station operator to make changes to its Transition Plan to update certain information or to cure any defects that may be identified by the Commission or by relevant stakeholders during the comment window. Space station operators must make any necessary updates or resolve any deficiencies in their individual Transition Plans by August 14, 2020. After this date, space station operators may only make further adjustments to their individual plans with the approval of the Commission.

285. *Relocation Coordinator and Status Reports.*—The Commission finds it in the public interest to provide for a Relocation Coordinator to ensure that all incumbent space station operators are relocating in a timely manner. If eligible space station operators elect accelerated relocation so that a supermajority (80%) of accelerated relocation payments are accepted (and thus accelerated relocation is triggered), the Commission finds it in the public interest to allow a search committee of such operators to select a Relocation Coordinator. Specifically, each electing space station operator may select one representative for the search committee, and the committee shall work by consensus to the extent possible or by supermajority vote (representing 80% of electing operators' accelerated relocation payments) to the extent consensus cannot be reached.[36] If electing eligible space station operators select a Relocation Coordinator, they shall also be responsible for paying for its costs out of accelerated relocation payments—this will align the incentives of the Relocation Coordinator and the search committee to minimize costs while maximizing the chances of meeting the Accelerated Relocation Deadlines.[37]

286. The Relocation Coordinator must be able to demonstrate that it has the requisite expertise to perform the duties required, which will include: (1) Coordinating the schedule for clearing the band; (2) performing engineering analysis, as necessary, to determine necessary earth station migration actions; (3) assigning obligations, as

[33] All required filings should be made in the docket for this proceeding, GN Docket No. 18–122.

[34] We encourage space station operators to coordinate with and seek input from associated incumbent earth station operators and other C-band satellite customers in developing their Transition Plans, and to work cooperatively with earth station operators—even those that elect a lump sum payment—during the transition. We decline, however, to require space station operators to include all of their ''express agreed commitments'' to their customers in the transition plans, as QVC and HSN request, as such requirement would be overly burdensome. The opportunity to comment on Transition Plans provides these customers the opportunity to raise concerns.

[35] While we recognize that space station operators may have an interest in maintaining confidentiality regarding certain aspects of specific contractual agreements and identifying customer information, we require that any information necessary to effectuate the transition in a transparent manner must be included in this filing. If space station operators will be migrating customers to frequencies on a different operator's space station, the details of that arrangement between two space station operators would be deemed necessary information.

[36] Given that the space station operators have primary responsibility for transitioning their associated incumbent earth stations, we decline NCTA's request to include earth station operators in the search committee for the Relocation Coordinator.

[37] Because this approach for selecting the Relocation Coordinator does not require that the selected entity be a neutral third-party, it is possible that the search committee will select a consortium of eligible space station operators. We therefore reject SES's request that overlay licensees, rather than space station operators, pay for the costs of the Relocation Coordinator, as such an approach could lead to self-dealing on the part of the Relocation Coordinator and create unnecessary additional costs for overlay licensees.

necessary, for earth station migrations and filtering; (4) coordinating with overlay licensees throughout the transition process; (5) assessing the completion of the transition in each PEA and determining overlay licensees' ability to commence operations; and (6) mediating scheduling disputes. The search committee shall notify the Commission of its choice of Relocation Coordinator no later than July 31, 2020.

287. The Wireless Telecommunications Bureau is hereby directed to issue a Public Notice inviting comment on whether the entity selected satisfies the criteria set out here. Following the comment period, the Bureau will issue a final order announcing that the criteria established in this *Report and Order* either have or have not been satisfied; should the Bureau be unable to find the criteria have been satisfied, the selection process will start over and the search committee will submit a new proposed entity. During the course of the Relocation Coordinator's tenure, the Commission will take such measures as are necessary to ensure a timely transition.

288. In the event that the search committee fails to select a Relocation Coordinator and to notify the Commission by July 31, 2020, the search committee will be dissolved without further action by the Commission. In the event the search committee fails to select a Relocation Coordinator, or in the case that at least 80% of accelerated relocation payments are not accepted (and thus accelerated relocation is not triggered), the Commission will initiate a procurement of a Relocation Coordinator to facilitate the transition. Specifically, the Commission directs the Office of the Managing Director to initiate a procurement process, and the Wireless Telecommunications Bureau to take other necessary actions to meet the Accelerated Relocation Deadlines (to the extent applicable to any given operator) and the Relocation Deadline.

289. In the case that the Wireless Telecommunications Bureau selects the Relocation Coordinator, overlay licensees will, collectively, pay for the services of the Relocation Coordinator and staff. The Relocation Coordinator shall submit its own reasonable costs to the Relocation Payment Clearinghouse, who will then collect payments from overlay licensees. It shall also provide additional financial information as requested by the Bureau to satisfy the Commission's oversight responsibilities and/or agency-specific/government-wide reporting obligations. Once selected, the Commission expects that the Relocation Coordinator will enter into one or more appropriate contracts with incumbent space station operators, overlay licensees, and their agents or designees.

290. However selected, the Relocation Coordinator's responsibilities will be the same. In short, the Relocation Coordinator may establish a timeline and take actions necessary to migrate and filter incumbent earth stations to ensure uninterrupted service during and following the transition. The Relocation Coordinator must review the Transition Plans filed by all eligible space station operators and recommend any changes to those plans to the Commission to the extent needed to ensure a timely transition. To the extent that incumbent earth stations are not accounted for in eligible space station operators' Transition Plans, the Relocation Coordinator must prepare an Earth Station Transition Plan for such incumbent earth stations and may require each associated space station operator to file the information needed for such a plan with the Relocation Coordinator. Where space station operators do not elect to clear by the Accelerated Relocation Deadlines and therefore are not responsible for earth station migration and filtering, the Earth Station Transition Plan must provide timelines that ensure all earth station relocation is completed by the Relocation Deadline. The Relocation Coordinator will describe and recommend the respective responsibility of each party for earth station migration obligations in the Earth Station Transition Plan and assist incumbent earth stations in transitioning including, for example, by installing filters or hiring a third party to install such filters to the extent necessary. For example, where an earth station requires repointing or retuning to receive transmissions on a new frequency or satellite, it might be most efficient for the same party performing those tasks to also install the necessary filter at the same time.

291. The Relocation Coordinator shall coordinate its operations with overlay licensees, who must ultimately pay for such relocation costs. The most efficient party to perform earth station migration actions or install an earth station filter, and the timeframe for doing so, likely will vary widely across earth stations. Incumbent space station operators must cooperate in good faith with the Relocation Coordinator—and the Relocation Coordinator must, likewise, coordinate in good faith with incumbent space station operators—throughout the transition. The Relocation Coordinator will also be responsible for receiving notice from earth station operators or other satellite customers of any disputes related to comparability of facilities, workmanship, or preservation of service during the transition and shall subsequently notify the Wireless Telecommunications Bureau of the dispute and provide recommendations for resolution.

292. To protect the fair and level playing field for applicants to participate in the Commission's auction, beginning on the initial deadline for filing auction applications until the deadline for making post-auction down payments, the Relocation Coordinator must make real-time disclosures of the content and timing of, and the parties to, communications, if any, from or to applicants in the auction, as applicants are defined by the Commission's rule prohibiting certain auction-related communications.

293. The Commission also agrees with commenters like Global Eagle and NAB that regularly-filed status reports would aid our oversight of the transition. Specifically, the Commission requires each eligible space station operator to report the status of its clearing efforts on a quarterly basis, beginning December 31, 2020. Because eligible space station operators will likely need to cooperate to meet the accelerated timelines, the Commission invites and encourages them to file joint status reports. The Commission also requires the Relocation Coordinator to report on the overall status of clearing efforts on the same schedule. The Commission directs the Wireless Telecommunications Bureau to specify the form and format of such reports.

294. Finally, the Commission rejects Eutelsat's assertion that the Commission should require the Relocation Coordinator to be a neutral third party. Eutelsat argues that allowing the Relocation Coordinator to be selected by a supermajority vote representing at least 80% of the electing operators' accelerated relocation payments would give Intelsat and SES effective control over the Relocation Coordinator, leading to potential conflicts of interest. Eutelsat argues that the Relocation Coordinator should, instead, be a neutral, independent third party akin to the Relocation Payment Clearinghouse. The Commission disagrees. The Relocation Coordinator's responsibilities will require detailed coordination with space station operators and earth stations to assess the validity of Transition Plans and ensure that the space station operators meet their relocation deadlines. A truly independent Relocation Coordinator may not have the requisite knowledge or expertise to perform these essential functions and

complete the transition in a timely manner. Given the complexity of the transition process, the importance of rapid clearing, and the need for ongoing coordination and cooperation with space station operators and their customers, the Commission finds that it is in the public interest for the Relocation Coordinator to be selected by parties representing the vast majority of the clearing responsibilities in the band. The Commission also finds that requiring the Relocation Coordinator to be a neutral, disinterested third party could create inefficiencies in the clearing process and endanger the successful completion of the transition. The Commission notes, however, that the Relocation Coordinator's responsibilities are the same vis-à-vis all incumbent space station operators and that it must operate in good faith to perform its duties on behalf of each incumbent operator.

7. Other FSS Transition Issues

295. In this section, the Commission addresses two additional issues related to the FSS Transition that were raised in the record.

296. *Maintenance of IBFS Data Accuracy.*—The Commission declines to require annual certification requirements or discontinuance requirements, as requested by advocates of point-to-multipoint flexible use in the band. The *NPRM* asked several questions about how best to maintain accurate earth station data in IBFS. The Commission believes there is increased awareness among incumbent earth station operators of their rights and responsibilities as a result of this proceeding and the various public notices associated with it. In addition, because FSS will no longer share with point-to-point in the contiguous United States and the Commission is not setting aside spectrum for point-to-multipoint or flexible use in the band on a shared basis with FSS using coordination or dynamic spectrum management, the Commission does not believe that such additional measures are necessary or worth the additional regulatory requirements. Further, Section 25.162 of the Commission's rules already requires FSS licensees to keep their Commission registration and license information up to date, and it is the responsibility of earth station registrants under the Commission's rules to surrender any registration or license for an earth station no longer in use.

297. *Revising the Coordination Policy Between FSS and FS Services.*—The full band, full arc coordination policy governs sharing between the co-primary FSS and FS services. In the contiguous United States this policy will be moot given our decisions today to transition the FSS allocation to the upper 200 megahertz of the band and to sunset incumbent point-to-point use of the band. Outside the contiguous United States, the record does not reflect any significant concerns with the existing policy. Indeed, satellite interests support retention of the full band, full arc policy and argue that the flexibility of full band, full arc is needed to deal with unanticipated satellite failures, emergencies on the ground, or unexpected interference. NCTA notes that earth station operators require flexibility to repoint and change frequencies. Accordingly, the Commission is not adopting its proposal to revise the coordination policy at this time to require earth stations to report to the Commission the actual frequencies and azimuths used. Nonetheless, if an earth station operator alleges harmful interference from wireless operations in adjacent bands, it must be prepared to provide all relevant technical data regarding its station's operation. Additionally, incumbent space station operations with earth stations will be protected on a primary basis in the remaining upper 200 megahertz of the band. Since the Commission is clearing 300 megahertz of the band and declining to permit point-to-multipoint communications within this band at this time, the Commission need not further limit the scope of earth station operations. Allowing continued flexibility will also facilitate antenna re-pointing to different satellites during the clearing process.

C. Fixed Use in the C-Band

298. The Commission adopts rules to sunset as of December 5, 2023, incumbent point-to-point Fixed Service use under part 101 in the 3.7–4.2 GHz band in the contiguous United States. The Commission finds that doing so will serve the public interest by facilitating the introduction of flexible use into this band and providing incumbent Fixed Service licensees with a reasonable period to self-relocate their permanent fixed operations out of the 3.7–4.2 GHz band. The Commission also declines to adopt modifications to part 101 to permit point-to-multipoint Fixed Service use in the 4.0–4.2 GHz band, as doing so could complicate the continued use of the 4.0–4.2 GHz band by FSS licensees during and after the transition.

1. Sunsetting Incumbent Point-to-Point Fixed Services

299. As noted in the *NPRM,* point-to-point Fixed Service use of the band has declined steeply over the past 20 years and many other spectrum options are available for point-to-point links. In the contiguous United States, there are now only 87 point-to-point Fixed Service licenses in this band, of which 51 are permanent point-to-point Fixed Service and 36 temporary Fixed Service licenses.[38] Frequency coordination allows FSS and terrestrial fixed microwave to share the band on a co-primary basis but coordination of mobile systems would be more complicated because the movement of the devices would require analyses and interference mitigation to avoid harmful interference to/from both services. Indeed, the Commission's *Emerging Technologies* framework has largely involved the relocation of fixed services to allow for mobile operations under new, flexible-use licenses. The Commission must therefore carefully balance these incumbent uses against the need for additional spectrum for flexible use in deciding upon the best means of resolving issues in this proceeding in the public interest.

300. The Commission finds that the relatively limited incumbent point-to-point Fixed Service use in this band may be accommodated by sunsetting primary operations in the 3.7–4.2 GHz band in the contiguous United States as of December 5, 2023. Accordingly, the Commission adopts a modified version of our proposal to sunset, in three years, incumbent point-to-point Fixed Service use in the 3.7–4.2 GHz band in the contiguous United States. Specifically, existing licensees, as of April 19, 2018, of licenses for permanent Fixed Service operations will have until December 5, 2023, to self-relocate their point-to-point links out of the 3.7–4.2 GHz band. The Commission is also revising its part 101 rules to specify that no applications for new point-to-point Fixed Service operations in the 3.7–4.2 GHz band will be granted for locations in the contiguous United States. The record in this proceeding demonstrates the need to allocate this spectrum for flexible use for the provision of 5G, and commenters overwhelmingly support the Commission's proposal to sunset incumbent point-to-point Fixed Service use in the contiguous United States. On the other hand, because the Commission is not authorizing new flexible-use services outside of the contiguous

[38] *See* Universal Licensing System, *https://wireless2.fcc.gov/UlsApp/UlsSearch/searchLicense.jsp.*

United States at this time, the Commission finds that it would not be in the public interest to maintain the existing freeze on new point-to-point Fixed Service links in those areas. Therefore, the freeze on point-to-point microwave Fixed Service applications for sites outside of the contiguous United States will be lifted on the date of publication of this action in the **Federal Register**. This decision lifting the freeze, in part, relieves a restriction and therefore is exempt from the effective date requirements of the Administrative Procedure Act. Moreover, the Commission finds that there is good cause for not delaying the partial lifting of the freeze because such a delay would be unnecessary and contrary to the public interest because it would not serve purposes of the freeze.

301. New equipment in other bands is readily available for point-to-point operations and allowing new authorizations in the 4.0–4.2 GHz band could frustrate the satellite repacking and overall repurposing of the 3.7–3.98 GHz band for 5G in the contiguous United States. Other bands available for assignment for fixed microwave services under part 101 include 5925–6425, 6525–6875, 6875–7125, 10,700–11,700, 17,700–18,300, 19,300–19,700 MHz, and 21,200–23,600 MHz. This sunset provision that the Commission adopts pursuant to its spectrum management authority under Title III will protect the operations of incumbent Fixed Service licensees while avoiding harmful interference to new flexible-use licensees and facilitating the FSS transition to the upper 200 megahertz.

302. In the *NPRM,* the Commission also sought comment on whether to treat those with permanent licenses differently from those with temporary licenses. The 36 licenses for temporary fixed links in the contiguous United States are blanket licenses to use any frequencies in the 3.7–4.2 GHz band for temporary links within a defined geographic area, *e.g.,* statewide. These licenses allow carriers to meet short-term needs for fixed links by prior coordinating specific frequencies and locations with all affected licensees.[39] Although these licenses have 10-year terms, a link cannot be used at a given location for more than 180 days. To be sure, these temporary licenses are different from licenses for permanent links. The Commission finds, however, in the context of our actions today making 280 megahertz of mid-band spectrum available as rapidly as possible, that these distinctions do not provide a sufficient public interest justification for treating the 36 temporary fixed licensees differently from the 51 permanent fixed licensees in the 3.7–4.2 GHz band. While temporary fixed licensees operate on a non-interference basis, the burden of analyzing and responding to coordination requests from these operators and to protect any successfully coordinated operations for up to 180 days could add additional complexity to new flexible-use deployments and earth-station transitions. Accordingly, these 36 licensees will have until December 5, 2023, to modify or replace their temporary fixed 3.7–4.2 GHz band equipment with comparable equipment that operates in other bands. Additionally, given that other bands are available for temporary fixed operations, the Commission is revising our rules for the contiguous United States to bar acceptance of applications for new licenses for temporary fixed operations in the 3.7–4.2 GHz band.

303. *Relocation Reimbursement and Cost Sharing.*—Incumbent licensees of point-to-point Fixed Service links that relocate out of the 3.7–4.2 GHz band by December 5, 2023, shall be eligible for reimbursement of their reasonable costs based on the well-established ''comparable facilities'' standard used for the transition of microwave links out of other bands. Similar to the Commission's approach for earth station clearing, because fixed service relocation affects spectrum availability on a local basis, all flexible-use licensees in a PEA where an incumbent Fixed Service licensee self-relocated will share in the reimbursement of these reasonable costs on a *pro rata* basis. Incumbent Fixed Service licensees will be subject to the same demonstration requirements and reimbursement administrative provisions as those adopted above for incumbent earth station operators.

304. *Estimated Relocation Costs of the FS Transition.*—The Commission finds it appropriate to provide potential bidders in our public auction with an estimate of the relocation costs that they may incur should they become overlay licensees. The Commission cautions that our estimates are estimates only, and it makes clear that overlay licensees will be responsible for the entire allowed costs of relocation—even to the extent that those costs exceed the estimated range of costs. The Commission further cautions that the record contains no information on the cost estimates of clearing the 87 incumbent licensees in the band.

305. The Commission's licensing records reflect that the 51 licenses for permanent links authorize a total of 702 links (discrete frequencies). The Commission notes that for microwave links relocated from the 2.1 GHz Advanced Wireless Services bands, $184,991 was the average cost per link relocation registered with the AWS Clearinghouse. Using this average cost per link to estimate the total cost of clearing 702 links from the 3.7–4.2 GHz band, results in a cost estimate of $129.9 million. Licensees of temporary fixed links were not entitled to relocation reimbursement from AWS licensees so the AWS Clearinghouse data may be less informative. The record is devoid of any cost data but the average cost per temporary link should be 25–50% lower than for permanent links because temporary links do not usually involve towers. Using $138,743 (25% lower) as the average replacement cost, if each of the 36 licensees has equipment for one temporary fixed link in the 3.7–4.2 GHz band, this results in a cost estimate of $5.13 million and a total cost estimate for all fixed links of approximately $135 million.

2. More Intensive Point-to-Multipoint Fixed Use

306. The Commission has decided to adopt flexible-use rules for this band that allow operators the ability to use it for fixed or mobile operations (or a combination thereof), and thus declines to adopt changes to part 101 that would limit terrestrial use of any portion the 3.7–4.2 GHz band to point-to-multipoint Fixed Service use.

307. In the *NPRM,* the Commission sought comment on rules that would allow for the more intensive point-to-multipoint Fixed Service use of the band, how permitting fixed wireless would affect the possible future clearing of the band for flexible use and the use of the band for satellite operations, and the impact that point-to-multipoint use would have on the flexibility of FSS earth stations to modify their operations in response to technical and business needs. Although some commenters support variations of rules that would license non-geographic, unauctioned point-to-multipoint Fixed Service use of the 3.7–4.2 GHz band, a number of commenters oppose the proposal. Commenters emphasize that licensing point-to-multipoint Fixed Service before or during the transition would substantially devalue the spectrum for flexible use, increase the costs of the transition, and undermine market-based

[39] *See, e.g., Universal Licensing System,* Call Sign KCA74 (authorizing temporary fixed operations statewide in two states in three bands); Call Sign KJA75 (authorizing temporary fixed operations statewide in nine states in over ten bands).

approaches to placing this spectrum to its most valued use.

308. The Commission agrees and finds that the record demonstrates that it would be unwise to open this band to point-to-multipoint Fixed use, as a stand-alone service, at this time. Other bands are available for point-to-multipoint use, including licensed spectrum immediately below 3.7 GHz. In short, permitting flexible use, fixed or mobile, services across the entire cleared band will ensure that prospective wireless providers have the ability to provide whichever services (including point-to-multipoint) that consumers most demand. And authorizing more intensive point-to-multipoint Fixed Service use of the 4.0–4.2 GHz band before the transition is over could dramatically complicate the repacking and relocation of FSS operations and earth station registrants.

D. Technical Rules for the 3.7–4.2 GHz Band

309. The Commission adopts technical rules for the 3.7–4.2 GHz band spectrum. The Commission finds that the technical rules it adopts herein will encourage efficient use of spectrum resources and promote investment in the 3.7–3.98 GHz band while protecting incumbent users in the band and in adjacent bands.

310. The Commission notes that Comcast recommends that the Commission ''encourage interested stakeholders to convene a broad-based group to develop a comprehensive framework for addressing interference prevention, detection, mitigation, and enforcement.'' Such groups have been successful in the past in providing the Commission with valuable insights and useful information regarding spectrum transitions for new uses.[40] The Commission believes that such a multi-stakeholder group could provide valuable insight into the complex coexistence issues in this band and provide a forum for the industry to work cooperatively towards efficient technical solutions to these issues. The Commission encourages the industry to convene a group of interested stakeholders to develop a framework for interference prevention, detection, mitigation, and enforcement in the 3.7–4.2 GHz band. The Commission also encourages any multi-stakeholder group that is formed to consider best practices and procedures to address issues that may arise during the various phases of the C-band transition and to consider coexistence issues related to terrestrial wireless operations below 3.7 GHz. To ensure that all viewpoints are considered, the Commission encourages industry to include representatives of incumbent earth stations (including MVPDs and broadcasters), incumbent space station operators, wireless network operators, network equipment manufacturers, and aeronautical radionavigation equipment manufacturers. The Commission does not, however, take a position on the exact makeup or organizational structure of any such stakeholder group.

311. The Commission directs the Office of Engineering and Technology to act as a liaison for the Commission with any such multi-stakeholder group so formed. In particular, the Commission expects the Office to observe the functioning of any such group and the technical concerns aired to keep an ear to the ground, as it were, on technical developments that come to light as the relocation process occurs. The Commission also expects the Office to provide guidance to any such group on the topics on which it would be most helpful for the Commission to receive input and a sense of the time frames in which such input would be helpful.

1. Power Levels

312. *Base Station Power.*—To support robust deployment of next-generation mobile broadband services, the Commission will allow base stations in non-rural areas to operate at power levels up to 1640 watts per megahertz EIRP. In addition, consistent with other broadband mobile services in nearby bands (AWS–1, AWS–3, AWS–4 and PCS), the Commission will permit base stations in rural areas to operate with double the non-rural power limits (3280 watts per megahertz) in rural areas. The Commission extends the same power density limit to emissions with a bandwidth less than one megahertz to facilitate uniform power distribution across a licensee's authorized band regardless of whether wideband or narrowband technologies are being deployed. This approach also provides licensees the flexibility to optimize their system designs to provide wide area coverage without sacrificing the flexibility needed to address coexistence issues with FSS operations. Further, because advanced antenna systems often have multiple radiating elements in the same sector, the Commission clarifies that the power limits it is adopting apply to the aggregate power of all antenna elements in any given sector of a base station.

313. The Commission agrees with commenters and believe that, similar to development in other bands, these base station power limits will promote investment in the 3.7–3.98 GHz band and facilitate the rapid and robust deployment of next generation wireless networks, including 5G. The Commission also finds that adopting consistent power levels with other AWS bands will allow licensees to achieve similar coverage, creating network efficiencies between network deployments in different spectrum bands.

314. The Commission disagrees with commenters that argue that the base station power limits in this band should be lower to facilitate coexistence with FSS earth stations and flexible-use operations below the 3.7 GHz band edge. The Commission believes that the 3.7–3.98 GHz band will be a core band for next generation wireless networks, including 5G, and will require power levels consistent with other bands used for wide area wireless operations to reach its full potential. The Commission also finds that the protection mechanisms it adopts herein will ensure that the potential for harmful interference to incumbent FSS earth stations is minimized regardless of the base station power levels permitted in the band. Indeed, the Commission notes that the C-Band Alliance modified its original proposal specifically to support base station power levels consistent with those we adopt here and has indicated that such power levels will not inhibit the rapid introduction of next generation wireless services to this band.

315. The Commission declines to adopt its proposal to impose a different power level for emissions less than one megahertz wide as we do not believe such a distinction is necessary. That is, rather than impose an absolute power limit for narrow emissions, the Commission adopts the same power density limits for all emissions in the band. Verizon supports a power density rule without a separate power limit for emissions less than one megahertz and suggests a minimum channel bandwidth of five megahertz to ensure use of the band for broadband applications. The Commission notes that the power rules for PCS and AWS–1, *e.g.,* where base stations are permitted an EIRP of 1640 Watts/MHz for emissions greater than 1 megahertz or 1640 Watts per emissions with a bandwidth of less than 1 MHz, were developed when mobile services were transitioning from narrowband (GSM systems) to wideband

[40] For example, after the Commission created the Citizen's Broadband Radio Service, the Wireless Innovation Forum stood up the Spectrum Sharing Committee to serve as a common industry and government standards body to support the development and advancement of Citizen's Broadband Radio Service Standards. *See https://cbrs.wirelessinnovation.org/about.*

technologies (CDMA). Thus, the Commission adopted the rules to ensure continued service to the public regardless of technology deployed. While 4G and 5G technologies have continued the trend towards wider channel bandwidths, certain narrowband Internet of Things (NB-IoT) technologies use smaller bandwidths (*e.g.,* 180 kHz). The Commission does not believe a separate power per emission distinction is necessary to accommodate narrowband emissions because they are often integrated with wideband emissions as additional resource blocks as opposed to being deployed as separate systems. Nor does the Commission believe it should adopt a minimum emission bandwidth for the band because licensees should be permitted to choose the best technology or a mix of technologies to meet market demands. Moreover, the Commission is mindful of the interference potential possible under our proposed rule whereby a licensee could deploy up to five NB-IoT channels in one megahertz. This situation could lead to an aggregate power of 8200 Watts/MHz in an urban area and 16400 Watts/MHz in a rural area. Licensees still have flexibility to implement any technology in accordance with our technical flexibility framework and can design their networks to ensure coverage, but our rules will ensure power parity between technologies. This approach should avoid an unlikely, yet problematic scenario where a system stacks narrowband high-powered emissions to meet coverage goals while also potentially interfering with adjacent channel operations. Thus, the Commission set a uniform power density distribution across the full 3.7–3.98 GHz band regardless of channel bandwidth.

316. The Commission also declines to adopt a maximum power limit of 75 dBm EIRP, summed over all antenna elements. While the Commission sought comment on this limit in the *NPRM,* it received little support on the record and several parties claimed that such a limit could hinder network deployments. The Commission agrees and finds that an upper limit could hinder flexibility to deploy wider bandwidth technologies without any corresponding benefit, as 3.7–3.98 GHz band licensees will design their systems to protect earth station locations around their deployments.

317. *Mobile Power.*—The Commission adopts a 1 Watt (30 dBm) EIRP power limit for mobile devices, as proposed in the *NPRM.* The Commission finds that this mobile power limit will provide adequate power for robust mobile service deployment. Additionally, this limit will permit operation of mobile power classes as outlined in the 5G standards.[41] The Commission note that most commenters support the proposed 1 Watt EIRP mobile power limit as adequate for 5G operations and as being consistent with industry standards.[42]

318. While a few commenters suggest allowing higher power limits, the Commission does not find the record supports a specific need for higher power at this time. Mobile devices typically operate at levels below 1 Watt to preserve battery life, meet human exposure limits, and meet power control requirements.

319. Similarly, the Commission disagrees with commenters that suggest lower mobile power limits consistent with those in the 3.5 GHz band. The Citizens Broadband Radio Service, which is based on lower power, narrower channels and a dynamic spectrum sharing framework, is fundamentally different than the service we are permitting in the 3.7–3.98 GHz band. Thus, the limits adopted there are not appropriate for this band. Licensees are expected to deploy much wider channel bandwidths and will operate in exclusively licensed spectrum. The mobile power limit the Commission adopts is intended to provide consistency between mobile 5G deployments in the 3.7–3.98 GHz band and comparable macro cell deployment in the PCS, AWS, and similar bands.

2. Out-of-Band Emissions

320. *Base Station Out-of-Band Emissions.*—The Commission adopts base station out-of-band emission (OOBE) requirements based on our proposed limits, which are similar to other AWS services. Specifically, base stations will be required to suppress their emissions beyond the edge of their authorization to a conducted power level of −13 dBm/MHz.

321. This limit is supported by several commenters because it avoids unnecessary constraints on flexible-use equipment in areas far from FSS earth stations and is compatible with the rules governing other mobile broadband services. The Commission adopts a conducted limit of −13 dBm/MHz because it is consistent with the emission limits the Commission has established for other mobile broadband services and the emission limits established for 5G technologies by standards bodies, and the Commission finds that this limit has been widely accepted as being adequate for reducing unwanted emissions into adjacent bands. The C-Band Alliance supports the OOBE limits contained in the 3GPP standard for band n77. Here the Commission establishes a fixed emission mask that fits within the 3GPP specifications and is less complicated. Further, the Commission is not adopting a suggestion to relax the limits in the first 10 megahertz outside of a licensee's authorized band because there is insufficient debate in the record on the impact of such a relaxation to adjacent channel operations and we believe manufacturers and licensees are familiar with our standard −13 dBm/MHz limit and have tools to ensure they meet this limit.

322. While some commenters support emission suppression to levels lower than what the Commission adopts, these more stringent emission limits would likely hinder the full potential of 5G deployment in this band. Because out-of-band emissions generally continue to decrease with spectral separation and manufacturers typically are able to filter those emissions to levels lower than what either our adopted limits or the 3GPP emission masks require,[43] the Commission does not believe it is necessary to specify additional levels of suppression further outside the band.

323. For base station OOBE, the Commission applies the part 27 measurement procedures and resolution bandwidth that are used for AWS devices outlined in § 27.53(h). Specifically, a resolution bandwidth of 1 megahertz or greater will be used; except in the 1 megahertz bands immediately outside and adjacent to the licensee's frequency block where a resolution bandwidth of at least 1% of the emission bandwidth may be employed. These procedures have been successfully used to prevent harmful interference from similar services operating in nearby bands. Thus, the Commission concludes that there is no demonstrated reason to change them for the 3.7–3.98 GHz band.

324. *Mobile Out-of-Band Emissions.*—As with base station out-of-band emission limits, we adopt mobile emission limits similar to our standard emission limits that apply to other mobile broadband services. Specifically, mobile units must suppress the conducted emissions to no more than −13 dBm/MHz outside their authorized frequency band.

[41] *See* 3GPP 38.101–1 NR; User Equipment (UE) radio transmission and reception; Part 1: Range 1 Standalone (Release 15).

[42] *See* 3GPP TS 38.101–3 version 15.2.0 Release 15 at 80 (UE Power class (PC) For FR1: Power class 3: 23 dBm and Power class 2: 26 dBm). AT&T Reply at 18; Ericsson Comments at 20; Nokia Comments at 12.

[43] 3GPP Standard TS 38.104, version 16.1.0, clause 6.6.4.2.1 for Category A base stations.

325. This limit is widely supported by the comments. The Commission notes that those emission masks vary by channel bandwidth. The Commission agrees that requiring limits more stringent than the 3GPP requirements ''could prevent user equipment that operates on wide channel bandwidths from being certified for use in the United States.'' The Commission adopted a relaxation of the emission limit within the first five megahertz of the channel edge by varying the resolution bandwidth used when measuring the emission. For emissions within 1 megahertz from the channel edge, the minimum resolution bandwidth will be either one percent of the emission bandwidth of the fundamental emission of the transmitter or 350 kilohertz. In the bands between one and five megahertz removed from the licensee's authorized frequency block, the minimum resolution bandwidth will be 500 kilohertz. The adopted relaxation will not affect the interference to FSS above 4.0 GHz. The adopted relaxation will be entirely contained within the 20 megahertz guard band. The effect on Citizens Broadband Radio Service operations below 3.7 GHz should be minimal. This limit will ensure new 3.7 GHz Service operators have a robust equipment market in which mobile devices can be designed to operate across the variety of spectrum bands currently available for mobile broadband services. The Commission finds that this limit has been widely accepted as being adequate for reducing unwanted emissions into adjacent bands.

326. The Commission notes that the C-Band Alliance proposed a more stringent mobile equipment emission mask, but later supported emission masks developed by standards bodies suitable for 5G devices. As with the requirements for base stations, the Commission's approach will provide equipment developers and adjacent channel licensees certainty as compared to the 3GPP 5G OOBE specifications, which vary with bandwidth. The limit largely falls within the 3GPP mask and does not preclude higher levels of suppression should they be needed.

327. The Commission notes that, like the AWS requirements, the Commission is adopting provisions that permit licensees in the 3.7–3.98 GHz band to implement private agreements with adjacent block licensees to exceed the adopted OOBE limits. Finally, similar to other part 27 services, the Commission applies § 27.53(i), which states that the FCC may, in its discretion, require greater attenuation than specified in the rules if an emission outside of the authorized bandwidth causes harmful interference.

3. Antenna Height Limits

328. The Commission adopts its proposal not to restrict antenna heights for 3.7–3.98 GHz band operations beyond any requirements necessary to ensure physical obstructions do not impact air navigation safety. This is consistent with part 27 AWS rules, which generally do not impose antenna height limits on antenna structures.

329. Commenters generally support adopting 3.7–3.98 GHz band rules similar to existing part 27 rules to promote consistency.

330. Rather than using antenna height limits to reduce interference between mobile service licensees, as has been done in the past, the Commission more recently has used service boundary limits to provide licensees more flexibility to design their systems while still ensuring harmful interference protection between systems. As this has proven successful in other services, the Commission adopts that same approach in the 3.7–3.98 GHz band. Further, the Commission believes such limits would have limited practical effect because it expects that licensees generally will deploy systems predicated on lower tower heights and increased cell density achieving maximum 5G data throughput to as many consumers as possible. In rural areas where higher antennas may be used to provide longer range to serve sparse populations, the Commission believes that the service area boundary limits it is adopting will ensure that adjacent area licensees are protected from harmful interference.

4. Service Area Boundary Limit

331. The Commission adopts the −76 dBm/m²/MHz power flux density (PFD) limit at a height of 1.5 meters above ground at the border of the licensees' service area boundaries as proposed in the *NPRM* and also permits licensees operating in adjacent geographic areas to voluntarily agree to higher levels at their common boundaries.

332. The commenters that specifically address the service area boundary limit support the −76 dBm/m²/MHz PFD limit. The Commission also notes that this metric is straightforward to calculate or measure and also scales with channel bandwidth to provide licensees flexibility for demonstrating compliance.

5. International Boundary Requirements

333. The Commission adopts its proposal to apply § 27.57(c) of its rules to this band, which requires all part 27 operations to comply with international agreements for operations near the Mexican and Canadian borders. This requirement is consistent with all other part 27 services. Under this provision, licensee operations must not cause harmful interference across the border, consistent with the terms of the agreements currently in force. The Commission notes that modification of the existing rules might be necessary in order to comply with any future agreements with Canada and Mexico regarding the use of these bands.

6. Other Part 27 Rules

334. As proposed in the *NPRM,* the Commission adopts several additional technical rules applicable to all part 27 services, including §§ 27.51 (Equipment authorization), 27.52 (RF safety), 27.54 (Frequency stability), and part 1, subpart BB, of the Commission's rules (Disturbance of AM Broadcast Station Antenna Patterns) for operations in the 3.7–3.98 GHz band. As operations in the 3.7–3.98 GHz band will be a part 27 service, the Commission finds these rules implement important safeguards for all wireless services to ensure that devices meet RF safety limits and that the potential for causing harmful interference to other operations is minimized. Further, few commenters address these issues other than supporting uniformity of 3.7–3.98 GHz band regulations with other part 27 services that will operate in nearby bands.

335. As the Commission has done for other part 27 services since 2014, the Commission also require client devices to be capable of operating across the entire 3.7–3.98 GHz band. Specifically, the Commission adds the 3.7–3.98 GHz band to Section 27.75, which requires mobile and portable stations operating in the 600 MHz band and certain AWS–3 bands to be capable of operating across the relevant band using the same air interfaces that the equipment uses on any frequency in the band. This requirement does not require licensees to use any particular industry standard. The Commission agrees that cross band operability is important to ensure a robust equipment market for all licensees.

7. Protection of Incumbent FSS Earth Stations

336. The record reflects widely varying views on how to protect incumbent operations and whether such protections should be negotiated or mandated by rule. The Commission adopts here specific criteria for the protection of the incumbent FSS earth stations but acknowledge the possibility

of private negotiations that depart from these limits.

337. The Commission will require a PFD limit of −124 dBW/m²/MHz as measured at the earth station antenna. This PFD limit applies to all emissions within the earth station's authorized band of operation, 4.0–4.2 GHz. In the event of early clearing of the lower 100 megahertz (Phase 1 of the transition), the limit will apply to all emissions within the 3.82–4.2 GHz band. The Commission also requires a PFD limit of −16 dBW/m²/MHz applied across the 3.7–3.98 GHz band at the earth station antenna as a means to prevent receiver blocking. This blocking limit applies to all emissions within the 3.7 GHz Service licensee's authorized band of operation.

a. Protection From Out of Band Emissions

338. The Commission adopts a PFD limit to protect registered FSS earth stations from out of band emissions from 3.7 GHz Service operations. For base and mobile stations operating in the 3.7–3.98 GHz band, the Commission adopts a PFD limit of −124 dBW/m²/MHz, as measured at the antenna of registered FSS earth stations. 3.7 GHz Service licensees will be obligated to ensure that the PFD limit at FSS earth stations is not exceeded by base and mobile station emissions, which may require them to limit mobile operations when in the vicinity of an earth station receiver.

339. The record contains a range of proposals on how FSS earth stations should be protected. Notably, the C-Band Alliance proposes a formula to calculate the expected received aggregate PSD at each FSS earth station receiver. The C-Band Alliance's proposed approach would require terrestrial licensees to consider the aggregate effect of all mobile and base station operations within 40 km of each earth station over a defined span of look angles for the earth station and a defined reference antenna. Several commenters argue that the C-Band Alliance's proposal is overly protective and would hinder 5G deployment. AT&T recommends adopting a PFD limit of −124 dBW/m²/MHz for 5G operations in the 50 megahertz immediately below the FSS band edge. The Commission agrees with this PFD value, but rather than apply it to stations only in a specific 50 megahertz as suggested by AT&T, it will apply that limit to all wireless operations in the 3.7–3.98 GHz band to ensure that earth stations are adequately protected.

340. The Commission finds that requiring compliance with a PFD limit is relatively simple and less burdensome on FSS earth station operators and 3.7 GHz Service licensees to implement than a PSD limit. Using PFD avoids the complexity of registering complex antenna gain patterns for more than twenty thousand earth stations, and it avoids multiple angular calculations that would be necessary to predict PSD within each satellite receiver. The PFD limit the Commission is adopting is based on a reference FSS antenna gain of 0 dBi, interference-to-noise (I/N) protection threshold of −6 dB, a 142.8K FSS earth station receiver noise temperature, and results in a calculated PFD of −120 dBW/m²/MHz.[44] To account for aggregate interference effects, which the Commission expects will be dominated by a single interferer, we adjust our calculated value by −4 dB (*i.e.,* assuming the dominant interferer is 40% of the aggregate power). This results in −120 dBW/m²/MHz −4 dB = −124 dBW/m²/MHz as the PFD limit to protect earth stations from out-of-band emissions. The Commission finds that using these parameters to calculate a PFD limit is reasonable and will adequately protect FSS earth station receivers from out-of-band emissions from fixed and mobile operations in the 3.7–3.98 GHz band.

341. The C-Band Alliance offered a method of estimating the effect of the aggregate power of all base stations within a certain distance of an FSS earth station. It provides a formula that considers the impact of aggregate power from all base stations and mobile devices from one licensee for operations within 40 km of an earth station, and if there are more than one licensee within 40 km it essentially divides allotted power by the number of licensees that operate in the subject area. This approach has challenges in that the number and location of mobile operations may be constantly changing, making it difficult to predict the aggregate power for all such stations. Thus, the C-Band Alliance approach assumes all relevant stations have equal potential to cause interference to an earth station. AT&T argues that the C-Band Alliance's aggregate power proposal is flawed, overly complex and does not account for the fact that a single dominant interferer drives the interference power received, not aggregate interference. The Commission agrees that the base stations closest to any earth station will have a larger potential for causing harmful interference than stations further away. The Commission declines to adopt the C-Band Alliance proposed methodology. The Commission finds that the methodology is excessively burdensome for FSS operators and terrestrial licensees, and it involves complex calculations that are unnecessary to reasonably limit the service impact of potential interference. Moreover, the PFD limit the Commission is adopting accounts for the potential of aggregate interference and will protect FSS earth stations from harmful interference.

342. The C-Band Alliance proposes that earth station protection be applied to all locations within one arc second (*i.e.,* about 30 meters depending on location) to provide a buffer around stations. The Commission declines to establish a buffered protection area for earth stations. The Commission observes that the angular variation over a 30 meter radius protection area is less than 1.7 degrees at distances greater than 1 km, and the path loss variation over a 30 meter radius protection area at distances greater than 1 km is less than 1 dB.[45] The Commission finds that protecting an area of a certain radius instead of an actual deployment could hinder deployment closer to earth stations because it could minimize the effect of terrain or shielding.

b. Protection From Receiver Blocking

343. The Commission will require base stations and mobiles to meet a PFD limit of −16 dBW/m²/MHz, as measured at the earth station antenna for all registered FSS earth stations. This blocking limit applies to all emissions within the 3.7 GHz Service licensee's authorized band of operation.

344. It is possible that emissions operating at high power, even one relatively removed in frequency, may overload a receiver in an adjacent band, also known as receiver blocking. Such blocking effects can be mitigated with filters designed to protect FSS earth stations from receiving energy intended for adjacent channels. Ericsson noted that the NTIA recommended the RF front-end preselection filters be included in new C-band earth station installation to preclude receiver front-end overload. The C-Band Alliance proposed an FSS blocking protection mechanism based on an aggregate power spectrum density (APSD) protection threshold that must be met by all terrestrial operators within 40 km of each earth station. The APSD is a function of the total amount of C-band spectrum, in megahertz, cleared for flexible-use licensees and the number of

[44] PFD (dBW/m²/MHz) = 10*log[(kT)*(4π/λ²)*(I/N)*(10⁻⁶ MHz/Hz)] = (−228.6 dBW/Hz) + 10*log(142.8) + 33.5 dB/m² − 6 dB (I/N) + 60 dB-Hz/MHz = −120 dBW/m²/MHz.

[45] $35*\log_{10}(1{,}030/970) = 0.91$ dB.

distinct licensees using the same frequency block within a 40 km radius of an earth station. The C-Band Alliance also proposed to install filters on all protected earth stations to reduce their susceptibility to blocking. After a series of refinements and testing of several prototype filters, the C-Band Alliance proposed the following definition of the FSS earth station filter mask:

Frequency range	Attenuation
From 3.7 GHz to 100 megahertz below FSS band edge	−70 dB.
From 100 megahertz below lower FSS band edge to 20 megahertz below lower FSS band edge	−60 dB.
From 20 megahertz below lower FSS band edge to 15 megahertz below lower FSS band edge	−30 dB.
From 15 megahertz below lower FSS band edge to lower FSS band edge	0 dB.

345. The transition of the 3.7–3.98 GHz band to flexible use may be conducted in phases, with an accelerated clearing of the lower 100 megahertz of the band. Some earth stations may need to have two different filters installed over the course of the transition. The filter mask above is defined relative to the lower band edge of the FSS and is applicable to both phases of the accelerated clearing plan. In Phase I, the FSS lower band edge is defined to be 3.82 GHz while in Phase II the FSS lower band edge is defined to be 4.0 GHz.

346. The Commission acknowledges that there can be variation in filter performance. However, when properly designed and installed, filters can have significant impact in reducing interference to FSS earth stations. While the Commission agrees with Verizon that C-band filter mask technology may be subject to further improvement, the Commission believes that failure to develop a baseline minimum specification can and will delay deployment of 5G networks in this band.

347. The Commission adopts a PFD limit to protect FSS earth stations from receiver blocking, relying on C-Band Alliance's filter specification for suppression of signals from the 3.7–3.98 GHz band. PFD is easily modeled at the design phase of a deployment, facilitates independent verification and testing by 3.7 GHz Service licensees and will greatly reduce the amount of coordination and the burden on all relevant parties. The Commission declines to adopt C-Band Alliance's suggested PSD limit for the same reasons described above in determining the PFD limit for out of band emissions. Most importantly, a PSD limit would require the use of detailed antenna pattern data for each individual earth station antenna and a multitude of angular computations for each base station. This level of complexity is an unnecessary burden and is not needed to provide adequate protection for earth stations.

348. C-Band Alliance states that through testing and analysis they have determined that the earth station receiver will encounter insignificant degradation if the aggregate power level across its entire operational frequency range is lower than −59 dBm at the input of the low-noise block downconverter (LNB). In determining the PFD blocking limit, the Commission uses the −59 dBm saturation limit suggested by the C-Band Alliance which includes an aggregate power factor, the filter's total rejection, the bandwidth of flexible-use service, and a 0 dBi FSS antenna gain. The Commission believes the use of 0 dBi FSS antenna gain is a valid assumption that helps simplify compliance and, for virtually all earth stations of record, provides greater than necessary protection. For the filter mask described above, the Commission has determined the total rejection to be 60.85 dB, for an accelerated Phase I where 3.7 GHz Service use will only operate in the 3.7–3.8 GHz frequency range. In the later Phase II band, the Commission has determined the total rejection to be somewhat greater at 64.46 dB over the full 3.7–4.0 GHz frequency range.[46] Based on these parameters, we adopt a PFD blocking limit of −16 dBW/m²/MHz for both Phase I and Phase II. This PFD applies at the earth station antenna and over the authorized band of operation of the 3.7 GHz Service licensee. The Commission declines to adopt Intelsat's request to set the PFD blocking limit to −30 dBW/m2/MHz, which incorrectly asserts that aggregation was not included in the calculation of the value. The Commission anticipates all stakeholders will work with manufacturers to obtain filters that have better performance characteristics than the baseline minimum specification if they are available. In the event of a claim of harmful interference, the earth station operator must demonstrate that they have installed a filter that complies with the mask described above. If they have not installed such a filter or are unable to make such a demonstration, and the 3.7 GHz Service licensee can confirm it meets the blocking PFD, the earth station operator will have to accept the interference.

[46] The OOBE limit for base stations in the guard band is −13 dBm/MHz.

c. Full Band/Full Arc Protections

349. Once the transition is complete, all FSS earth stations will operate above 4.0 GHz, so the Commission will continue to allow full band/full arc use of that band. The Commission sought comment in the *NPRM* on revising the full band/full arc policy for the C-band and several commenters addressed this matter. For example, the C-Band Alliance proposed limiting the orbital arc of satellites that may serve earth stations in the contiguous United States to 87° W.L. and 139° W.L. The Commission recognizes, however, that the proposal excludes satellites of competing operators that operate outside that arc. While the Commission finds merit in knowing the actual spectrum uses and orientation of earth stations for protection purposes, the Commission finds these merits are outweighed by the need to provide flexibility to earth stations that will be transitioned to operate above 4.0 GHz. Accordingly, the Commission will maintain the existing policy regarding full band/full arc for earth stations above 4.0 GHz.

8. Protection of TT&C Earth Stations

350. The Commission establishes a protection mechanism to allow continued use of the 3.7–4.0 GHz band by space station licensees operating TT&C links until these operations can be moved to other bands. The Commission notes that, for some satellites, TT&C links cannot be moved to other transponders within the satellite, but the earth station location for those TT&C links can be moved. Accordingly, until a replacement satellite can be launched, certain TT&C links will need to continue to operate on a co-channel basis with terrestrial 3.7 GHz Service spectrum.

a. Identification of TT&C Earth Stations To Be Protected and Operations at Protected Sites

351. According to the record, there are 14 unique locations in the contiguous United States where earth stations are currently providing TT&C functions in the C-band. Due to the potential to hinder 3.7 GHz Service deployment around these locations, the C-Band Alliance indicated that these operations could be consolidated into four locations. Specifically, they identified Brewster, WA and Hawley, PA as two locations where consolidated TT&C could be located. C-Band Alliance noted

''[t]he key selection criteria are that any site: (1) Must be located at a sufficient distance from a major urban area or have a terrain profile such that the propagation losses between urban area and the TT&C/Gateway location will be large enough to attenuate Flexible Use base station transmissions to a level that will not unduly impair the Flexible Use licensee's operation in that urban area; (2) must be geographically diverse from the other TT&C/Gateway sites; (3) requires nearby access to major telecommunications points-of-presence; (4) requires some existing FSS infrastructure in place that can be improved upon for new or additional TT&C/Gateway infrastructure; (5) requires unhindered visibility to the geostationary satellite arc to elevation angles as low as 5 degrees; (6) must have sufficient land available to accommodate up to 20 very large (*i.e.,* up to 13m) transmit/receive antennas; (7) must be in an area unaffected by nearby aeronautical traffic; and (8) must be able to be built out (*e.g.,* building permits, zoning requirements) within a 36-month time frame.'' The space station operators must identify the four consolidated TT&C locations as soon as feasible, but not later than the submission of the Transition Plan.[47] Should the incumbent space station operators fail to come to consensus, the Commission expects that SES would identify two locations and Intelsat would identify the other two locations. The Commission's Wireless Telecommunications Bureau will assess the proposed locations, including consideration of the criteria proposed by C-band Alliance, and make a determination as to the reasonableness of the sites. The Wireless Telecommunications Bureau will consider the size of the population that would be affected as well as other factors in their assessment and may require alternative locations if the proposed sites are deemed deficient. Identification of the locations must also include all the technical parameters necessary to assess coexistence such as frequency, authorized bandwidth and specific look angles to existing satellites.

352. To facilitate protection of TT&C links while also transitioning them out of the 3.7 GHz Service band, the Commission will not authorize any new TT&C earth station links in the 3.7 GHz Service band within the contiguous United States unless it is to consolidate existing TT&C links into the selected locations for temporary operation. That is, the Commission will allow until December 5, 2021 to consolidate TT&C links to four protected locations. The Commission may allow existing TT&C operations to continue in their current location beyond the December 5, 2021 deadline either through a waiver request upon a sufficient showing to the International Bureau or through negotiated agreements with affected 3.7 GHz Service licensees. During the transition period prior to December 5, 2021, the space station operators will work to consolidate TT&C sites to four locations and ensure operations are adequately protected through coordination. After that date, operations that are not relocated may continue on an unprotected basis.

353. Further, until December 5, 2030, the Commission will allow protected operation of TT&C operations in the 3.7–4.0 GHz band at the consolidated locations. This should allow sufficient time for replacement satellites to be launched and satisfy the lifespan of existing satellites. After this transition period, these TT&C links may continue to operate on an unprotected basis until the satellites they are communicating with cease operation. The Commission will also allow negotiated agreements for longer operation where relevant parties should be able to arrange operating parameters to coexist to allow early entry by 3.7 GHz Service operations or extended operations by TT&C earth stations.

354. Further, the Commission will allow private negotiation of TT&C sites as well. Given the limited number of TT&C sites, the Commission believes private negotiations between the TT&C station operators and 3.7 GHz Service licensees may permit early entry of 3.7 GHz Service operations or may prolong TT&C operations in instances where these operations are designed to coexist. Alternatively, TT&C operations could negotiate to relocate to another country that is maintaining C-band FSS or a remote shielded location in the United States that is not heavily populated.

355. Lockheed Martin provides Launch and Early Operations Phase (LEOP) missions for new satellites. They state that the earth station, located in Carpentersville, NJ, has a unique topography that ''ensures that interference from the facility is highly unlikely and has historically resulted in no known interference from Lockheed Martin's operations to other users of the band.'' They requested that these LEOP operations be allowed to continue through use of the Commission's Special Temporary Authority (''STA'') licensing mechanism. The Commission agrees that such operations may seek authorization through the STA process.

356. The Commission also finds that earth stations located at TT&C sites may continue to be used—on an unprotected basis—for international gateway and other operations in the 3.7–4.0 GHz band. According to the C-band Alliance, these sites are critical ingestion points for a variety of customer services, including foreign language programming uplinked outside of the U.S, that require the use of the full 3.7–4.2 GHz band. SES contends that operations at these locations should be permitted to continue in the 3.7–4.0 GHz band on a protected basis. Intelsat argues that the Commission should permit FSS operations at designated TT&C sites on a secondary basis.

357. The Commission agrees with NAB and find that it is in the public interest to allow earth stations located at the four designated TT&C sites to continue to use the 3.7–4.0 GHz band for international gateway, and other purposes, on an unprotected basis during the TT&C transition period. Such uses will not cause harmful interference to terrestrial deployments in the band and will not be protected from harmful interference. As such, permitting these operations will not affect future deployments by flexible use licensees or delay the transition of the band. Extending interference protection to these operations, as requested by SES and C-band Alliance, could effectively preclude terrestrial operations across a wide geographic area near each TT&C facility across the entire 3.7–4.0 GHz band. This outcome would be inconsistent with the Commission's goals for this proceeding and the transition plan detailed herein.

358. The Commission declines to adopt Disney and Eutelsat's requests to allow secondary or unprotected FSS operations in the 3.7–4.0 GHz band nationwide. Expanding FSS access to the 3.7–4.0 GHz band during the transition period—even on an unprotected basis—could introduce uncertainty into the transition process and raise doubts about the availability of the band for new flexible use services. Such uses also create a perverse incentive for space station operators and earth station operators not to complete their transition work on schedule—leading to potential harmful interference or delays in making the spectrum available for next-generation services like 5G. In contrast, the Commission agrees with NAB that these operations should be permitted to continue in the 3.7–4.0 GHz band on an

[47] X2nSat requests that the Commission designate the TT&C site located in Las Cruces, New Mexico as one of the four protected TT&C sites. X2nSat Feb. 13, 2020 Ex Parte at 1. We decline the invitation because X2nSat's arguments do not address the key criteria we expect the space station operators will use to make their selections.

unprotected basis at designated TT&C sites during the 10-year TT&C transition period, or longer if agreements can be negotiated with terrestrial wireless operators. If all of the overlay licensees in the relevant PEA(s) agree that extending the use of any or all of these four TT&C sites for FSS operations is the highest and best use of the spectrum in the area, the Commission finds no public policy justification to intervene in such a voluntary transaction and second-guess the market.

b. Co-Channel Protection Criteria

359. TT&C earth stations perform a critical function in maintaining space station operations. While these operations need adequate protection, their operations will have a direct impact on the ability of mobile broadband services to operate on the same spectrum. The Commission adopted a single out-of-band emissions PFD level for protecting FSS earth stations above 4.0 GHz due to the large number of earth stations and the fact that many earth station operators lack sufficient technical skills to perform engineering analysis of potential interference sources. The PFD limit that the Commission adopted for earth stations necessarily relied on assumptions of some parameters such as noise temperature and elevation angle. TT&C operations have a wider range of variability in some of these key parameters and previous assumptions may no longer be sufficient. Given that there are few TT&C locations to be protected, it is possible to do more detailed analysis specific to each site's particular parameters. The Commission finds that a protection criteria of I/N = −6 dB is appropriate for TT&C links, as we did for the FSS earth stations described above. The 3.7 GHz Service licensee must ensure that the aggregated power from its operations will meet an I/N of −6 dB as received by the TT&C earth station. The Commission will require 3.7 GHz Service licensees to coordinate their operations within 70 km of TT&C earth stations that continue to operate in the 3.7–3.98 GHz band.

360. The Commission's decision to coordinate actual parameters for TT&C deployments is supported by many factors in the record. For example, a significant factor in the distance over which coordination is needed is the elevation angle in which the earth station is pointed. Several commenters pushed for limiting protections based upon a minimum elevation angle in order to reduce the distance from the earth station in which 3.7 GHz Service operations must coordinate. The Commission agrees that TT&C links are highly unlikely to conduct normal operations at such low elevation angles because control signals need a much higher degree of reliability than other traffic.[48] But if a low elevation angle is unavoidable, an operator may be able to use technical solutions to achieve the necessary reliability. It is understood that low elevation angles may be needed during infrequent events such as the loss of a satellite.

361. Further, because there are fewer TT&C earth stations, and they are run by highly qualified technical staff, a coordination process that takes into account terrain, shielding, polarization and other technical parameters will result in adequate earth station protection and permit terrestrial use at a closer distance. The space station operators who manage TT&C links are sophisticated users with internal engineering resources. Reliance on the Commission's typical prior coordination process would be the simplest and most thorough approach. 3.7 GHz Service licensees are expected to take all practical steps necessary to minimize the risk of harmful interference to TT&C operations. Licensees will cooperate in good faith and make reasonable efforts to anticipate and resolve technical problems that may inhibit effective and efficient use of the spectrum. Licensees of stations suffering or causing harmful interference are expected to cooperate and resolve the problem by mutually satisfactory arrangements. If the licensees are unable to do so, the Commission may impose restrictions including specifying the transmitter power, antenna height, or area or hours of operation of the stations concerned. Any 3.7 GHz Service licensee with base stations located within the appropriate coordination distance is required to provide upon request an engineering analysis to the TT&C operator to demonstrate their ability to comply with the −6 dB I/N criteria. Both parties are expected to negotiate in good faith. If a dispute arises, either party can bring the issue to the FCC. Further, the Commission is only providing protection for TT&C operations. Other services or content that are capable of moving to different transponders must be moved above 4.0 GHz or other FSS bands unless parties negotiate other arrangements.

362. To minimize the impact of this coordination requirement, the Commission advises that the protection criteria will be applied only for the frequencies, bandwidths and look angles that will be in use at each TT&C site, not full band or full arc. For its purposes here, the Commission defines co-channel operations as when any of the 3.7 GHz Service licensee's authorized frequencies are separated from the center frequency of the TT&C earth station by less than 150% of the maximum emission bandwidth in use by the TT&C operation. They must continue to be protected over the bandwidth that they use. While this definition affords co-channel protection over more bandwidth than is in use, it is reasonable to allow for graduated receiver selectivity outside of the desired channel. The record is clear that the actual parameters of earth stations make a significant difference in the coordination process and the Commission does not feel it is justified to preclude 3.7 GHz Service operations by coordinating frequencies or look angles that are not being used. Unlike the typical conventional FSS earth station operator, TT&C earth station operators are aware of the precise engineering antenna patterns, look angles, noise temperature, and other specifications that allow a detailed coordination process to efficiently protect TT&C functions and allow 3.7 GHz Service operations at a safe distance, which can provide better margin for their robust operations.

363. The Commission agrees with commenters asserting that a 150 km coordination distance is overly conservative and instead, the Commission sets a co-channel coordination distance of 70 km for all TT&C operations. First, the Commission notes that it is allowing coordination based on the parameters of the TT&C's actual operations and finds it highly unlikely that the relevant TT&C locations will be pointed at the horizon presenting a burdensome coordination process with multiple terrestrial licensees for a scenario that is highly unlikely. Further, a 150 km coordination would complicate 3.7 GHz Service deployment for several licensees, many of whom would have an unlikely chance of having any impact on TT&C operations, especially due to their consolidation to areas with terrain shielding and other protective factors. Further, should any interference to a protected TT&C location occur, we require parties to act in good faith to resolve the interference.

c. Adjacent Channel Protection Criteria

364. To protect TT&C earth stations from adjacent channel interference due

[48] *See, e.g.,* Recommendation ITU–R S.1716, Performance and availability objectives for fixed-satellite service telemetry, tracking and command systems, at 1 (TT&C carriers need higher performance reliability objectives than normal traffic carriers) (2005), *https://www.itu.int/rec/R-REC-S.1716.*

to out-of-band emissions, the Commission set the same interference protection criteria of −6 dB I/N ratio. This limit will apply to all emissions removed from the TT&C's center frequency by more than 150% of the TT&C's necessary emission bandwidth. Prior coordination is not required for adjacent channel licenses. Both 3.7 GHz Service licensees and TT&C earth station operators are expected to cooperate in good faith and make reasonable efforts to anticipate and resolve technical problems that may inhibit effective and efficient use of the spectrum. The TT&C operators should make available pertinent technical information about their systems upon request by the 3.7 GHz Service licensees. Licensees of stations suffering or causing harmful interference are expected to cooperate and resolve the problem by mutually satisfactory arrangements.

365. To provide protection from potential receiver overload, the Commission will require base stations and mobiles to meet a PFD limit of −16 dBW/m²/MHz, as measured at the TT&C earth station antenna. This blocking limit applies to all emissions within the 3.7 GHz Service licensee's authorized band of operation. This is the same limit that is applied to other earth stations as described above and for the same reasons. All TT&C earth stations will be protected based on the assumption that robust filters have been installed at the facilities, like other FSS earth stations. Because the bandwidth of the TT&C emission can vary, this filter will have to be custom fit for each earth station. The quality should be just as robust, providing a minimum of 60 dB of rejection. The frequency at which the TT&C filter must meet this 60 dB of rejection will vary with the bandwidth. The Commission expects that the filter should meet 60 dB of rejection for all frequencies removed from the TT&C's center frequency by more than 150% of the TT&C's emission bandwidth, both above and below the TT&C channel. Further, the filter should provide 70 dB of rejection for all frequencies removed from the TT&C's center frequency by more than 250% of the TT&C's emission bandwidth, both above and below. Intelsat now claims that the protected bandwidth on both sides of the TT&C's telemetry signal must be at least 25 megahertz. But given that TT&Cs typically use a channel bandwidth of 400 to 800 kilohertz, the Commission finds this claim to be excessive. In the event of a claim of harmful interference, the earth station operator must demonstrate that they have installed a filter that complies with the mask described above. If they have not installed such a filter or are unable to make such a demonstration, and the 3.7 GHz Service licensee can confirm it meets the PFD, the TT&C operator will have to accept the interference.

9. Coexistence With Aeronautical Radionavigation

366. The nearby 4.2–4.4 GHz band is allocated to Aeronautical Radionavigation and aeronautical mobile (route) services worldwide.[49] This band is home to radio altimeters and Wireless Avionics Intra-Communications systems used on aircraft and helicopters worldwide. Radio altimeters are critical aeronautical safety-of-life systems primarily used at altitudes under 2500 feet above ground level (AGL) and must operate without harmful interference. Wireless Avionics Intra-Communications systems provide communications over short distances between points on a single aircraft and are not intended to provide air-to-ground communications or communications between two or more aircraft.

367. By licensing only up to 3.98 GHz as flexible-use spectrum, the Commission is providing a 220-megahertz guard band between new services in the lower C-band and radio altimeters and Wireless Avionics Intra-Communications services operating in the 4.2–4.4 GHz band. This is double the minimum guard band requirement discussed in initial comments by Boeing and ASRC.

368. A set of preliminary test results prepared by the Aerospace Vehicle Systems Institute was provided to the Commission after the comment and reply period. AVSI's study simulated an aggregate 5G emission for various amounts of allocated spectrum and measured the received power level at which the accuracy of height measurements exceeds certain criteria. In one scenario, AVSI modeled a worst-case scenario with an aircraft altimeter operating at 200 feet AGL, with numerous other altimeters nearby creating in-band interference and aggregate base station emissions across the 3.7 to 4.0 GHz band. The preliminary results show that there may be a large variation in radio altimeter receiver performance between different manufacturers. The measured PSD levels at which errors occurred ranged from −21 to −51 dBm/MHz for the various types of altimeters that were tested. AVSI concluded that ''most of the altimeters reported broadly consistent susceptibility to OoBI PSD levels until more than approximately 200 to 250 MHz of OoBI was introduced.'' AVSI noted that as the amount of active spectrum increased above 3.9 GHz, the acceptable levels of PSD began to decrease.

369. T-Mobile commissioned a study by Alion to review the AVSI report and they raised several concerns. Alion noted that AVSI's analysis identified levels of interference where performance degradation occurred, but did not investigate whether these levels would occur in any reasonable scenario. Alion questioned the interference margin assumptions, noting that two of the initial altimeters types failed due to interference from other altimeters and the scenario had to be adjusted. They also questioned the simulated waveform for the 5G emissions, which showed flat out-of-band emissions approximately 40 dB below the carrier. Alion noted that emissions naturally decrease with frequency separation and concluded that the simulated emission ''would not comply with the emission limits for virtually any services associated with a base station or fixed station governed by FCC rules: part 27 services, part 27.53 or part 96 services.''

370. The Commission agrees with T-Mobile and Alion that the AVSI study does not demonstrate that harmful interference would likely result under reasonable scenarios (or even reasonably ''foreseeable'' scenarios to use the parlance of AVSI). The Commission finds the limits it sets for the 3.7 GHz Service are sufficient to protect aeronautical services in the 4.2–4.4 GHz band. Specifically, the technical rules on power and emission limits the Commission sets for the 3.7 GHz Service and the spectral separation of 220 megahertz should offer all due protection to services in the 4.2–4.4 GHz band. The Commission nonetheless agrees with AVSI that further analysis is warranted on why there may even be a potential for some interference given that well-designed equipment should not ordinarily receive any significant interference (let alone harmful interference) given these circumstances. As such, the Commission encourages AVSI and others to participate in the multi-stakeholder group that the Commission expects industry will set up—and as requested by AVSI itself. The Commission expects the aviation industry to take account of the RF environment that is evolving below the 3980 MHz band edge and take

[49] World Radio Conference-15 added a primary aeronautical mobile (route) service (AM(R)S) allocation to the 4.2–4.4 GHz band in all ITU Regions, and adopted footnote 5.436, which reserves the use of this allocation exclusively for wireless avionics intra-communications systems.

appropriate action, if necessary, to ensure protection of such devices.

10. Coexistence With the Citizens Broadband Radio Service

371. The Commission does not require dynamic spectrum management or other protection mechanisms suggested by some to protect the Citizens Broadband Radio Service (operating below 3.7 GHz) or FSS operations (in the 4.0–4.2 GHz band) from new 3.7 GHz Service operations. Although some commenters support the use of some form of dynamic spectrum management or an automated coordination capability to mitigate interference from new 3.7 GHz Service operations into the 3.55–3.7 GHz band, the Commission finds such provisions are unwarranted in this instance and could hinder efficient 5G deployment in the band. Specifically, the Commission notes that the dynamic management approach is needed in the Citizens Broadband Radio Service to coordinate access between Priority Access Licensees and General Authorized Access users and to prevent interference to incumbent Federal and non-Federal operations. The same considerations are not present in the 3.7–4.2 GHz band and the transition and licensing approach the Commission adopts for introducing 3.7 GHz Service to the 3.7–3.98 GHz band is appropriate for the unique circumstances and anticipated use cases for the band. Further, the Commission denies requests that it require coordination between Citizens Broadband Radio Service and 3.7 GHz Service operations, but it encourages parties to explore synchronization of TDD operations to minimize interference between these adjacent services.

372. The Commission finds that 3.7 GHz Service operations above 3.7 GHz can coexist with operations below the band edge. First, the Commission notes that the emission limits it is adopting are consistent with other mobile service bands that have proven successful in coexisting with a variety of adjacent services. Further, the flexible nature of the equipment that will likely operate in the Citizens Broadband Radio Service band and the advanced spectrum management capabilities of the SAS should allow flexibility to access different channels in any location that might be near a higher-powered 3.7 GHz Service tower or make opportunistic use of different channels in different areas. Further, in some instances, operations above and below the 3.7 GHz band edge may be synchronized when they are deployed as part of a carrier's network. Synchronization of two different carriers can be implemented using traditional 3GPP methods based on an absolute timing reference.

IV. Final Regulatory Flexibility Analysis

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

373. In the *Report and Order and Order of Proposed Modification* (*Report and Order*), the Commission expands on its efforts to close the digital divide and secure U.S. leadership in the next generation of wireless services, including fifth-generation (5G) wireless and other advanced spectrum-based services by making the 3.7–3.98 GHz band available for flexible terrestrial wireless use. The Commission adopts new rules for this band that are designed to achieve four key goals: (1) Make a significant amount of spectrum available for flexible use, including 5G services; (2) ensure that a significant amount of that spectrum is made available quickly so it can be used in upcoming 5G deployments; (3) recover for the public a portion of the value of this public spectrum resource; and (4) ensure the continuous and uninterrupted delivery of services currently offered in the 3.7–4.2 GHz band (C-band). Specifically, the Commission makes 280 MHz of spectrum available on a national basis through an auction conducted by the Commission. Because this band is prime spectrum for next generation wireless services, this action will serve as a critical step in advancing United States leadership in 5G and in implementing the Commission's comprehensive strategy to Facilitate America's Superiority in 5G Technology (the 5G FAST Plan). At the same time, the Commission adopts rules to accommodate incumbent Fixed Satellite Service and Fixed Services operations in the band, enabling those operators to have continuous and uninterrupted delivery of the same video programming and other content that they do today.

374. The 3.7–4.2 GHz band currently is allocated in the United States exclusively for non-Federal use on a primary basis for Fixed Satellite Service (FSS) and Fixed Service. For FSS, the 3.7–4.2 GHz band (space-to-Earth or downlink) is paired with the 5.925–6.425 GHz band (Earth-to-space or uplink), and collectively these bands are known as the ''conventional C-band.'' Domestically, space station operators use the 3.7–4.2 GHz band to provide downlink signals of various bandwidths to licensed transmit-receive, registered receive-only, and unregistered receive-only earth stations throughout the United States. FSS operators use this band to deliver programming to television and radio broadcasters throughout the country and to provide telephone and data services to consumers. The 3.7–4.2 GHz band is also used for reception of telemetry signals transmitted by satellites, typically near the edges of the band, *i.e.,* at 3.7 GHz or 4.2 GHz.

375. The *Report and Order* expands on the Commission's efforts to open up mid-band spectrum by making the 3.7–3.98 GHz band available for flexible-use wireless services. The Commission adds a mobile, except aeronautical mobile, allocation to the 3.7–4.0 GHz band. The Commission also adopts a process to transition this 280 megahertz of spectrum from incumbent use to new flexible-use by December 5, 2025, with accelerated relocation payment options for space station operators that serve earth stations in the contiguous United States to accelerate this transition in two stages: (1) 100 megahertz (3.7–3.8 GHz) by December 5, 2021 and (2) all 280 megahertz by December 5, 2023. In both cases, the space station operators would clear an additional 20 megahertz to be used as a guard band. The Commission adopts relocation and accelerated relocation payment rules including rules establishing an independent Relocation Payment Clearinghouse to oversee the cost-related aspects of the transition, as well as a Relocation Coordinator to ensure that all incumbent space station operators are relocating in a timely manner and ensure uninterrupted service during and following the transition. The Commission adopts service and technical rules for flexible-use licensees in the 280 megahertz of spectrum designated for transition to flexible use.

376. Adopting a primary non-Federal mobile, except aeronautical mobile, allocation to the 3.7–3.98 GHz band will foster more efficient and intensive use of mid-band spectrum to facilitate and incentivize investment in next generation wireless services. Mid-band spectrum is ideal for next generation wireless broadband service due to its favorable propagation and capacity characteristics. Allocating the 3.7–3.98 GHz band for mobile services will also address the Commission's mandate under the MOBILE NOW Act to identify spectrum for mobile and fixed wireless broadband use. In addition, adopting this allocation will harmonize the Commission's allocations for the 3.7–4.0 GHz band with international allocations. The Commission's plan will ensure that content that FSS now delivers to incumbent earth stations will continue uninterrupted.

B. Summary of Significant Issues Raised by Public Comments in Response to the IRFA

377. 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

378. 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.

379. 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

380. 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. The RFA generally defines the term ''small entity'' as having the same meaning as the terms ''small business,'' ''small organization,'' and ''small governmental jurisdiction.'' In addition, the term ''small business'' has the same meaning as the term ''small business concern'' under the Small Business Act.'' A ''small business concern'' is one which: (1) Is independently owned and operated; (2) is not dominant in its field of operation; and (3) satisfies any additional criteria established by the SBA.

381. *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. 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. These types of small businesses represent 99.9% of all businesses in the United States, which translates to 30.7 million businesses.

382. 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.'' The Internal Revenue Service (IRS) uses a revenue benchmark of $50,000 or less to delineate its annual electronic filing requirements for small exempt organizations. Nationwide, for tax year 2018, there were approximately 571,709 small exempt organizations in the U.S. reporting revenues of $50,000 or less according to the registration and tax data for exempt organizations available from the IRS.

383. 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.'' U.S. Census Bureau data from the 2017 Census of Governments indicate that there were 90,075 local governmental jurisdictions consisting of general purpose governments and special purpose governments in the United States. Of this number, there were 36,931 general purpose governments (county, municipal and town or township) with populations of less than 50,000 and 12,040 special purpose governments—independent school districts with enrollment populations of less than 50,000. Accordingly, based on the 2017 U.S. Census of Governments data, we estimate that at least 48,971 entities fall into the category of ''small governmental jurisdictions.''

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

385. *Satellite Telecommunications.* This category comprises firms ''primarily engaged in providing telecommunications services to other establishments in the telecommunications and broadcasting industries by forwarding and receiving communications signals via a system of satellites or reselling satellite telecommunications.'' Satellite telecommunications service providers include satellite and earth station operators. The category has a small business size standard of $35 million or less in average annual receipts, under SBA rules. For this category, U.S. Census Bureau data for 2012 show that there were a total of 333 firms that operated for the entire year. Of this total, 299 firms had annual receipts of less than $25 million. Consequently, we estimate that the majority of satellite telecommunications providers are small entities.

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

386. The Commission expects the rules adopted in the *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. In addition to the rule changes associated with transitioning the band through the approach adopted in the *Report and Order,* there are new service rule compliance obligations. New licensees in the 3.7–3.98 GHz band will have to meet various service rules, including construction benchmarks and technical operating requirements. In the event a small entity obtains licenses through auction, the small entity licensee would be required to satisfy construction requirements, operate in compliance with technical rules (*e.g.,* power, out of band emissions, and field strength limits), and may have to coordinate with incumbent FSS operations in limited instances. Small entity licensees would be responsible for making certain construction demonstrations with the Commission through the Universal Licensing System showing that they have satisfied the relevant construction benchmarks.

387. All filing, recordkeeping and reporting requirements adopted in the *Report and Order,* including professional, accounting, engineering or survey services used in meeting these requirements will be the same for small and large entities that intend to utilize these new 3.7 GHz Service licenses. To the extent having the same requirements for all licensees results in the costs of complying with the rules being relatively greater for smaller entities than for large ones, these costs are necessary to effectuate the purpose of the Communications Act, namely to further the efficient use of spectrum, to

prevent spectrum warehousing and are necessary to promote fairness. Likewise, compliance with the service and technical rules and coordination requirements are necessary for the furtherance of the goals of protecting the public while also providing interference free services. Small entities must therefore comply with these rules and requirements. The Commission believes however, that small entities will benefit from having more information about opportunities in the 3.7–3.98 GHz band, more flexibility to provide a wider range of services, and more options for gaining access to wireless spectrum.

388. In order to comply with the rule changes adopted in the *Report and Order,* small entities may be required to hire attorneys, engineers, consultants, or other professionals. While the Commission cannot quantify the cost of compliance with the rule changes, we note that several of the rule changes are consistent with and mirror existing policies and requirements used for other part 27 flexible-use licenses. Therefore, small entities with existing licenses in other bands may already be familiar with such policies and requirements and have the processes and procedures in place to facilitate compliance resulting in minimal incremental costs to comply with our requirements for the 3.7–4.2 GHz band. The recordkeeping, reporting and other compliance obligations for small entities and other licensees are described below.

389. *Designated Entity Provisions.* The Commission adopts the proposal to apply the two small business definitions with higher gross revenues thresholds to auctions of overlay licenses in the 3.7–3.98 GHz band. Accordingly, an entity with average annual gross revenues for the relevant preceding period not exceeding $55 million will qualify as a ''small business,'' while an entity with average annual gross revenues for the relevant preceding period not exceeding $20 million will qualify as a ''very small business.'' Since their adoption in 2015, the Commission has used these gross revenue thresholds in auctions for licenses likely to be used to provide 5G services in a variety of bands. The results in these auctions indicate that these gross revenue thresholds have provided an opportunity for bidders claiming eligibility as small businesses to win licenses to provide spectrum-based services at auction. These thresholds do not appear to be overly inclusive as a substantial number of qualified bidders in these auctions do not come within the thresholds. This helps preclude designated entity benefits from flowing to entities for which such credits are not necessary.

390. The Commission also adopts the proposal to provide qualifying ''small businesses'' with a bidding credit of 15% and qualifying ''very small businesses'' with a bidding credit of 25%, consistent with the standardized schedule in part 1 of the rules. This proposal was modeled on the small business size standards and associated bidding credits that the Commission adopted for a range of other services. The Commission believes that use of the small business tiers and associated bidding credits set forth in the part 1 bidding credit schedule will provide consistency and predictability for small businesses.

391. *Rural Service Providers.* In the *NPRM,* the Commission also sought comment on a proposal to offer a bidding credit for rural service providers. The rural service provider bidding credit awards a 15% bidding credit to those that service predominantly rural areas and that have fewer than 250,000 combined wireless, wireline, broadband and cable subscribers. As a general matter, the Commission ''has made closing the digital divide between Americans with, and without, access to modern broadband networks its top priority . . . [and is] committed to ensuring that all Americans, including those in rural areas, Tribal lands, and disaster-affected areas, have the benefits of a high-speed broadband connection.'' In this proceeding, a variety of organizations and associations that in turn represent the providers that serve the most rural and sparsely populated areas of the country have come together to stress that ''rules [for bringing this spectrum to market] should balance the competing needs of interested parties and offer meaningful opportunities for providers of all kinds and sizes to offer spectrum-based services to rural consumers.''

392. *Licensing and Operating Rules.* The Commission adopts licensing and operating rules that afford licensees the flexibility to align licenses in the 3.7–3.98 GHz band with licenses in other spectrum bands governed by part 27 of the Commission's rules and other flexible-use services. Specifically, the Commission adopts rules requiring 3.7 GHz Service licensees in the 3.7–3.98 GHz band to comply with licensing and operating rules that are similar to all part 27 services, including flexible use, regulatory status, foreign ownership reporting, compliance with construction requirements, renewal criteria, permanent discontinuance of operations, partitioning and disaggregation, and spectrum leasing.

393. *Application Requirements and Eligibility.* Licensees in the A, B, and C blocks must comply with the Commission's general application requirements. Further, the Commission adopts an open eligibility standard for licenses in the A, B, and C Blocks. The Commission has determined that eligibility restrictions on licenses may be imposed only when open eligibility would pose a significant likelihood of substantial harm to competition in specific markets and when an eligibility restriction would be effective in eliminating that harm.

394. *Mobile Spectrum Holdings.* The Commission does not impose a pre-auction bright-line limit on acquisitions of the 3.7–3.98 GHz band. Instead, the Commission will incorporate into the spectrum screen the 280 megahertz of spectrum that the Commission makes available in the 3.7–3.98 GHz band. The Commission will also perform case-by-case review of the long-form license applications filed as a result of the auction. In regard to mobile spectrum holdings, the Commission will include the A, B, and C Blocks of the 3.7–3.98 GHz band in the screen for secondary market transactions because the spectrum will become ''suitable and available in the near term for the provision of mobile telephony/broadband services.'' The Commission will add the 280 megahertz of spectrum to the screen once the auction closes.

395. *Mobile or Point-to-Multipoint Performance Requirements.* The Commission concludes that licensees in the A, B, and C Blocks offering mobile or point-to-multipoint services must provide reliable signal coverage and offer service to at least 45% of the population in each of their license areas within eight years of the license issue date (first performance benchmark), and to at least 80% of the population in each of their license areas within 12 years from the license issue date (second performance benchmark).

396. *Alternate IoT Performance Requirements.* The Commission recognized in the *NPRM* that 3.7–3.98 GHz licenses have flexibility to provide services potentially less suited to a population coverage metric. Therefore, the Commission sought comment on an alternative performance benchmark metric for licensees providing IoT-type fixed and mobile services. Based on the record evidence, the Commission will allow licenses in the A, B, and C Blocks offering IoT-type services to provide geographic area coverage of 35% of the license area at the first (eight-year) performance benchmark, and geographic area coverage of 65% of the license area at the second (12-year) performance benchmark.

397. *Fixed Point-to-Point under Flexible Use Performance Requirements.* The Commission adopts a requirement that part 27 geographic area licensees providing Fixed Service in the A, B, and C Blocks band must demonstrate within eight years of the license issue date (first performance benchmark) that they have four links operating and providing service, either to customers or for internal use, if the population within the license area is equal to or less than 268,000. If the population within the license area is greater than 268,000, the Commission requires a licensee relying on point-to-point service to demonstrate it has at least one link in operation and providing service, either to customers or for internal use, per every 67,000 persons within a license area. The Commission requires licensees relying on point-to-point service to demonstrate within 12 years of the license issue date (final performance benchmark) that they have eight links operating and providing service, either to customers or for internal use, if the population within the license area is equal to or less than 268,000. If the population within the license area is greater than 268,000, the Commission requires a licensee relying on point-to-point service to demonstrate it is providing service and has at least two links in operation per every 67,000 persons within a license area.

398. *Penalty for Failure to Meet Performance Requirements.* Along with performance benchmarks, the Commission adopts meaningful and enforceable penalties for failing to ensure timely build-out. Specifically, as proposed in the *NPRM,* the Commission adopts a rule requiring that, in the event a licensee in the A, B, or C Block fails to meet the first performance benchmark, the licensee's second benchmark and license term would be reduced by two years, thereby requiring it to meet the second performance benchmark two years sooner (at 10 years into the license term) and reducing its license term to 13 years. If a licensee fails to meet the second performance benchmark for a particular license area, its authorization for each license area in which it fails to meet the performance requirement shall terminate automatically without Commission action.

399. *Compliance Procedures.* In addition to compliance procedures applicable to all part 27 licensees, including the filing of electronic coverage maps and supporting documentation, the Commission adopts a rule requiring that such electronic coverage maps must accurately depict both the boundaries of each licensed area and the coverage boundaries of the actual areas to which the licensee provides service. As proposed in the *NPRM,* the rule the Commission is adopting requires measurements of populations served on areas no larger than the Census Tract level so a licensee deploying small cells has the option to measure its coverage using a smaller acceptable identifier such as a Census Block. Each licensee also must file supporting documentation certifying the type of service it is providing for each licensed area within its service territory and the type of technology used to provide such service. Supporting documentation must include the assumptions used to create the coverage maps, including the propagation model and the signal strength necessary to provide reliable service with the licensee's technology.

400. *License Renewal.* As proposed in the *NPRM,* the Commission will apply the general renewal requirements applicable to all Wireless Radio Services (WRS) licensees to 3.7–3.98 GHz band licensees in the A, B, and C Blocks. This approach will promote consistency across services.

401. *Renewal Term Construction Obligation.* In addition to, and independent of, these general renewal provisions, the Commission finds that any additional renewal term construction obligations adopted in the *Wireless Radio Services Renewal Reform* proceeding would apply to licenses in the A, B, and C Blocks of the 3.7–3.98 GHz band.

402. *New Earth Stations.* On April 19, 2018, the staff released the *Freeze and 90-Day Earth Station Filing Window Public Notice,* which froze applications for new or modified earth stations in the 3.7–4.2 GHz band to preserve the current landscape of authorized operations pending action as part of the Commission's ongoing inquiry into the possibility of permitting mobile broadband use and more intensive fixed use of the band through this proceeding. Given the Commission's decision to limit FSS operations in the 3.7–4.0 GHz band in the contiguous United States but not elsewhere, the Commission converts the freeze for new FSS earth stations in the 3.7–4.0 GHz band in the contiguous United States into an elimination of the application process for registrations and licenses for those operations, and the Commission lifts the freeze for new FSS earth stations in the 3.7–4.2 GHz band outside of the contiguous United States as of the publication date of the Report and Order. Earth stations registered after the filing freeze is lifted will not be considered incumbent earth stations and will not qualify for reimbursement of relocation costs. Further, any new registered earth stations outside of the contiguous United States may not claim protection from harmful interference from new flexible-use licensees in the contiguous United States.

403. The Commission revises the part 25 rules such that applications for 3.7–4.0 GHz band earth station licenses or registrations in the contiguous United States will no longer be accepted. Limiting, as described, the registration of new earth stations in spectrum being transitioned to primary terrestrial use will provide a stable spectral environment for more intensive terrestrial use of 3.7–3.98 GHz and facilitate the rapid transition to terrestrial use.

404. With respect to registered incumbent earth stations that are transitioned to the 4.0–4.2 GHz band, the Commission will permit these earth stations to be renewed and/or modified to maintain their operations in the 4.0–4.2 GHz band. The Commission will not, however, accept applications for new earth stations in the 4.0–4.2 GHz portion of the band for the time being, during this transition period.

405. *Relocation and Accelerated Relocation Payments.* New overlay licensees must pay their share of relocation and accelerated relocation payments to reimburse incumbents for the reasonable costs of transitioning out of the lower 300 megahertz of the C-band in the contiguous United States. Based on the unique circumstances of the band, the Commission also finds it necessary to condition new licenses on making acceleration payments to satellite incumbents that voluntarily choose to clear the band on an expedited schedule. Like relocation payments, the Commission finds that requiring such mandatory payments is both in the public interest and within the Commission's Title III authority.

406. *Sunsetting Incumbent Point-to-Point Fixed Services.* Incumbent licensees of temporary fixed and permanent point-to-point Fixed Service links will have until December 5, 2023, to self-relocate their point-to-point links out of the 3.7–4.2 GHz band. The Commission also revises its part 101 rules to specify that no applications for new point-to-point Fixed Service will be granted in the contiguous United States.

407. *Relocation Reimbursement and Cost Sharing for Point-to-Point Fixed Services.* Incumbent licensees of permanent point-to-point Fixed Service links that self-relocate out of the band within December 5, 2023 shall be eligible for reimbursement of their reasonable costs based on the well-established ''comparable facilities''

standard used for the transition of microwave links out of other bands. Similar to the Commission's approach for earth station clearing, because fixed service relocation affects spectrum availability on a local basis, all flexible-use licensees in a PEA where an incumbent Fixed Service licensee self-relocated will share in the reimbursement of these reasonable costs on a *pro rata* basis. Incumbent Fixed Service licensees will be subject to the same demonstration requirements and reimbursement administrative provisions as those adopted above for incumbent earth station operators.

408. *Power Levels for Base Station Power.* To support robust deployment of next-generation mobile broadband services, the Commission will allow base stations in non-rural areas to operate at power levels up to 1640 watts per megahertz EIRP. In addition, consistent with other broadband mobile services in nearby bands (AWS–1, AWS–3, AWS–4 and PCS), the Commission will permit base stations in rural areas to operate with double the non-rural power limits (3280 watts per megahertz) in rural areas. The Commission extends the same power density limit to emissions with a bandwidth less than one megahertz to facilitate uniform power distribution across a licensee's authorized band regardless of whether wideband or narrowband technologies are being deployed.

409. *Power Levels for Mobile Power.* The Commission adopts a 1 Watt (30 dBm) EIRP power limit for mobile devices, as proposed in the *NPRM.*

410. *Base Station Out-of-band Emissions.* The Commission adopts base station out-of-band emission (OOBE) requirements based on the proposed limits, which are similar to other AWS services. Specifically, base stations will be required to suppress their emissions beyond the edge of their authorization to a conducted power level of −13 dBm/MHz. For base station OOBE, we apply the part 27 measurement procedures and resolution bandwidth that are used for AWS devices outlined in section 27.53(h). Specifically, a resolution bandwidth of 1 megahertz or greater will be used; except in the 1 megahertz bands immediately outside and adjacent to the licensee's frequency block where a resolution bandwidth of at least 1% of the emission bandwidth may be employed.

411. *Mobile Out-of-Band Emissions.* As with base station out-of-band emission limits, the Commission adopts mobile emission limits similar to the standard emission limits that apply to other mobile broadband services. Specifically, mobile units must suppress the conducted emissions to no more than −13 dBm/MHz outside their authorized frequency band. We adopted a relaxation of the emission limit within the first five megahertz of the channel edge by varying the resolution bandwidth used when measuring the emission. For emissions within 1 MHz from the channel edge, the minimum resolution bandwidth will be either one percent of the emission bandwidth of the fundamental emission of the transmitter or 350 kHz. In the bands between one and five megahertz removed from the licensee's authorized frequency block, the minimum resolution bandwidth will be 500 kHz. The relaxation will not affect the interference to FSS above 4.0 GHz. The relaxation will be entirely contained within the 20 MHz guard band. The effect on CBRS operations below 3.7 GHz should be minimal.

412. *Antenna Heights Limit.* The Commission adopts the proposal not to restrict antenna heights for 3.7–3.98 GHz band operations beyond any requirements necessary to ensure air navigation safety. This is consistent with part 27 AWS rules, which generally do not impose antenna height limits on antenna structures.

413. *Service Area Boundary Limit.* The Commission adopts the −76 dBm/m2/MHz power flux density (PFD) limit at a height of 1.5 meters above ground at the border of the licensees' service area boundaries as proposed in the NPRM and also permits licensees operating in adjacent geographic areas to voluntarily agree to higher levels at their common boundaries.

414. *International Boundary Requirements.* The Commission adopts the proposal to apply section 27.57(c) of the rules, which requires all part 27 operations to comply with international agreements for operations near the Mexican and Canadian borders.

415. *Other Part 27 Rules.* The Commission adopts several additional technical rules applicable to all part 27 services, including sections 27.51 (Equipment authorization), 27.52 (RF safety), 27.54 (Frequency stability), and part 1, subpart BB of the Commission's rules (Disturbance of AM Broadcast Station Antenna Patterns) for operations in the 3.7–3.98 GHz band. The Commission requires client devices to be capable of operating across the entire 3.7–3.98 GHz band. Specifically, the Commission adds the 3.7–3.98 GHz band to section 27.75, which requires mobile and portable stations operating in the 600 MHz band and certain AWS–3 bands to be capable of operating across the relevant band using the same air interfaces that the equipment uses on any frequency in the band. This requirement does not require licensees to use any particular industry standard.

416. *Protection from Out of Band Emissions.* The Commission adopts a PFD limit to protect registered FSS earth stations from out of band emissions from 3.7 GHz Service operations. For base and mobile stations operating in the 3.7–3.98 GHz band, the Commission adopts a PFD limit of −124 dBW/m^2/MHz, as measured at the antenna of registered FSS earth stations. 3.7 GHz Service licensees will be obligated to ensure that the PFD limit at FSS earth stations is not exceeded by base and mobile station emissions, which may require them to limit mobile operations when in the vicinity of an earth station receiver.

417. *Protection from Receiver Blocking.* The Commission will require base stations and mobiles to meet a PFD limit of −16 dBW/m^2/MHz, as measured at the earth station antenna for all registered FSS earth stations. This blocking limit applies to all emissions within the 3.7 GHz Service licensee's authorized band of operation.

418. *Co-Channel Protection Criteria for TT&C Earth Stations.* A protection criteria of I/N = −6 dB is appropriate for TT&C links. The Commission will require 3.7 GHz Service licensees to coordinate their operations within 70 km of TT&C earth stations that continue to operate in the 3.7–3.98 GHz band.

419. *Adjacent Channel Protection Criteria for TT&C Earth Stations.* To protect TT&C earth stations from adjacent channel interference due to out-of-band emissions, the Commission sets the same interference protection criteria of −6 dB I/N ratio. Prior coordination is not required for adjacent channel licenses. To provide protection from potential receiver overload, the Commission will require base stations and mobiles to meet a PFD limit of −16 dBW/m^2/MHz, as measured at the TT&C earth station antenna.

420. Small entities may be required to hire attorneys, engineers, consultants, or other professionals to comply with the rule changes adopted in the *Report and Order.* Although the Commission cannot quantify the cost of compliance with the rule changes, we note that several of the rule changes are consistent with and mirror existing policies and requirements used for other part 27 flexible-use licenses. Therefore, small entities with existing licenses in other bands may already be familiar with such policies and requirements and have the processes and procedures in place to facilitate compliance resulting in minimal incremental costs to comply

with our requirements for the 3.7–4.2 GHz band.

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

421. The RFA requires an agency to describe any significant, specifically small business, alternatives 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 or reporting requirements under the rule for small entities; (3) the use of performance, rather than design, standards; and (4) an exemption from coverage of the rule, or any part thereof, for small entities.

422. In the *Report and Order,* the Commission has adopted a transition using a Commission-led competitive bidding process to make C-band spectrum available for next-generation terrestrial wireless use. We considered the position of the Small Satellite Operators, the C-Band Alliance, and the approaches of other commenters but believe that the Commission-led forward auction will leverage the best features of the various proposals submitted in the record and allow us to repurpose the socially efficient amount of spectrum for flexible use rapidly and transparently. It will also facilitate robust deployment of next-generation terrestrial wireless networks and ensure that qualified incumbents in the band are able to continue their operations without interruption. The advantages of the public auction approach include making a significant amount of 3.7–4.2 GHz band spectrum available quickly through a public auction of flexible use license, followed by a transition period that leverages incumbent FSS operators' expertise to achieve an effective relocation of existing services to the upper portion of the band, aligns stakeholders' incentives so as to achieve an expeditious transition, and ensures effective accommodation of incumbent users. It will also facilitate robust deployment of next generation terrestrial wireless networks and ensure that qualified incumbents in the band are able to continue their operations without interruption. We find that the public auction approach fulfills the Commission's obligations to manage spectrum in the public interest.

423. To ensure that small entities and all eligible interests are included in the Transition Plans and compensated for the transition to the upper 200 megahertz of the band, the transition obligations the Commission adopts require that, in order for a space station operator to satisfy the clearing benchmarks and become eligible for reimbursement of reasonable relocation costs and potential accelerated relocation payments, it must demonstrate that the space station transmissions and receiving earth station operations have been sufficiently cleared such that the new flexible-use licensee could begin operating without causing harmful interference to registered incumbent earth stations. We find that, if the Small Satellite Operators satisfy our definition of eligible space station operators such that they have incumbent registered earth station customers that will need to be transitioned to the upper portion of the band, then they would be entitled to reimbursement of reasonable relocation costs and potential accelerated relocation payments. This will ensure that any small space station operator incumbent affected by the transition will have the opportunity to participate.

424. The *Report and Order* adopts bidding credits for small and very small businesses. The auction of flexible-use licenses relies heavily on a competitive marketplace to set the value of spectrum and compensate incumbents for the costs of transitioning out of the lower 300 megahertz of the band. Specifically, for small entities, the Commission is focused on facilitating competition in the band and ensuring that all relevant interests, not just those of the largest companies, are represented. This will help to reduce the potential economic impact on small entities.

425. The license areas chosen in the *Report and Order* should provide spectrum access opportunities for smaller carriers by giving them access to less densely populated areas that match their footprints. While PEAs are small enough to provide spectrum access opportunities for smaller carriers and PEAs can be further disaggregated, these units of area also nest within and may be aggregated to form larger license areas. Thus, the rules should enable small entities and other providers providing service in the 3.7–3.98 GHz band to adjust their spectrum holdings more easily and build their networks pursuant to individual business plans, allowing them to manage the economic impact. We also believe this should result in small entities having an easier time acquiring or accessing spectrum.

426. Another step taken by the Commission that should help minimize the economic impact for small entities is the adoption of 15-year license terms for licenses in the 3.7–3.98 GHz band. Small entities should benefit from the opportunity for long term operational certainty and a longer period to develop, test and provision innovative services and applications. This longer licensing term should also allow small entities to curtail and spread out its costs. Lastly, as mentioned above, many of the rule changes adopted in the *Report and Order* are consistent with and mirror existing requirements for other bands. The Commission's decision to take this approach for the 3.7–3.98 GHz band should minimize the economic impact for small entities who are already obligated to comply with and have been complying with existing requirements in other bands.

V. Ordering Clauses

427. Accordingly, *It is ordered* that, pursuant to Sections 1, 2, 4(i), 4(j), 5(c), 201, 302, 303, 304, 307(e), 309, and 316 of the Communications Act of 1934, as amended, 47 U.S.C. 151, 152, 154(i), 154(j), 155(c), 201, 302, 303, 304, 307(e), 309, and 316, this *Report and Order is hereby adopted.*

428. *It is further ordered* that the rules and requirements as adopted herein *are adopted,* effective sixty (60) days after publication in the **Federal Register**; and that the *Order of Proposed Modification* is effective as of the date of publication in the **Federal Register**; provided, however, that compliance will not be required for §§ 25.138(a) and (b); 25.147(a) through (c); 27.14(w)(1) through (4); 27.1412(b)(3)(i), (c) introductory text, (c)(2), (d)(1) and (2), and (f) through (h); 27.1413(a)(2) and (3), (b), and (c)(3) and (7); 27.1414(b)(3), (b)(4)(i) and (iii), (c)(1) through (3); 27.1415; 27.1416(a); 27.1417; 27.1419; 27.1421; 27.1422(c); 27.1424; and 101.101, Note (2) of the Commission's rules, which contain new or modified information collection requirements that require review by the Office of Management and Budget (OMB) under the Paperwork Reduction Act, until the effective date for those information collections is announced in a document published in the **Federal Register** after the Commission receives OMB approval. The Commission directs the Bureau to issue such document announcing the compliance dates for §§ 25.138(a) and (b); 25.147(a) through (c); 27.14(w)(1) through (4); 27.1412(b)(3)(i), (c) introductory text, (c)(2), (d)(1) and (2), and (f) through (h); 27.1413(a)(2) and (3), (b), and (c)(3) and (7); 27.1414(b)(3), (b)(4)(i) and (iii), (c)(1) through (3); 27.1415; 27.1416(a); 27.1417; 27.1419; 27.1421; 27.1422(c);

27.1424; and 101.101, Note (2) accordingly.

429. *It is further ordered* that the freeze on applications for new FSS earth stations in the 3.7–4.2 GHz band outside of the contiguous United States and on applications for new point-to-point microwave Fixed Service sites outside of the contiguous United States will be lifted on the date of publication of this *Report and Order* in the **Federal Register**.

430. *It is further ordered* that, pursuant to Section 309 and 316 of the Communications Act of 1934, as amended, 47 U.S.C. 309 and 316, in the *Order of Proposed Modification* the Commission proposes that the licenses and authorizations of all 3.7–4.2 GHz FSS licensees and market access holders; all transmit-receive earth station licenses; and all Fixed Service licenses will be modified pursuant to the conditions specified in this *Report and Order* at paragraphs 123–125, 321, 323, 325, these modification conditions will be effective 60 days after publication of this *Report and Order and Order* in the **Federal Register**, provided, however, that in the event any FSS licensee, Fixed Service licensee, transmit-receive earth station licensee, or any other licensee or permittee who believes that its license or permit would be modified by this proposed action, seeks to protest this proposed modification and its accompanying timetable, the proposed license modifications specified in this *Report and Order and Order* and contested by the licensee or permittee shall not be made final as to such licensee or permittee unless and until the Commission orders otherwise. Pursuant to Section 316(a)(1) of the Communications Act of 1934, as amended, 47 U.S.C. 316(a)(1), publication of this *Report and Order* in the **Federal Register** shall constitute notification in writing of our *Order* proposing the modification of the 3.7–4.2 GHz FSS licenses, Fixed Service Licenses, transmit-receive earth station licenses, and of the grounds and reasons therefore, and those licensees and any other party seeking to file a protest pursuant to Section 316 shall have 30 days from the date of such publication to protest such Order.

431. *It is further ordered*, pursuant to Section 309 and 316 of the Communications Act of 1934, as amended, 47 U.S.C. 309 and 316, that following the final modification of each FSS license and transmit-receive earth station license, the International Bureau shall further modify such licenses as are necessary in order to implement the specific band reconfiguration in the manner specified in this *Report and Order;* and the Wireless Telecommunications Bureau shall modify each Fixed Service license as necessary in order to implement the specific band reconfiguration in the manner specified in this *Report and Order.*

432. *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.

433. *It is further ordered* that this *Report and Order* SHALL BE sent to Congress and the Government Accountability Office pursuant to the Congressional Review Act, see 5 U.S.C. 801(a)(1)(A).

434. It is our intention in adopting these rules that, if any provision of the *Report and Order* or the rules, or the application thereof to any person or circumstance, is held to be unlawful, the remaining portions of such *Report and Order* and the rules not deemed unlawful, and the application of the *Report and Order* and the rules to other persons or circumstances, shall remain in effect to the fullest extent permitted by law.

List of Subjects in 47 CFR Parts 1, 2, 25, 27, and 101

Administrative practice and procedures, Communications, Communications equipment, Radio, Reporting and recordkeeping requirements, Satellites, Telecommunications.

Federal Communications Commission.

Cecilia Sigmund,

Federal Register Liaison Officer, Office of the Secretary.

Final Rules

For the reasons discussed in the preamble, the Federal Communications Commission amends 47 CFR parts 1, 2, 25, 27, and 101 as follows:

PART 1—PRACTICE AND PROCEDURE

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

Authority: 47 U.S.C. chs. 2, 5, 9, 13; 28 U.S.C. 2461 note, unless otherwise noted.

■ 2. Amend § 1.907 by revising the definition of ''Covered geographic licenses'' to read as follows:

§ 1.907 Definitions.

* * * * *

Covered geographic licenses. Covered geographic licenses consist of the following services: 1.4 GHz Service (part 27, subpart I, of this chapter); 1.6 GHz Service (part 27, subpart J); 24 GHz Service and Digital Electronic Message Services (part 101, subpart G, of this chapter); 218–219 MHz Service (part 95, subpart F, of this chapter); 220–222 MHz Service, excluding public safety licenses (part 90, subpart T, of this chapter); 600 MHz Service (part 27, subpart N); 700 MHz Commercial Services (part 27, subpart F and H); 700 MHz Guard Band Service (part 27, subpart G); 800 MHz Specialized Mobile Radio Service (part 90, subpart S); 900 MHz Specialized Mobile Radio Service (part 90, subpart S); 3.7 GHz Service (part 27, subpart O); Advanced Wireless Services (part 27, subparts K and L); Air-Ground Radiotelephone Service (Commercial Aviation) (part 22, subpart G, of this chapter); Broadband Personal Communications Service (part 24, subpart E, of this chapter); Broadband Radio Service (part 27, subpart M); Cellular Radiotelephone Service (part 22, subpart H); Citizens Broadband Radio Service (part 96, subpart C, of this chapter); Dedicated Short Range Communications Service, excluding public safety licenses (part 90, subpart M); H Block Service (part 27, subpart K); Local Multipoint Distribution Service (part 101, subpart L); Multichannel Video Distribution and Data Service (part 101, subpart P); Multilateration Location and Monitoring Service (part 90, subpart M); Multiple Address Systems (EAs) (part 101, subpart O); Narrowband Personal Communications Service (part 24, subpart D); Paging and Radiotelephone Service (part 22, subpart E; part 90, subpart P); VHF Public Coast Stations, including Automated Maritime Telecommunications Systems (part 80, subpart J, of this chapter); Upper Microwave Flexible Use Service (part 30 of this chapter); and Wireless Communications Service (part 27, subpart D).

* * * * *

■ 3. Amend § 1.9005 by:

■ a. Removing the word ''and'' at the end of paragraph (kk);

■ b. Removing the period at the end of paragraph (ll) and adding ''; and'' in its place; and

■ c. Adding paragraph (mm).

The addition reads as follows:

§ 1.9005 Included services.

* * * * *

(mm) The 3.7 GHz Service in the 3.7–3.98 GHz band.

PART 2—FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS

■ 4. The authority citation for part 2 continues to read as follows:

Authority: 47 U.S.C. 154, 302a, 303, and 336, unless otherwise noted.

■ 5. Amend § 2.106 by revising page 41 of the Table of Frequency Allocations and adding footnote NG182 and revising footnote NG457A in the list of Non-Federal Government (NG) Footnotes to read as follows:

§ 2.106 Table of Frequency Allocations.

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BILLING CODE 6712–01–P

Table of Frequency Allocations	3500-5460 MHz (SHF)				Page 41
International Table			United States Table		FCC Rule Part(s)
Region 1 Table	Region 2 Table	Region 3 Table	Federal Table	Non-Federal Table	
(See previous page)	3500-3600 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 5.431B Radiolocation 5.433	3500-3600 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 5.433A Radiolocation 5.433	3500-3550 RADIOLOCATION G59 AERONAUTICAL RADIONAVIGATION (ground-based) G110	3500-3550 Radiolocation	Private Land Mobile (90)
			3550-3650 RADIOLOCATION G59 AERONAUTICAL RADIONAVIGATION (ground-based) G110	3550-3600 FIXED MOBILE except aeronautical mobile US105 US433	Citizens Broadband (96)
3600-4200 FIXED FIXED-SATELLITE (space-to-Earth) Mobile	3600-3700 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 5.434 Radiolocation 5.433	3600-3700 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile Radiolocation 5.435	US105 US107 US245 US433	3600-3650 FIXED FIXED-SATELLITE (space-to-Earth) US107 US245 MOBILE except aeronautical mobile US105 US433	Satellite Communications (25) Citizens Broadband (96)
			3650-3700 US109 US349	3650-3700 FIXED FIXED-SATELLITE (space-to-Earth) NG169 NG185 MOBILE except aeronautical mobile US109 US349	
	3700-4200 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile		3700-4200	3700-4000 FIXED MOBILE except aeronautical mobile NG182 NG457A	Wireless Communications (27)
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4200-4400 AERONAUTICAL MOBILE (R) 5.436 AERONAUTICAL RADIONAVIGATION 5.438 5.437 5.439 5.440			4200-4400 AERONAUTICAL RADIONAVIGATION 5.440 US261		Aviation (87)
4400-4500 FIXED MOBILE 5.440A			4400-4940 FIXED MOBILE	4400-4500	
4500-4800 FIXED FIXED-SATELLITE (space-to-Earth) 5.441 MOBILE 5.440A				4500-4800 FIXED-SATELLITE (space-to-Earth) 5.441 US245	
4800-4990 FIXED MOBILE 5.440A 5.441A 5.441B 5.442 Radio astronomy 5.149 5.339 5.443			US113 US245 US342	4800-4940 US113 US342	
			4940-4990 5.339 US342 US385 G122	4940-4990 FIXED MOBILE except aeronautical mobile 5.339 US342 US385	Public Safety Land Mobile (90Y)
4990-5000 FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY Space research (passive) 5.149			4990-5000 RADIO ASTRONOMY US74 Space research (passive) US246		

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Non-Federal Government (NG) Footnotes

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NG182 In the band 3700–4200 MHz, the following provisions shall apply:

(a) Except as provided in paragraph (c)(1) of this footnote, any currently authorized space stations serving the contiguous United States may continue to operate on a primary basis, but no applications for new space station authorizations or new petitions for market access shall be accepted for filing after June 21, 2018, other than applications by existing operators in the band seeking to make more efficient use of the band 4000–4200 MHz. Applications for extension, cancellation, replacement, or modification of existing space station authorizations in the band will continue to be accepted and processed normally.

(b) In areas outside the contiguous United States, the band 3700–4000 MHz is also allocated to the fixed-satellite service (space-to-Earth) on a primary basis.

(c) In the contiguous United States, *i.e.,* the contiguous 48 states and the District of Columbia as defined by Partial Economic Areas Nos. 1–41, 43–211, 213–263, 265–297, 299–359, and 361–411, which includes areas within 12 nautical miles of the U.S. Gulf coastline (*see* § 27.6(m) of this chapter), the following provisions apply:

(1) Incumbent use of the fixed-satellite service (space-to-Earth) in the band 3700–4000 MHz is subject to the provisions of §§ 25.138, 25.147, 25.203(n) and part 27, subpart O, of this chapter;

(2) Fixed service licensees authorized as of April 19, 2018, pursuant to part 101 of this chapter, must self-relocate their point-to-point links out of the band 3700–4200 MHz by December 5, 2023;

(3) In the band 3980–4000 MHz, no new fixed or mobile operations will be permitted until specified by Commission rule, order, or notice.

* * * * *

NG457A Earth stations on vessels (ESVs), as regulated under 47 CFR part 25, are an application of the fixed-satellite service and the following provisions shall apply:

(a) In the band 3700–4200 MHz, ESVs may be authorized to receive FSS signals from geostationary satellites. ESVs in motion are subject to the condition that these earth stations may not claim protection from transmissions of non-Federal stations in the fixed and mobile except aeronautical mobile services. While docked, ESVs receiving in the band 4000–4200 MHz may be coordinated for up to 180 days, renewable. NG182 applies to incumbent licensees that provide service to ESVs in the band 3700–4000 MHz.

(b) In the band 5925–6425 MHz, ESVs may be authorized to transmit to geostationary satellites on a primary basis.

* * * * *

PART 25—SATELLITE COMMUNICATIONS

■ 6. The authority citation for part 25 continues to read as follows:

Authority: 47 U.S.C. 154, 301, 302, 303, 307, 309, 310, 319, 332, 605, and 721, unless otherwise noted.

■ 7. Amend § 25.103 by adding the definition of ''Contiguous United States (CONUS)'' in alphabetical order to read as follows:

§ 25.103 Definitions.

* * * * *

Contiguous United States (CONUS). For purposes of subparts B and C of this part, the contiguous United States consists of the contiguous 48 states and the District of Columbia as defined by Partial Economic Areas Nos. 1–41, 43–211, 213–263, 265–297, 299–359, and 361–411, which includes areas within 12 nautical miles of the U.S. Gulf coastline. In this context, the rest of the United States includes the Honolulu, Anchorage, Kodiak, Fairbanks, Juneau, Puerto Rico, Guam-Northern Mariana Islands, U.S. Virgin Islands, American Samoa, and the Gulf of Mexico PEAs (Nos. 42, 212, 264, 298, 360, 412–416). *See* § 27.6(m) of this chapter.

* * * * *

■ 8. Amend § 25.109 by adding paragraph (e) to read as follows:

§ 25.109 Cross-reference.

* * * * *

(e) Space and earth stations in the 3700–4200 MHz band may be subject to transition rules in part 27 of this chapter.

■ 9. Add § 25.138 to read as follows:

§ 25.138 Earth Stations in the 3.7–4.2 GHz band.

(a) Applications for new, modified, or renewed earth station licenses and registrations in the 3.7–4.0 GHz portion of the band in CONUS are no longer accepted.

(b) Applications for new earth station licenses or registrations within CONUS in the 4.0–4.2 GHz portion of the band will not be accepted until the transition is completed and upon announcement by the International Bureau via Public Notice that applications may be filed.

(c) Fixed and temporary fixed earth stations operating in the 3.7–4.0 GHz portion of the band within CONUS will be protected from interference by licensees in the 3.7 GHz Service subject to the deadlines set forth in § 27.1412 of this chapter and are eligible for transition into the 4.0–4.2 GHz band so long as they:

(1) Were operational as of April 19, 2018 and continue to be operational;

(2) Were licensed or registered (or had a pending application for license or registration) in the IBFS database on November 7, 2018; and

(3) Timely certified the accuracy of the information on file with the Commission by May 28, 2019.

(d) Fixed and temporary earth station licenses and registrations that meet the criteria in paragraph (c) of this section may be renewed or modified to maintain operations in the 4.0–4.2 GHz band.

(e) Applications for new, modified, or renewed licenses and registrations for earth stations outside CONUS operating in the 3.7–4.2 GHz band will continue to be accepted.

■ 10. Add § 25.147 to read as follows:

§ 25.147 Space Stations in the 3.7–4.2 GHz band.

The 3.7–4.0 GHz portion of the band is being transitioned in CONUS from FSS GSO (space-to-Earth) to the 3.7 GHz Service.

(a) New applications for space station licenses and petitions for market access concerning space-to-Earth operations in the 3.7–4.0 GHz portion of the band within CONUS will no longer be accepted.

(b) Applications for new or modified space station licenses or petitions for market access in the 4.0–4.2 GHz portion of the band within CONUS will not be accepted during the transition except by existing operators in the band to implement an efficient transition.

(c) Applications for new or modified space station licenses or petitions for market access for space-to-Earth operations in the 3.7–4.2 GHz band outside CONUS will continue to be accepted.

■ 11. Amend § 25.203 by adding paragraph (n) to read as follows:

§ 25.203 Choice of sites and frequencies.

* * * * *

(n) From December 5, 2021 until December 5, 2030, consolidated telemetry, tracking, and control (TT&C) operations at no more than four locations may be authorized on a primary basis to support space station operations, and no other TT&C operations shall be entitled to interference protection in the 3.7–4.0 GHz band.

PART 27—MISCELLANEOUS WIRELESS COMMUNICATIONS SERVICES

■ 12. The authority citation for part 27 continues to read as follows:

Authority: 47 U.S.C. 154, 301, 302a, 303, 307, 309, 332, 336, 337, 1403, 1404, 1451, and 1452, unless otherwise noted.

■ 13. Amend § 27.1 by adding paragraph (b)(15) and revising paragraph (c) to read as follows:

§ 27.1 Basis and purpose.

* * * * *

(b) * * *

(15) 3700–3980 MHz.

(c) *Scope.* The rules in this part apply only to stations authorized under this part or authorized under another part of this chapter on frequencies or bands transitioning to authorizations under this part.

■ 14. Amend § 27.4 by adding in alphabetical order the definition for ''3.7 GHz Service'' to read as follows:

§ 27.4 Terms and definitions.

3.7 GHz Service. A radiocommunication service licensed under this part for the frequency bands specified in § 27.5(m) (3700–3980 MHz band).

* * * * *

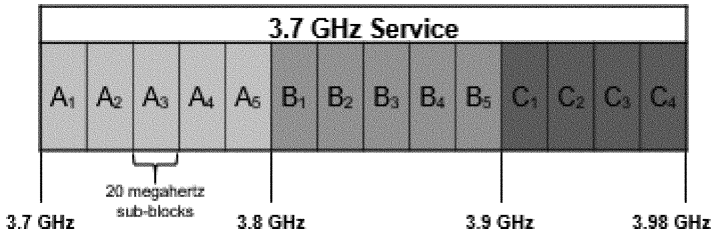
■ 15. Amend § 27.5 by adding paragraph (m) to read as follows:

§ 27.5 Frequencies.

* * * * *

(m) *3700–3980 MHz band.* The 3.7 GHz Service is comprised of Block A (3700–3800 MHz); Block B (3800–3900 MHz); and Block C (3900–3980 MHz). These blocks are licensed as 14 individual 20 megahertz sub-blocks available for assignment in the contiguous United States on a Partial Economic Area basis, *see* § 27.6(m), as follows:

Figure 1 to paragraph (m)



■ 16. Amend § 27.6 by adding paragraph (m) to read as follows:

§ 27.6 Service areas.

* * * * *

(m) *3700–3980 MHz Band.* Service areas in the 3.7 GHz Service are based on Partial Economic Areas (PEAs) as defined by appendix A to this subpart (*see Wireless Telecommunications Bureau Provides Details About Partial Economic Areas,* DA 14–759, Public Notice, released June 2, 2014, for more information). The 3.7 GHz Service will be licensed in the contiguous United States, *i.e.,* the contiguous 48 states and the District of Columbia as defined by Partial Economic Areas Nos. 1–41, 43–211, 213–263, 265–297, 299–359, and 361–411. The service areas of PEAs that border the U.S. coastline of the Gulf of Mexico extend 12 nautical miles from the U.S. Gulf coastline. The 3.7 GHz Service will not be licensed for the following PEAs:

TABLE 3 TO PARAGRAPH (m)

PEA No.	PEA name
42	Honolulu, HI.
212	Anchorage, AK.
264	Kodiak, AK.
298	Fairbanks, AK.
360	Juneau, AK.
412	Puerto Rico.
413	Guam-Northern Mariana Islands.
414	US Virgin Islands.
415	American Samoa.

■ 17. Add appendix A to subpart A of part 27 to read as follows:

Appendix A to Subpart A of Part 27—List of Partial Economic Areas With Corresponding Counties

PEA No.	Federal Information Processing System No.	County name	State
1	09001	Fairfield	CT
1	09003	Hartford	CT
1	09005	Litchfield	CT
1	09007	Middlesex	CT
1	09009	New Haven	CT
1	09011	New London	CT
1	09013	Tolland	CT
1	09015	Windham	CT
1	34003	Bergen	NJ
1	34013	Essex	NJ
1	34017	Hudson	NJ
1	34019	Hunterdon	NJ
1	34021	Mercer	NJ
1	34023	Middlesex	NJ
1	34025	Monmouth	NJ
1	34027	Morris	NJ
1	34029	Ocean	NJ
1	34031	Passaic	NJ
1	34035	Somerset	NJ
1	34037	Sussex	NJ
1	34039	Union	NJ
1	34041	Warren	NJ
1	36005	Bronx	NY
1	36027	Dutchess	NY
1	36047	Kings	NY
1	36059	Nassau	NY
1	36061	New York	NY
1	36071	Orange	NY
1	36079	Putnam	NY
1	36081	Queens	NY
1	36085	Richmond	NY
1	36087	Rockland	NY
1	36103	Suffolk	NY
1	36105	Sullivan	NY
1	36111	Ulster	NY
1	36119	Westchester	NY
1	42025	Carbon	PA
1	42069	Lackawanna	PA
1	42077	Lehigh	PA
1	42079	Luzerne	PA
1	42089	Monroe	PA
1	42095	Northampton	PA
2	06029	Kern	CA
2	06037	Los Angeles	CA
2	06059	Orange	CA
2	06065	Riverside	CA
2	06071	San Bernardino	CA
2	06079	San Luis Obispo	CA
2	06083	Santa Barbara	CA
2	06111	Ventura	CA
3	17031	Cook	IL
3	17043	DuPage	IL
3	17063	Grundy	IL
3	17089	Kane	IL
3	17091	Kankakee	IL
3	17093	Kendall	IL
3	17097	Lake	IL
3	17111	McHenry	IL
3	17197	Will	IL
3	18091	La Porte	IN
3	18089	Lake	IN
3	18127	Porter	IN
4	06001	Alameda	CA
4	06013	Contra Costa	CA
4	06041	Marin	CA
4	06053	Monterey	CA
4	06055	Napa	CA
4	06075	San Francisco	CA
4	06077	San Joaquin	CA
4	06081	San Mateo	CA
4	06085	Santa Clara	CA
4	06087	Santa Cruz	CA
4	06095	Solano	CA
4	06097	Sonoma	CA
4	06099	Stanislaus	CA

PEA No.	Federal Information Processing System No.	County name	State
5	11001	District of Columbia.	DC
5	24003	Anne Arundel ...	MD
5	24005	Baltimore	MD
5	24510	Baltimore City ...	MD
5	24009	Calvert	MD
5	24011	Caroline	MD
5	24013	Carroll	MD
5	24017	Charles	MD
5	24019	Dorchester	MD
5	24025	Harford	MD
5	24027	Howard	MD
5	24029	Kent	MD
5	24031	Montgomery	MD
5	24033	Prince George's	MD
5	24035	Queen Anne's ..	MD
5	24037	St. Mary's	MD
5	24041	Talbot	MD
5	51510	Alexandria City	VA
5	51013	Arlington	VA
5	51059	Fairfax	VA
5	51600	Fairfax City	VA
5	51610	Falls Church City.	VA
5	51107	Loudoun	VA
5	51683	Manassas City ..	VA
5	51685	Manassas Park City.	VA
5	51153	Prince William ...	VA
6	10001	Kent	DE
6	10003	New Castle	DE
6	24015	Cecil	MD
6	34001	Atlantic	NJ
6	34005	Burlington	NJ
6	34007	Camden	NJ
6	34009	Cape May	NJ
6	34011	Cumberland	NJ
6	34015	Gloucester	NJ
6	34033	Salem	NJ
6	42011	Berks	PA
6	42017	Bucks	PA
6	42029	Chester	PA
6	42045	Delaware	PA
6	42071	Lancaster	PA
6	42091	Montgomery	PA
6	42101	Philadelphia	PA
7	25001	Barnstable	MA
7	25005	Bristol	MA
7	25007	Dukes	MA
7	25009	Essex	MA
7	25017	Middlesex	MA
7	25019	Nantucket	MA
7	25021	Norfolk	MA
7	25023	Plymouth	MA
7	25025	Suffolk	MA
7	25027	Worcester	MA
7	44001	Bristol	RI
7	44003	Kent	RI
7	44005	Newport	RI
7	44007	Providence	RI
7	44009	Washington	RI
8	48085	Collin	TX
8	48113	Dallas	TX
8	48121	Denton	TX
8	48139	Ellis	TX
8	48181	Grayson	TX
8	48221	Hood	TX
8	48251	Johnson	TX
8	48257	Kaufman	TX
8	48367	Parker	TX
8	48397	Rockwall	TX
8	48439	Tarrant	TX
8	48497	Wise	TX
9	12011	Broward	FL
9	12043	Glades	FL
9	12051	Hendry	FL
9	12061	Indian River	FL
9	12085	Martin	FL
9	12086	Miami-Dade	FL
9	12087	Monroe	FL
9	12093	Okeechobee	FL
9	12099	Palm Beach	FL
9	12111	St. Lucie	FL
10 ..	48039	Brazoria	TX
10 ..	48071	Chambers	TX
10 ..	48157	Fort Bend	TX
10 ..	48167	Galveston	TX
10 ..	48201	Harris	TX
10 ..	48291	Liberty	TX
10 ..	48339	Montgomery	TX
10 ..	48473	Waller	TX
11 ..	13011	Banks	GA
11 ..	13013	Barrow	GA
11 ..	13035	Butts	GA
11 ..	13057	Cherokee	GA
11 ..	13059	Clarke	GA
11 ..	13063	Clayton	GA
11 ..	13067	Cobb	GA
11 ..	13085	Dawson	GA
11 ..	13089	DeKalb	GA
11 ..	13097	Douglas	GA
11 ..	13105	Elbert	GA
11 ..	13113	Fayette	GA
11 ..	13117	Forsyth	GA
11 ..	13119	Franklin	GA
11 ..	13121	Fulton	GA
11 ..	13133	Greene	GA
11 ..	13135	Gwinnett	GA
11 ..	13137	Habersham	GA
11 ..	13139	Hall	GA
11 ..	13147	Hart	GA
11 ..	13151	Henry	GA
11 ..	13157	Jackson	GA
11 ..	13159	Jasper	GA
11 ..	13187	Lumpkin	GA
11 ..	13195	Madison	GA
11 ..	13211	Morgan	GA
11 ..	13217	Newton	GA
11 ..	13219	Oconee	GA
11 ..	13221	Oglethorpe	GA
11 ..	13223	Paulding	GA
11 ..	13241	Rabun	GA
11 ..	13247	Rockdale	GA
11 ..	13257	Stephens	GA
11 ..	13265	Taliaferro	GA
11 ..	13297	Walton	GA
11 ..	13311	White	GA
12 ..	26049	Genesee	MI
12 ..	26087	Lapeer	MI
12 ..	26093	Livingston	MI
12 ..	26099	Macomb	MI
12 ..	26125	Oakland	MI
12 ..	26155	Shiawassee	MI
12 ..	26147	St. Clair	MI
12 ..	26161	Washtenaw	MI
12 ..	26163	Wayne	MI
13 ..	12009	Brevard	FL
13 ..	12017	Citrus	FL
13 ..	12035	Flagler	FL
13 ..	12049	Hardee	FL
13 ..	12055	Highlands	FL
13 ..	12069	Lake	FL
13 ..	12083	Marion	FL
13 ..	12095	Orange	FL
13 ..	12097	Osceola	FL
13 ..	12105	Polk	FL
13 ..	12117	Seminole	FL
13 ..	12119	Sumter	FL
13 ..	12127	Volusia	FL
14 ..	39007	Ashtabula	OH
14 ..	39019	Carroll	OH
14 ..	39029	Columbiana	OH
14 ..	39035	Cuyahoga	OH
14 ..	39043	Erie	OH
14 ..	39055	Geauga	OH
14 ..	39077	Huron	OH
14 ..	39085	Lake	OH
14 ..	39093	Lorain	OH
14 ..	39099	Mahoning	OH
14 ..	39103	Medina	OH
14 ..	39133	Portage	OH
14 ..	39151	Stark	OH
14 ..	39153	Summit	OH
14 ..	39155	Trumbull	OH
14 ..	42085	Mercer	PA
15 ..	04013	Maricopa	AZ
16 ..	53009	Clallam	WA
16 ..	53031	Jefferson	WA
16 ..	53033	King	WA
16 ..	53035	Kitsap	WA
16 ..	53053	Pierce	WA
16 ..	53061	Snohomish	WA
17 ..	27003	Anoka	MN
17 ..	27009	Benton	MN
17 ..	27019	Carver	MN
17 ..	27025	Chisago	MN
17 ..	27037	Dakota	MN
17 ..	27053	Hennepin	MN
17 ..	27123	Ramsey	MN
17 ..	27139	Scott	MN
17 ..	27141	Sherburne	MN
17 ..	27145	Stearns	MN
17 ..	27163	Washington	MN
17 ..	27171	Wright	MN
17 ..	55109	St. Croix	WI
18 ..	06073	San Diego	CA
19 ..	41003	Benton	OR
19 ..	41005	Clackamas	OR
19 ..	41007	Clatsop	OR
19 ..	41009	Columbia	OR
19 ..	41041	Lincoln	OR
19 ..	41043	Linn	OR
19 ..	41047	Marion	OR
19 ..	41051	Multnomah	OR
19 ..	41053	Polk	OR
19 ..	41057	Tillamook	OR
19 ..	41067	Washington	OR
19 ..	41071	Yamhill	OR
19 ..	53011	Clark	WA
19 ..	53015	Cowlitz	WA
19 ..	53069	Wahkiakum	WA
20 ..	08001	Adams	CO
20 ..	08005	Arapahoe	CO
20 ..	08013	Boulder	CO
20 ..	08014	Broomfield	CO
20 ..	08031	Denver	CO
20 ..	08035	Douglas	CO
20 ..	08047	Gilpin	CO
20 ..	08059	Jefferson	CO
21 ..	12053	Hernando	FL
21 ..	12057	Hillsborough	FL
21 ..	12101	Pasco	FL
21 ..	12103	Pinellas	FL

PEA No.	Federal Information Processing System No.	County name	State
22 ..	06005	Amador	CA
22 ..	06007	Butte	CA
22 ..	06011	Colusa	CA
22 ..	06017	El Dorado	CA
22 ..	06021	Glenn	CA
22 ..	06057	Nevada	CA
22 ..	06061	Placer	CA
22 ..	06067	Sacramento	CA
22 ..	06101	Sutter	CA
22 ..	06113	Yolo	CA
22 ..	06115	Yuba	CA
23 ..	42003	Allegheny	PA
23 ..	42005	Armstrong	PA
23 ..	42007	Beaver	PA
23 ..	42019	Butler	PA
23 ..	42063	Indiana	PA
23 ..	42073	Lawrence	PA
23 ..	42125	Washington	PA
23 ..	42129	Westmoreland	PA
24 ..	17005	Bond	IL
24 ..	17027	Clinton	IL
24 ..	17121	Marion	IL
24 ..	17133	Monroe	IL
24 ..	17163	St. Clair	IL
24 ..	29071	Franklin	MO
24 ..	29099	Jefferson	MO
24 ..	29183	St. Charles	MO
24 ..	29189	St. Louis	MO
24 ..	29510	St. Louis City	MO
25 ..	21015	Boone	KY
25 ..	21023	Bracken	KY
25 ..	21037	Campbell	KY
25 ..	21077	Gallatin	KY
25 ..	21081	Grant	KY
25 ..	21117	Kenton	KY
25 ..	21135	Lewis	KY
25 ..	21161	Mason	KY
25 ..	21191	Pendleton	KY
25 ..	39001	Adams	OH
25 ..	39015	Brown	OH
25 ..	39017	Butler	OH
25 ..	39025	Clermont	OH
25 ..	39027	Clinton	OH
25 ..	39061	Hamilton	OH
25 ..	39071	Highland	OH
25 ..	39165	Warren	OH
26 ..	04015	Mohave	AZ
26 ..	32003	Clark	NV
27 ..	49011	Davis	UT
27 ..	49035	Salt Lake	UT
27 ..	49045	Tooele	UT
27 ..	49049	Utah	UT
27 ..	49057	Weber	UT
28 ..	48013	Atascosa	TX
28 ..	48029	Bexar	TX
28 ..	48091	Comal	TX
28 ..	48187	Guadalupe	TX
29 ..	12001	Alachua	FL
29 ..	12003	Baker	FL
29 ..	12007	Bradford	FL
29 ..	12019	Clay	FL
29 ..	12023	Columbia	FL
29 ..	12029	Dixie	FL
29 ..	12031	Duval	FL
29 ..	12041	Gilchrist	FL
29 ..	12047	Hamilton	FL
29 ..	12067	Lafayette	FL
29 ..	12075	Levy	FL
29 ..	12089	Nassau	FL
29 ..	12107	Putnam	FL
29 ..	12109	St. Johns	FL
29 ..	12121	Suwannee	FL
29 ..	12125	Union	FL
30 ..	20091	Johnson	KS
30 ..	20209	Wyandotte	KS
30 ..	29037	Cass	MO
30 ..	29047	Clay	MO
30 ..	29095	Jackson	MO
30 ..	29165	Platte	MO
30 ..	29177	Ray	MO
31 ..	18011	Boone	IN
31 ..	18035	Delaware	IN
31 ..	18057	Hamilton	IN
31 ..	18063	Hendricks	IN
31 ..	18081	Johnson	IN
31 ..	18095	Madison	IN
31 ..	18097	Marion	IN
32 ..	21047	Christian	KY
32 ..	47021	Cheatham	TN
32 ..	47037	Davidson	TN
32 ..	47043	Dickson	TN
32 ..	47125	Montgomery	TN
32 ..	47147	Robertson	TN
32 ..	47149	Rutherford	TN
32 ..	47165	Sumner	TN
32 ..	47187	Williamson	TN
32 ..	47189	Wilson	TN
33 ..	37053	Currituck	NC
33 ..	51550	Chesapeake City.	VA
33 ..	51620	Franklin City	VA
33 ..	51073	Gloucester	VA
33 ..	51650	Hampton City	VA
33 ..	51093	Isle of Wight	VA
33 ..	51095	James City	VA
33 ..	51115	Mathews	VA
33 ..	51700	Newport News City.	VA
33 ..	51710	Norfolk City	VA
33 ..	51735	Poquoson City	VA
33 ..	51740	Portsmouth City	VA
33 ..	51175	Southampton	VA
33 ..	51800	Suffolk City	VA
33 ..	51181	Surry	VA
33 ..	51810	Virginia Beach City.	VA
33 ..	51830	Williamsburg City.	VA
33 ..	51199	York	VA
34 ..	06019	Fresno	CA
34 ..	06031	Kings	CA
34 ..	06039	Madera	CA
34 ..	06107	Tulare	CA
35 ..	48209	Hays	TX
35 ..	48331	Milam	TX
35 ..	48453	Travis	TX
35 ..	48491	Williamson	TX
36 ..	22051	Jefferson Parish	LA
36 ..	22057	Lafourche Parish.	LA
36 ..	22071	Orleans Parish	LA
36 ..	22075	Plaquemines Parish.	LA
36 ..	22087	St. Bernard Parish.	LA
36 ..	22089	St. Charles Parish.	LA
36 ..	22093	St. James Parish.	LA
36 ..	22095	St. John the Baptist Parish.	LA
36 ..	22103	St. Tammany Parish.	LA
36 ..	22105	Tangipahoa Parish.	LA
36 ..	22109	Terrebonne Parish.	LA
36 ..	22117	Washington Parish.	LA
36 ..	28109	Pearl River	MS
37 ..	39041	Delaware	OH
37 ..	39045	Fairfield	OH
37 ..	39049	Franklin	OH
37 ..	39097	Madison	OH
37 ..	39129	Pickaway	OH
38 ..	55079	Milwaukee	WI
38 ..	55089	Ozaukee	WI
38 ..	55131	Washington	WI
38 ..	55133	Waukesha	WI
39 ..	40017	Canadian	OK
39 ..	40027	Cleveland	OK
39 ..	40031	Comanche	OK
39 ..	40051	Grady	OK
39 ..	40081	Lincoln	OK
39 ..	40083	Logan	OK
39 ..	40087	McClain	OK
39 ..	40109	Oklahoma	OK
39 ..	40125	Pottawatomie	OK
40 ..	01015	Calhoun	AL
40 ..	01073	Jefferson	AL
40 ..	01117	Shelby	AL
40 ..	01115	St. Clair	AL
40 ..	01121	Talladega	AL
40 ..	01125	Tuscaloosa	AL
40 ..	01127	Walker	AL
41 ..	36011	Cayuga	NY
41 ..	36017	Chenango	NY
41 ..	36023	Cortland	NY
41 ..	36025	Delaware	NY
41 ..	36043	Herkimer	NY
41 ..	36053	Madison	NY
41 ..	36065	Oneida	NY
41 ..	36067	Onondaga	NY
41 ..	36075	Oswego	NY
41 ..	36077	Otsego	NY
41 ..	36097	Schuyler	NY
41 ..	36109	Tompkins	NY
42 ..	15001	Hawaii	HI
42 ..	15003	Honolulu	HI
42 ..	15005	Kalawao	HI
42 ..	15007	Kauai	HI
42 ..	15009	Maui	HI
43 ..	37071	Gaston	NC
43 ..	37119	Mecklenburg	NC
43 ..	37179	Union	NC
44 ..	36037	Genesee	NY
44 ..	36051	Livingston	NY
44 ..	36055	Monroe	NY
44 ..	36069	Ontario	NY
44 ..	36073	Orleans	NY
44 ..	36099	Seneca	NY
44 ..	36101	Steuben	NY
44 ..	36117	Wayne	NY
44 ..	36121	Wyoming	NY
44 ..	36123	Yates	NY
45 ..	37063	Durham	NC
45 ..	37135	Orange	NC
45 ..	37183	Wake	NC
46 ..	05005	Baxter	AR
46 ..	05009	Boone	AR
46 ..	05015	Carroll	AR
46 ..	05023	Cleburne	AR
46 ..	05029	Conway	AR
46 ..	05045	Faulkner	AR

PEA No.	Federal Information Processing System No.	County name	State
46 ..	05049	Fulton	AR
46 ..	05063	Independence	AR
46 ..	05065	Izard	AR
46 ..	05067	Jackson	AR
46 ..	05069	Jefferson	AR
46 ..	05071	Johnson	AR
46 ..	05085	Lonoke	AR
46 ..	05089	Marion	AR
46 ..	05101	Newton	AR
46 ..	05105	Perry	AR
46 ..	05115	Pope	AR
46 ..	05117	Prairie	AR
46 ..	05119	Pulaski	AR
46 ..	05125	Saline	AR
46 ..	05129	Searcy	AR
46 ..	05135	Sharp	AR
46 ..	05137	Stone	AR
46 ..	05141	Van Buren	AR
46 ..	05145	White	AR
46 ..	05147	Woodruff	AR
46 ..	05149	Yell	AR
47 ..	48061	Cameron	TX
47 ..	48215	Hidalgo	TX
47 ..	48427	Starr	TX
47 ..	48489	Willacy	TX
48 ..	42001	Adams	PA
48 ..	42041	Cumberland	PA
48 ..	42043	Dauphin	PA
48 ..	42067	Juniata	PA
48 ..	42075	Lebanon	PA
48 ..	42099	Perry	PA
48 ..	42133	York	PA
49 ..	36001	Albany	NY
49 ..	36021	Columbia	NY
49 ..	36035	Fulton	NY
49 ..	36039	Greene	NY
49 ..	36041	Hamilton	NY
49 ..	36057	Montgomery	NY
49 ..	36083	Rensselaer	NY
49 ..	36091	Saratoga	NY
49 ..	36093	Schenectady	NY
49 ..	36095	Schoharie	NY
49 ..	36113	Warren	NY
49 ..	36115	Washington	NY
50 ..	37149	Polk	NC
50 ..	45007	Anderson	SC
50 ..	45021	Cherokee	SC
50 ..	45045	Greenville	SC
50 ..	45073	Oconee	SC
50 ..	45077	Pickens	SC
50 ..	45083	Spartanburg	SC
50 ..	45087	Union	SC
51 ..	18019	Clark	IN
51 ..	18043	Floyd	IN
51 ..	18077	Jefferson	IN
51 ..	18143	Scott	IN
51 ..	21029	Bullitt	KY
51 ..	21041	Carroll	KY
51 ..	21103	Henry	KY
51 ..	21111	Jefferson	KY
51 ..	21185	Oldham	KY
51 ..	21211	Shelby	KY
51 ..	21223	Trimble	KY
52 ..	21019	Boyd	KY
52 ..	21043	Carter	KY
52 ..	21063	Elliott	KY
52 ..	21089	Greenup	KY
52 ..	39053	Gallia	OH
52 ..	39087	Lawrence	OH
52 ..	39105	Meigs	OH
52 ..	39167	Washington	OH
52 ..	54005	Boone	WV
52 ..	54007	Braxton	WV
52 ..	54011	Cabell	WV
52 ..	54013	Calhoun	WV
52 ..	54015	Clay	WV
52 ..	54019	Fayette	WV
52 ..	54021	Gilmer	WV
52 ..	54035	Jackson	WV
52 ..	54039	Kanawha	WV
52 ..	54043	Lincoln	WV
52 ..	54045	Logan	WV
52 ..	54053	Mason	WV
52 ..	54067	Nicholas	WV
52 ..	54073	Pleasants	WV
52 ..	54079	Putnam	WV
52 ..	54081	Raleigh	WV
52 ..	54085	Ritchie	WV
52 ..	54087	Roane	WV
52 ..	54089	Summers	WV
52 ..	54099	Wayne	WV
52 ..	54101	Webster	WV
52 ..	54105	Wirt	WV
52 ..	54107	Wood	WV
52 ..	54109	Wyoming	WV
53 ..	04003	Cochise	AZ
53 ..	04019	Pima	AZ
53 ..	04023	Santa Cruz	AZ
54 ..	36029	Erie	NY
54 ..	36063	Niagara	NY
55 ..	01033	Colbert	AL
55 ..	01049	DeKalb	AL
55 ..	01055	Etowah	AL
55 ..	01059	Franklin	AL
55 ..	01071	Jackson	AL
55 ..	01077	Lauderdale	AL
55 ..	01079	Lawrence	AL
55 ..	01083	Limestone	AL
55 ..	01089	Madison	AL
55 ..	01095	Marshall	AL
55 ..	01103	Morgan	AL
55 ..	47103	Lincoln	TN
56 ..	26005	Allegan	MI
56 ..	26015	Barry	MI
56 ..	26023	Branch	MI
56 ..	26025	Calhoun	MI
56 ..	26067	Ionia	MI
56 ..	26077	Kalamazoo	MI
56 ..	26107	Mecosta	MI
56 ..	26117	Montcalm	MI
56 ..	26121	Muskegon	MI
56 ..	26123	Newaygo	MI
56 ..	26127	Oceana	MI
56 ..	26159	Van Buren	MI
57 ..	51036	Charles City	VA
57 ..	51041	Chesterfield	VA
57 ..	51057	Essex	VA
57 ..	51075	Goochland	VA
57 ..	51085	Hanover	VA
57 ..	51087	Henrico	VA
57 ..	51097	King and Queen	VA
57 ..	51101	King William	VA
57 ..	51103	Lancaster	VA
57 ..	51119	Middlesex	VA
57 ..	51127	New Kent	VA
57 ..	51133	Northumberland	VA
57 ..	51145	Powhatan	VA
57 ..	51159	Richmond	VA
57 ..	51760	Richmond City	VA
58 ..	17023	Clark	IL
58 ..	18007	Benton	IN
58 ..	18015	Carroll	IN
58 ..	18017	Cass	IN
58 ..	18021	Clay	IN
58 ..	18023	Clinton	IN
58 ..	18045	Fountain	IN
58 ..	18055	Greene	IN
58 ..	18067	Howard	IN
58 ..	18093	Lawrence	IN
58 ..	18103	Miami	IN
58 ..	18105	Monroe	IN
58 ..	18107	Montgomery	IN
58 ..	18109	Morgan	IN
58 ..	18117	Orange	IN
58 ..	18119	Owen	IN
58 ..	18121	Parke	IN
58 ..	18133	Putnam	IN
58 ..	18153	Sullivan	IN
58 ..	18157	Tippecanoe	IN
58 ..	18159	Tipton	IN
58 ..	18165	Vermillion	IN
58 ..	18167	Vigo	IN
58 ..	18171	Warren	IN
58 ..	18181	White	IN
59 ..	05035	Crittenden	AR
59 ..	47157	Shelby	TN
59 ..	47167	Tipton	TN
60 ..	33001	Belknap	NH
60 ..	33011	Hillsborough	NH
60 ..	33013	Merrimack	NH
60 ..	33015	Rockingham	NH
60 ..	33017	Strafford	NH
61 ..	39039	Defiance	OH
61 ..	39051	Fulton	OH
61 ..	39063	Hancock	OH
61 ..	39065	Hardin	OH
61 ..	39069	Henry	OH
61 ..	39095	Lucas	OH
61 ..	39123	Ottawa	OH
61 ..	39125	Paulding	OH
61 ..	39143	Sandusky	OH
61 ..	39147	Seneca	OH
61 ..	39171	Williams	OH
61 ..	39173	Wood	OH
61 ..	39175	Wyandot	OH
62 ..	39021	Champaign	OH
62 ..	39023	Clark	OH
62 ..	39057	Greene	OH
62 ..	39109	Miami	OH
62 ..	39113	Montgomery	OH
62 ..	39135	Preble	OH
63 ..	40021	Cherokee	OK
63 ..	40037	Creek	OK
63 ..	40097	Mayes	OK
63 ..	40113	Osage	OK
63 ..	40131	Rogers	OK
63 ..	40143	Tulsa	OK
63 ..	40145	Wagoner	OK
64 ..	18039	Elkhart	IN
64 ..	18049	Fulton	IN
64 ..	18085	Kosciusko	IN
64 ..	18087	Lagrange	IN
64 ..	18099	Marshall	IN
64 ..	18131	Pulaski	IN
64 ..	18141	St. Joseph	IN
64 ..	18149	Starke	IN
64 ..	26021	Berrien	MI
64 ..	26027	Cass	MI
64 ..	26149	St. Joseph	MI
65 ..	12021	Collier	FL
65 ..	12071	Lee	FL
66 ..	26037	Clinton	MI
66 ..	26045	Eaton	MI

PEA No.	Federal Information Processing System No.	County name	State
66 ..	26059	Hillsdale	MI
66 ..	26065	Ingham	MI
66 ..	26075	Jackson	MI
66 ..	26091	Lenawee	MI
66 ..	26115	Monroe	MI
67 ..	12015	Charlotte	FL
67 ..	12027	DeSoto	FL
67 ..	12081	Manatee	FL
67 ..	12115	Sarasota	FL
68 ..	26081	Kent	MI
68 ..	26139	Ottawa	MI
69 ..	25003	Berkshire	MA
69 ..	25011	Franklin	MA
69 ..	25013	Hampden	MA
69 ..	25015	Hampshire	MA
69 ..	50003	Bennington	VT
70 ..	06015	Del Norte	CA
70 ..	41011	Coos	OR
70 ..	41015	Curry	OR
70 ..	41019	Douglas	OR
70 ..	41029	Jackson	OR
70 ..	41033	Josephine	OR
70 ..	41039	Lane	OR
71 ..	47001	Anderson	TN
71 ..	47009	Blount	TN
71 ..	47013	Campbell	TN
71 ..	47093	Knox	TN
71 ..	47105	Loudon	TN
71 ..	47129	Morgan	TN
71 ..	47145	Roane	TN
71 ..	47151	Scott	TN
71 ..	47173	Union	TN
72 ..	12005	Bay	FL
72 ..	12013	Calhoun	FL
72 ..	12037	Franklin	FL
72 ..	12039	Gadsden	FL
72 ..	12045	Gulf	FL
72 ..	12063	Jackson	FL
72 ..	12065	Jefferson	FL
72 ..	12073	Leon	FL
72 ..	12077	Liberty	FL
72 ..	12079	Madison	FL
72 ..	12123	Taylor	FL
72 ..	12129	Wakulla	FL
72 ..	13087	Decatur	GA
72 ..	13099	Early	GA
72 ..	13131	Grady	GA
72 ..	13201	Miller	GA
72 ..	13253	Seminole	GA
72 ..	13275	Thomas	GA
73 ..	48141	El Paso	TX
74 ..	13047	Catoosa	GA
74 ..	13083	Dade	GA
74 ..	13295	Walker	GA
74 ..	47007	Bledsoe	TN
74 ..	47011	Bradley	TN
74 ..	47065	Hamilton	TN
74 ..	47115	Marion	TN
74 ..	47107	McMinn	TN
74 ..	47121	Meigs	TN
74 ..	47123	Monroe	TN
74 ..	47139	Polk	TN
74 ..	47143	Rhea	TN
74 ..	47153	Sequatchie	TN
75 ..	35001	Bernalillo	NM
75 ..	35043	Sandoval	NM
76 ..	06003	Alpine	CA
76 ..	06027	Inyo	CA
76 ..	06035	Lassen	CA
76 ..	06051	Mono	CA
76 ..	06063	Plumas	CA
76 ..	06091	Sierra	CA
76 ..	32510	Carson City	NV
76 ..	32001	Churchill	NV
76 ..	32005	Douglas	NV
76 ..	32007	Elko	NV
76 ..	32011	Eureka	NV
76 ..	32013	Humboldt	NV
76 ..	32015	Lander	NV
76 ..	32019	Lyon	NV
76 ..	32027	Pershing	NV
76 ..	32029	Storey	NV
76 ..	32031	Washoe	NV
76 ..	32033	White Pine	NV
77 ..	23001	Androscoggin	ME
77 ..	23005	Cumberland	ME
77 ..	23007	Franklin	ME
77 ..	23013	Knox	ME
77 ..	23015	Lincoln	ME
77 ..	23017	Oxford	ME
77 ..	23023	Sagadahoc	ME
77 ..	23031	York	ME
78 ..	37001	Alamance	NC
78 ..	37081	Guilford	NC
78 ..	37151	Randolph	NC
79 ..	28001	Adams	MS
79 ..	28005	Amite	MS
79 ..	28021	Claiborne	MS
79 ..	28023	Clarke	MS
79 ..	28029	Copiah	MS
79 ..	28031	Covington	MS
79 ..	28035	Forrest	MS
79 ..	28037	Franklin	MS
79 ..	28041	Greene	MS
79 ..	28061	Jasper	MS
79 ..	28063	Jefferson	MS
79 ..	28065	Jefferson Davis	MS
79 ..	28067	Jones	MS
79 ..	28069	Kemper	MS
79 ..	28073	Lamar	MS
79 ..	28075	Lauderdale	MS
79 ..	28077	Lawrence	MS
79 ..	28079	Leake	MS
79 ..	28085	Lincoln	MS
79 ..	28091	Marion	MS
79 ..	28099	Neshoba	MS
79 ..	28101	Newton	MS
79 ..	28111	Perry	MS
79 ..	28113	Pike	MS
79 ..	28123	Scott	MS
79 ..	28127	Simpson	MS
79 ..	28129	Smith	MS
79 ..	28147	Walthall	MS
79 ..	28153	Wayne	MS
80 ..	19155	Pottawattamie	IA
80 ..	31055	Douglas	NE
80 ..	31153	Sarpy	NE
81 ..	26001	Alcona	MI
81 ..	26011	Arenac	MI
81 ..	26017	Bay	MI
81 ..	26035	Clare	MI
81 ..	26051	Gladwin	MI
81 ..	26057	Gratiot	MI
81 ..	26063	Huron	MI
81 ..	26069	Iosco	MI
81 ..	26073	Isabella	MI
81 ..	26111	Midland	MI
81 ..	26129	Ogemaw	MI
81 ..	26145	Saginaw	MI
81 ..	26151	Sanilac	MI
81 ..	26157	Tuscola	MI
82 ..	22005	Ascension Parish.	LA
82 ..	22007	Assumption Parish.	LA
82 ..	22033	East Baton Rouge Parish.	LA
82 ..	22047	Iberville Parish	LA
82 ..	22063	Livingston Parish.	LA
82 ..	22121	West Baton Rouge Parish.	LA
83 ..	18001	Adams	IN
83 ..	18003	Allen	IN
83 ..	18009	Blackford	IN
83 ..	18033	De Kalb	IN
83 ..	18053	Grant	IN
83 ..	18069	Huntington	IN
83 ..	18075	Jay	IN
83 ..	18113	Noble	IN
83 ..	18151	Steuben	IN
83 ..	18169	Wabash	IN
83 ..	18179	Wells	IN
83 ..	18183	Whitley	IN
84 ..	01003	Baldwin	AL
84 ..	01025	Clarke	AL
84 ..	01035	Conecuh	AL
84 ..	01053	Escambia	AL
84 ..	01097	Mobile	AL
84 ..	01099	Monroe	AL
84 ..	01129	Washington	AL
84 ..	01131	Wilcox	AL
85 ..	45015	Berkeley	SC
85 ..	45019	Charleston	SC
85 ..	45029	Colleton	SC
85 ..	45035	Dorchester	SC
86 ..	21005	Anderson	KY
86 ..	21011	Bath	KY
86 ..	21017	Bourbon	KY
86 ..	21049	Clark	KY
86 ..	21067	Fayette	KY
86 ..	21069	Fleming	KY
86 ..	21073	Franklin	KY
86 ..	21097	Harrison	KY
86 ..	21113	Jessamine	KY
86 ..	21165	Menifee	KY
86 ..	21167	Mercer	KY
86 ..	21173	Montgomery	KY
86 ..	21181	Nicholas	KY
86 ..	21187	Owen	KY
86 ..	21201	Robertson	KY
86 ..	21205	Rowan	KY
86 ..	21209	Scott	KY
86 ..	21239	Woodford	KY
87 ..	12033	Escambia	FL
87 ..	12091	Okaloosa	FL
87 ..	12113	Santa Rosa	FL
87 ..	12131	Walton	FL
88 ..	24001	Allegany	MD
88 ..	24021	Frederick	MD
88 ..	24023	Garrett	MD
88 ..	24043	Washington	MD
88 ..	42055	Franklin	PA
88 ..	42057	Fulton	PA
88 ..	54057	Mineral	WV
89 ..	45063	Lexington	SC
89 ..	45079	Richland	SC
90 ..	22025	Catahoula Parish.	LA
90 ..	22029	Concordia Parish.	LA
90 ..	22065	Madison Parish	LA
90 ..	22107	Tensas Parish	LA
90 ..	28007	Attala	MS

PEA No.	Federal Information Processing System No.	County name	State
90 ..	28049	Hinds	MS
90 ..	28051	Holmes	MS
90 ..	28089	Madison	MS
90 ..	28121	Rankin	MS
90 ..	28149	Warren	MS
90 ..	28163	Yazoo	MS
91 ..	08041	El Paso	CO
91 ..	08119	Teller	CO
92 ..	17019	Champaign	IL
92 ..	17025	Clay	IL
92 ..	17029	Coles	IL
92 ..	17035	Cumberland	IL
92 ..	17041	Douglas	IL
92 ..	17045	Edgar	IL
92 ..	17049	Effingham	IL
92 ..	17051	Fayette	IL
92 ..	17053	Ford	IL
92 ..	17079	Jasper	IL
92 ..	17115	Macon	IL
92 ..	17139	Moultrie	IL
92 ..	17147	Piatt	IL
92 ..	17173	Shelby	IL
92 ..	17183	Vermilion	IL
93 ..	22001	Acadia Parish	LA
93 ..	22039	Evangeline Parish.	LA
93 ..	22045	Iberia Parish	LA
93 ..	22055	Lafayette Parish	LA
93 ..	22097	St. Landry Parish.	LA
93 ..	22099	St. Martin Parish	LA
93 ..	22101	St. Mary Parish	LA
93 ..	22113	Vermilion Parish	LA
94 ..	48027	Bell	TX
94 ..	48099	Coryell	TX
94 ..	48145	Falls	TX
94 ..	48309	McLennan	TX
95 ..	21025	Breathitt	KY
95 ..	21065	Estill	KY
95 ..	21071	Floyd	KY
95 ..	21109	Jackson	KY
95 ..	21115	Johnson	KY
95 ..	21119	Knott	KY
95 ..	21127	Lawrence	KY
95 ..	21129	Lee	KY
95 ..	21133	Letcher	KY
95 ..	21153	Magoffin	KY
95 ..	21159	Martin	KY
95 ..	21175	Morgan	KY
95 ..	21189	Owsley	KY
95 ..	21193	Perry	KY
95 ..	21195	Pike	KY
95 ..	21197	Powell	KY
95 ..	21237	Wolfe	KY
95 ..	51021	Bland	VA
95 ..	51027	Buchanan	VA
95 ..	51051	Dickenson	VA
95 ..	51105	Lee	VA
95 ..	51720	Norton City	VA
95 ..	51167	Russell	VA
95 ..	51185	Tazewell	VA
95 ..	51195	Wise	VA
95 ..	54047	McDowell	WV
95 ..	54055	Mercer	WV
95 ..	54059	Mingo	WV
96 ..	21001	Adair	KY
96 ..	21013	Bell	KY
96 ..	21021	Boyle	KY
96 ..	21045	Casey	KY
96 ..	21051	Clay	KY
96 ..	21053	Clinton	KY
96 ..	21079	Garrard	KY
96 ..	21087	Green	KY
96 ..	21095	Harlan	KY
96 ..	21121	Knox	KY
96 ..	21125	Laurel	KY
96 ..	21131	Leslie	KY
96 ..	21137	Lincoln	KY
96 ..	21151	Madison	KY
96 ..	21147	McCreary	KY
96 ..	21199	Pulaski	KY
96 ..	21203	Rockcastle	KY
96 ..	21207	Russell	KY
96 ..	21217	Taylor	KY
96 ..	21231	Wayne	KY
96 ..	21235	Whitley	KY
96 ..	47025	Claiborne	TN
97 ..	19143	Osceola	IA
97 ..	27013	Blue Earth	MN
97 ..	27015	Brown	MN
97 ..	27023	Chippewa	MN
97 ..	27033	Cottonwood	MN
97 ..	27043	Faribault	MN
97 ..	27047	Freeborn	MN
97 ..	27063	Jackson	MN
97 ..	27067	Kandiyohi	MN
97 ..	27073	Lac qui Parle	MN
97 ..	27079	Le Sueur	MN
97 ..	27081	Lincoln	MN
97 ..	27083	Lyon	MN
97 ..	27091	Martin	MN
97 ..	27085	McLeod	MN
97 ..	27093	Meeker	MN
97 ..	27101	Murray	MN
97 ..	27103	Nicollet	MN
97 ..	27105	Nobles	MN
97 ..	27127	Redwood	MN
97 ..	27129	Renville	MN
97 ..	27131	Rice	MN
97 ..	27143	Sibley	MN
97 ..	27147	Steele	MN
97 ..	27161	Waseca	MN
97 ..	27165	Watonwan	MN
97 ..	27173	Yellow Medicine	MN
98 ..	47019	Carter	TN
98 ..	47059	Greene	TN
98 ..	47073	Hawkins	TN
98 ..	47163	Sullivan	TN
98 ..	47171	Unicoi	TN
98 ..	47179	Washington	TN
98 ..	51520	Bristol City	VA
98 ..	51169	Scott	VA
98 ..	51173	Smyth	VA
98 ..	51191	Washington	VA
99 ..	28003	Alcorn	MS
99 ..	28013	Calhoun	MS
99 ..	28017	Chickasaw	MS
99 ..	28019	Choctaw	MS
99 ..	28025	Clay	MS
99 ..	28043	Grenada	MS
99 ..	28057	Itawamba	MS
99 ..	28081	Lee	MS
99 ..	28087	Lowndes	MS
99 ..	28095	Monroe	MS
99 ..	28097	Montgomery	MS
99 ..	28103	Noxubee	MS
99 ..	28105	Oktibbeha	MS
99 ..	28115	Pontotoc	MS
99 ..	28117	Prentiss	MS
99 ..	28139	Tippah	MS
99 ..	28141	Tishomingo	MS
99 ..	28145	Union	MS
99 ..	28155	Webster	MS
99 ..	28159	Winston	MS
99 ..	47071	Hardin	TN
99 ..	47109	McNairy	TN
100	37013	Beaufort	NC
100	37031	Carteret	NC
100	37049	Craven	NC
100	37055	Dare	NC
100	37079	Greene	NC
100	37095	Hyde	NC
100	37103	Jones	NC
100	37107	Lenoir	NC
100	37117	Martin	NC
100	37137	Pamlico	NC
100	37147	Pitt	NC
100	37177	Tyrrell	NC
100	37187	Washington	NC
101	20015	Butler	KS
101	20173	Sedgwick	KS
102	08015	Chaffee	CO
102	08019	Clear Creek	CO
102	08027	Custer	CO
102	08029	Delta	CO
102	08037	Eagle	CO
102	08043	Fremont	CO
102	08045	Garfield	CO
102	08049	Grand	CO
102	08051	Gunnison	CO
102	08053	Hinsdale	CO
102	08057	Jackson	CO
102	08065	Lake	CO
102	08077	Mesa	CO
102	08081	Moffat	CO
102	08085	Montrose	CO
102	08091	Ouray	CO
102	08093	Park	CO
102	08097	Pitkin	CO
102	08103	Rio Blanco	CO
102	08107	Routt	CO
102	08113	San Miguel	CO
102	08117	Summit	CO
103	51043	Clarke	VA
103	51061	Fauquier	VA
103	51069	Frederick	VA
103	51139	Page	VA
103	51157	Rappahannock	VA
103	51171	Shenandoah	VA
103	51187	Warren	VA
103	51840	Winchester City	VA
103	54003	Berkeley	WV
103	54023	Grant	WV
103	54027	Hampshire	WV
103	54031	Hardy	WV
103	54037	Jefferson	WV
103	54065	Morgan	WV
103	54083	Randolph	WV
103	54093	Tucker	WV
104	08069	Larimer	CO
104	08123	Weld	CO
105	13073	Columbia	GA
105	13181	Lincoln	GA
105	13189	McDuffie	GA
105	13245	Richmond	GA
105	13317	Wilkes	GA
105	45003	Aiken	SC
105	45037	Edgefield	SC
106	39009	Athens	OH
106	39047	Fayette	OH
106	39059	Guernsey	OH
106	39073	Hocking	OH
106	39079	Jackson	OH

PEA No.	Federal Information Processing System No.	County name	State
106	39115	Morgan	OH
106	39119	Muskingum	OH
106	39121	Noble	OH
106	39127	Perry	OH
106	39131	Pike	OH
106	39141	Ross	OH
106	39145	Scioto	OH
106	39163	Vinton	OH
107	23003	Aroostook	ME
107	23009	Hancock	ME
107	23011	Kennebec	ME
107	23019	Penobscot	ME
107	23021	Piscataquis	ME
107	23025	Somerset	ME
107	23027	Waldo	ME
107	23029	Washington	ME
108	19049	Dallas	IA
108	19153	Polk	IA
108	19181	Warren	IA
109	37065	Edgecombe	NC
109	37069	Franklin	NC
109	37077	Granville	NC
109	37083	Halifax	NC
109	37127	Nash	NC
109	37131	Northampton	NC
109	37145	Person	NC
109	37181	Vance	NC
109	37185	Warren	NC
109	37195	Wilson	NC
110	21075	Fulton	KY
110	21105	Hickman	KY
110	47005	Benton	TN
110	47017	Carroll	TN
110	47023	Chester	TN
110	47033	Crockett	TN
110	47039	Decatur	TN
110	47045	Dyer	TN
110	47047	Fayette	TN
110	47053	Gibson	TN
110	47069	Hardeman	TN
110	47075	Haywood	TN
110	47077	Henderson	TN
110	47079	Henry	TN
110	47095	Lake	TN
110	47097	Lauderdale	TN
110	47113	Madison	TN
110	47131	Obion	TN
110	47183	Weakley	TN
111	05007	Benton	AR
111	05087	Madison	AR
111	05143	Washington	AR
111	29119	McDonald	MO
111	40001	Adair	OK
111	40041	Delaware	OK
112	21003	Allen	KY
112	21009	Barren	KY
112	21031	Butler	KY
112	21057	Cumberland	KY
112	21061	Edmonson	KY
112	21099	Hart	KY
112	21141	Logan	KY
112	21169	Metcalfe	KY
112	21171	Monroe	KY
112	21213	Simpson	KY
112	21219	Todd	KY
112	21227	Warren	KY
112	47027	Clay	TN
112	47035	Cumberland	TN
112	47049	Fentress	TN
112	47087	Jackson	TN
112	47111	Macon	TN
112	47133	Overton	TN
112	47137	Pickett	TN
112	47141	Putnam	TN
112	47169	Trousdale	TN
113	42031	Clarion	PA
113	42039	Crawford	PA
113	42049	Erie	PA
113	42053	Forest	PA
113	42121	Venango	PA
113	42123	Warren	PA
114	42051	Fayette	PA
114	42059	Greene	PA
114	54001	Barbour	WV
114	54017	Doddridge	WV
114	54033	Harrison	WV
114	54041	Lewis	WV
114	54049	Marion	WV
114	54061	Monongalia	WV
114	54077	Preston	WV
114	54091	Taylor	WV
114	54097	Upshur	WV
115	37021	Buncombe	NC
115	37087	Haywood	NC
115	37089	Henderson	NC
115	37099	Jackson	NC
115	37115	Madison	NC
115	37173	Swain	NC
115	37175	Transylvania	NC
116	17007	Boone	IL
116	17201	Winnebago	IL
116	55105	Rock	WI
117	13045	Carroll	GA
117	13077	Coweta	GA
117	13143	Haralson	GA
117	13149	Heard	GA
117	13171	Lamar	GA
117	13199	Meriwether	GA
117	13231	Pike	GA
117	13255	Spalding	GA
117	13263	Talbot	GA
117	13285	Troup	GA
117	13293	Upson	GA
118	18005	Bartholomew	IN
118	18013	Brown	IN
118	18031	Decatur	IN
118	18041	Fayette	IN
118	18059	Hancock	IN
118	18065	Henry	IN
118	18071	Jackson	IN
118	18079	Jennings	IN
118	18135	Randolph	IN
118	18139	Rush	IN
118	18145	Shelby	IN
118	18161	Union	IN
118	18177	Wayne	IN
119	53005	Benton	WA
119	53021	Franklin	WA
119	53077	Yakima	WA
120	05027	Columbia	AR
120	05073	Lafayette	AR
120	22013	Bienville Parish	LA
120	22015	Bossier Parish	LA
120	22017	Caddo Parish	LA
120	22027	Claiborne Parish	LA
120	22119	Webster Parish	LA
120	22127	Winn Parish	LA
121	42009	Bedford	PA
121	42013	Blair	PA
121	42021	Cambria	PA
121	42061	Huntingdon	PA
121	42087	Mifflin	PA
121	42111	Somerset	PA
122	55025	Dane	WI
123	39005	Ashland	OH
123	39033	Crawford	OH
123	39067	Harrison	OH
123	39075	Holmes	OH
123	39139	Richland	OH
123	39157	Tuscarawas	OH
123	39169	Wayne	OH
124	53027	Grays Harbor	WA
124	53041	Lewis	WA
124	53045	Mason	WA
124	53049	Pacific	WA
124	53067	Thurston	WA
125	17013	Calhoun	IL
125	17083	Jersey	IL
125	17117	Macoupin	IL
125	17119	Madison	IL
125	29073	Gasconade	MO
125	29113	Lincoln	MO
125	29139	Montgomery	MO
125	29163	Pike	MO
125	29219	Warren	MO
126	04007	Gila	AZ
126	04009	Graham	AZ
126	04011	Greenlee	AZ
126	04021	Pinal	AZ
127	18027	Daviess	IN
127	18037	Dubois	IN
127	18051	Gibson	IN
127	18083	Knox	IN
127	18101	Martin	IN
127	18123	Perry	IN
127	18125	Pike	IN
127	18129	Posey	IN
127	18147	Spencer	IN
127	18163	Vanderburgh	IN
127	18173	Warrick	IN
128	13009	Baldwin	GA
128	13021	Bibb	GA
128	13023	Bleckley	GA
128	13091	Dodge	GA
128	13153	Houston	GA
128	13169	Jones	GA
128	13225	Peach	GA
128	13235	Pulaski	GA
128	13289	Twiggs	GA
128	13315	Wilcox	GA
128	13319	Wilkinson	GA
129	17001	Adams	IL
129	17009	Brown	IL
129	17017	Cass	IL
129	17021	Christian	IL
129	17061	Greene	IL
129	17107	Logan	IL
129	17129	Menard	IL
129	17135	Montgomery	IL
129	17137	Morgan	IL
129	17149	Pike	IL
129	17167	Sangamon	IL
129	17169	Schuyler	IL
129	17171	Scott	IL
130	53063	Spokane	WA
131	37037	Chatham	NC
131	37085	Harnett	NC
131	37101	Johnston	NC
131	37105	Lee	NC
131	37163	Sampson	NC
132	48007	Aransas	TX
132	48025	Bee	TX
132	48355	Nueces	TX

PEA No.	Federal Information Processing System No.	County name	State
132	48391	Refugio	TX
132	48409	San Patricio	TX
133	48005	Angelina	TX
133	48161	Freestone	TX
133	48225	Houston	TX
133	48289	Leon	TX
133	48293	Limestone	TX
133	48313	Madison	TX
133	48347	Nacogdoches	TX
133	48373	Polk	TX
133	48395	Robertson	TX
133	48403	Sabine	TX
133	48405	San Augustine	TX
133	48407	San Jacinto	TX
133	48419	Shelby	TX
133	48455	Trinity	TX
133	48471	Walker	TX
134	39031	Coshocton	OH
134	39083	Knox	OH
134	39089	Licking	OH
134	39091	Logan	OH
134	39101	Marion	OH
134	39117	Morrow	OH
134	39159	Union	OH
135	48199	Hardin	TX
135	48241	Jasper	TX
135	48245	Jefferson	TX
135	48351	Newton	TX
135	48361	Orange	TX
135	48457	Tyler	TX
136	42035	Clinton	PA
136	42037	Columbia	PA
136	42081	Lycoming	PA
136	42093	Montour	PA
136	42097	Northumberland	PA
136	42109	Snyder	PA
136	42113	Sullivan	PA
136	42119	Union	PA
136	42131	Wyoming	PA
137	27049	Goodhue	MN
137	55005	Barron	WI
137	55013	Burnett	WI
137	55017	Chippewa	WI
137	55033	Dunn	WI
137	55035	Eau Claire	WI
137	55091	Pepin	WI
137	55093	Pierce	WI
137	55095	Polk	WI
137	55107	Rusk	WI
137	55113	Sawyer	WI
137	55129	Washburn	WI
138	50001	Addison	VT
138	50005	Caledonia	VT
138	50007	Chittenden	VT
138	50011	Franklin	VT
138	50013	Grand Isle	VT
138	50015	Lamoille	VT
138	50019	Orleans	VT
138	50021	Rutland	VT
138	50023	Washington	VT
139	05001	Arkansas	AR
139	05003	Ashley	AR
139	05011	Bradley	AR
139	05013	Calhoun	AR
139	05017	Chicot	AR
139	05019	Clark	AR
139	05025	Cleveland	AR
139	05039	Dallas	AR
139	05041	Desha	AR
139	05043	Drew	AR
139	05051	Garland	AR
139	05053	Grant	AR
139	05057	Hempstead	AR
139	05059	Hot Spring	AR
139	05061	Howard	AR
139	05079	Lincoln	AR
139	05095	Monroe	AR
139	05097	Montgomery	AR
139	05099	Nevada	AR
139	05103	Ouachita	AR
139	05109	Pike	AR
139	05139	Union	AR
140	51033	Caroline	VA
140	51047	Culpeper	VA
140	51630	Fredericksburg City.	VA
140	51099	King George	VA
140	51113	Madison	VA
140	51137	Orange	VA
140	51177	Spotsylvania	VA
140	51179	Stafford	VA
140	51193	Westmoreland	VA
141	27001	Aitkin	MN
141	27007	Beltrami	MN
141	27021	Cass	MN
141	27029	Clearwater	MN
141	27035	Crow Wing	MN
141	27041	Douglas	MN
141	27051	Grant	MN
141	27057	Hubbard	MN
141	27059	Isanti	MN
141	27065	Kanabec	MN
141	27095	Mille Lacs	MN
141	27097	Morrison	MN
141	27115	Pine	MN
141	27121	Pope	MN
141	27149	Stevens	MN
141	27151	Swift	MN
141	27153	Todd	MN
141	27159	Wadena	MN
142	06009	Calaveras	CA
142	06043	Mariposa	CA
142	06047	Merced	CA
142	06069	San Benito	CA
142	06109	Tuolumne	CA
143	33003	Carroll	NH
143	33005	Cheshire	NH
143	33007	Coos	NH
143	33009	Grafton	NH
143	33019	Sullivan	NH
143	50009	Essex	VT
143	50017	Orange	VT
143	50025	Windham	VT
143	50027	Windsor	VT
144	48063	Camp	TX
144	48119	Delta	TX
144	48147	Fannin	TX
144	48159	Franklin	TX
144	48223	Hopkins	TX
144	48231	Hunt	TX
144	48277	Lamar	TX
144	48379	Rains	TX
144	48387	Red River	TX
144	48449	Titus	TX
144	48459	Upshur	TX
144	48467	Van Zandt	TX
144	48499	Wood	TX
145	47003	Bedford	TN
145	47015	Cannon	TN
145	47031	Coffee	TN
145	47041	DeKalb	TN
145	47051	Franklin	TN
145	47055	Giles	TN
145	47061	Grundy	TN
145	47117	Marshall	TN
145	47119	Maury	TN
145	47127	Moore	TN
145	47159	Smith	TN
145	47175	Van Buren	TN
145	47177	Warren	TN
145	47185	White	TN
146	37019	Brunswick	NC
146	37047	Columbus	NC
146	37129	New Hanover	NC
146	37141	Pender	NC
147	10005	Sussex	DE
147	24039	Somerset	MD
147	24045	Wicomico	MD
147	24047	Worcester	MD
147	51001	Accomack	VA
147	51131	Northampton	VA
148	53029	Island	WA
148	53055	San Juan	WA
148	53057	Skagit	WA
148	53073	Whatcom	WA
149	28039	George	MS
149	28045	Hancock	MS
149	28047	Harrison	MS
149	28059	Jackson	MS
149	28131	Stone	MS
150	29029	Camden	MO
150	29059	Dallas	MO
150	29065	Dent	MO
150	29085	Hickory	MO
150	29105	Laclede	MO
150	29125	Maries	MO
150	29131	Miller	MO
150	29141	Morgan	MO
150	29149	Oregon	MO
150	29161	Phelps	MO
150	29167	Polk	MO
150	29169	Pulaski	MO
150	29203	Shannon	MO
150	29215	Texas	MO
150	29225	Webster	MO
150	29229	Wright	MO
151	37067	Forsyth	NC
151	37169	Stokes	NC
152	48183	Gregg	TX
152	48203	Harrison	TX
152	48423	Smith	TX
153	55027	Dodge	WI
153	55039	Fond du Lac	WI
153	55047	Green Lake	WI
153	55055	Jefferson	WI
153	55127	Walworth	WI
154	45033	Dillon	SC
154	45043	Georgetown	SC
154	45051	Horry	SC
154	45067	Marion	SC
155	55015	Calumet	WI
155	55087	Outagamie	WI
155	55139	Winnebago	WI
156	16001	Ada	ID
157	04012	La Paz	AZ
157	04027	Yuma	AZ
157	06025	Imperial	CA
158	30029	Flathead	MT
158	30039	Granite	MT
158	30047	Lake	MT
158	30049	Lewis and Clark	MT
158	30053	Lincoln	MT
158	30061	Mineral	MT

PEA No.	Federal Information Processing System No.	County name	State
158	30063	Missoula	MT
158	30077	Powell	MT
158	30081	Ravalli	MT
158	30089	Sanders	MT
159	13007	Baker	GA
159	13017	Ben Hill	GA
159	13019	Berrien	GA
159	13027	Brooks	GA
159	13037	Calhoun	GA
159	13061	Clay	GA
159	13071	Colquitt	GA
159	13075	Cook	GA
159	13101	Echols	GA
159	13155	Irwin	GA
159	13173	Lanier	GA
159	13185	Lowndes	GA
159	13205	Mitchell	GA
159	13243	Randolph	GA
159	13273	Terrell	GA
159	13277	Tift	GA
159	13287	Turner	GA
159	13321	Worth	GA
160	48015	Austin	TX
160	48051	Burleson	TX
160	48057	Calhoun	TX
160	48089	Colorado	TX
160	48123	DeWitt	TX
160	48149	Fayette	TX
160	48175	Goliad	TX
160	48239	Jackson	TX
160	48285	Lavaca	TX
160	48321	Matagorda	TX
160	48469	Victoria	TX
160	48477	Washington	TX
160	48481	Wharton	TX
161	17003	Alexander	IL
161	17055	Franklin	IL
161	17059	Gallatin	IL
161	17065	Hamilton	IL
161	17069	Hardin	IL
161	17077	Jackson	IL
161	17081	Jefferson	IL
161	17087	Johnson	IL
161	17145	Perry	IL
161	17151	Pope	IL
161	17153	Pulaski	IL
161	17157	Randolph	IL
161	17165	Saline	IL
161	17181	Union	IL
161	17189	Washington	IL
161	17199	Williamson	IL
162	18025	Crawford	IN
162	18061	Harrison	IN
162	18175	Washington	IN
162	21027	Breckinridge	KY
162	21085	Grayson	KY
162	21093	Hardin	KY
162	21123	Larue	KY
162	21155	Marion	KY
162	21163	Meade	KY
162	21179	Nelson	KY
162	21215	Spencer	KY
162	21229	Washington	KY
163	19163	Scott	IA
163	17073	Henry	IL
163	17161	Rock Island	IL
164	01001	Autauga	AL
164	01051	Elmore	AL
164	01101	Montgomery	AL
165	01017	Chambers	AL
165	01019	Cherokee	AL
165	01029	Cleburne	AL
165	01111	Randolph	AL
165	13015	Bartow	GA
165	13055	Chattooga	GA
165	13115	Floyd	GA
165	13233	Polk	GA
166	06049	Modoc	CA
166	06089	Shasta	CA
166	06093	Siskiyou	CA
166	06103	Tehama	CA
166	41035	Klamath	OR
167	51005	Alleghany	VA
167	51015	Augusta	VA
167	51017	Bath	VA
167	51530	Buena Vista City	VA
167	51580	Covington City	VA
167	51660	Harrisonburg City.	VA
167	51091	Highland	VA
167	51678	Lexington City	VA
167	51163	Rockbridge	VA
167	51165	Rockingham	VA
167	51790	Staunton City	VA
167	51820	Waynesboro City.	VA
167	54025	Greenbrier	WV
167	54071	Pendleton	WV
167	54075	Pocahontas	WV
168	17143	Peoria	IL
168	17179	Tazewell	IL
168	17203	Woodford	IL
169	37061	Duplin	NC
169	37133	Onslow	NC
169	37191	Wayne	NC
170	01005	Barbour	AL
170	01031	Coffee	AL
170	01039	Covington	AL
170	01045	Dale	AL
170	01061	Geneva	AL
170	01067	Henry	AL
170	01069	Houston	AL
170	12059	Holmes	FL
170	12133	Washington	FL
170	13239	Quitman	GA
171	05033	Crawford	AR
171	05047	Franklin	AR
171	05083	Logan	AR
171	05127	Scott	AR
171	05131	Sebastian	AR
171	40061	Haskell	OK
171	40077	Latimer	OK
171	40079	Le Flore	OK
171	40135	Sequoyah	OK
172	27017	Carlton	MN
172	27031	Cook	MN
172	27061	Itasca	MN
172	27071	Koochiching	MN
172	27075	Lake	MN
172	27137	St. Louis	MN
172	55031	Douglas	WI
173	51019	Bedford	VA
173	51515	Bedford City	VA
173	51035	Carroll	VA
173	51063	Floyd	VA
173	51067	Franklin	VA
173	51071	Giles	VA
173	51121	Montgomery	VA
173	51155	Pulaski	VA
173	51750	Radford City	VA
173	54063	Monroe	WV
174	29043	Christian	MO
174	29077	Greene	MO
175	28009	Benton	MS
175	28033	DeSoto	MS
175	28071	Lafayette	MS
175	28093	Marshall	MS
175	28107	Panola	MS
175	28119	Quitman	MS
175	28137	Tate	MS
175	28143	Tunica	MS
175	28161	Yalobusha	MS
176	19015	Boone	IA
176	19025	Calhoun	IA
176	19027	Carroll	IA
176	19047	Crawford	IA
176	19073	Greene	IA
176	19075	Grundy	IA
176	19079	Hamilton	IA
176	19083	Hardin	IA
176	19091	Humboldt	IA
176	19127	Marshall	IA
176	19161	Sac	IA
176	19169	Story	IA
176	19171	Tama	IA
176	19187	Webster	IA
176	19197	Wright	IA
177	13029	Bryan	GA
177	13051	Chatham	GA
177	13103	Effingham	GA
178	20003	Anderson	KS
178	20011	Bourbon	KS
178	20059	Franklin	KS
178	20107	Linn	KS
178	20121	Miami	KS
178	29013	Bates	MO
178	29015	Benton	MO
178	29039	Cedar	MO
178	29083	Henry	MO
178	29101	Johnson	MO
178	29107	Lafayette	MO
178	29159	Pettis	MO
178	29195	Saline	MO
178	29185	St. Clair	MO
178	29217	Vernon	MO
179	19007	Appanoose	IA
179	19051	Davis	IA
179	19057	Des Moines	IA
179	19087	Henry	IA
179	19099	Jasper	IA
179	19101	Jefferson	IA
179	19107	Keokuk	IA
179	19111	Lee	IA
179	19123	Mahaska	IA
179	19125	Marion	IA
179	19135	Monroe	IA
179	19157	Poweshiek	IA
179	19177	Van Buren	IA
179	19179	Wapello	IA
179	17067	Hancock	IL
179	17071	Henderson	IL
179	29045	Clark	MO
179	29199	Scotland	MO
180	04005	Coconino	AZ
180	04025	Yavapai	AZ
181	05081	Little River	AR
181	05091	Miller	AR
181	05113	Polk	AR
181	05133	Sevier	AR
181	40013	Bryan	OK
181	40023	Choctaw	OK
181	40089	McCurtain	OK
181	40127	Pushmataha	OK

PEA No.	Federal Information Processing System No.	County name	State
181	48037	Bowie	TX
181	48067	Cass	TX
181	48315	Marion	TX
181	48343	Morris	TX
182	19103	Johnson	IA
182	19113	Linn	IA
183	29019	Boone	MO
183	29027	Callaway	MO
183	29051	Cole	MO
183	29053	Cooper	MO
183	29089	Howard	MO
183	29135	Moniteau	MO
183	29151	Osage	MO
184	22021	Caldwell Parish	LA
184	22035	East Carroll Parish.	LA
184	22041	Franklin Parish	LA
184	22049	Jackson Parish	LA
184	22061	Lincoln Parish	LA
184	22067	Morehouse Parish.	LA
184	22073	Ouachita Parish	LA
184	22083	Richland Parish	LA
184	22111	Union Parish	LA
184	22123	West Carroll Parish.	LA
185	26013	Baraga	MI
185	26043	Dickinson	MI
185	26053	Gogebic	MI
185	26061	Houghton	MI
185	26071	Iron	MI
185	26083	Keweenaw	MI
185	26103	Marquette	MI
185	26109	Menominee	MI
185	26131	Ontonagon	MI
185	55037	Florence	WI
185	55051	Iron	WI
185	55075	Marinette	WI
185	55078	Menominee	WI
185	55083	Oconto	WI
185	55115	Shawano	WI
186	45023	Chester	SC
186	45057	Lancaster	SC
186	45091	York	SC
187	16005	Bannock	ID
187	16011	Bingham	ID
187	16019	Bonneville	ID
187	16033	Clark	ID
187	16043	Fremont	ID
187	16051	Jefferson	ID
187	16065	Madison	ID
187	16077	Power	ID
187	16081	Teton	ID
188	36003	Allegany	NY
188	36009	Cattaraugus	NY
188	36013	Chautauqua	NY
188	42083	McKean	PA
188	42105	Potter	PA
189	22003	Allen Parish	LA
189	22009	Avoyelles Parish	LA
189	22011	Beauregard Parish.	LA
189	22043	Grant Parish	LA
189	22059	La Salle Parish	LA
189	22079	Rapides Parish	LA
189	22115	Vernon Parish	LA
190	30019	Daniels	MT
190	30021	Dawson	MT
190	30031	Gallatin	MT
190	30033	Garfield	MT
190	30037	Golden Valley	MT
190	30057	Madison	MT
190	30055	McCone	MT
190	30065	Musselshell	MT
190	30067	Park	MT
190	30069	Petroleum	MT
190	30083	Richland	MT
190	30085	Roosevelt	MT
190	30091	Sheridan	MT
190	30095	Stillwater	MT
190	30097	Sweet Grass	MT
190	30105	Valley	MT
190	30111	Yellowstone	MT
191	51007	Amelia	VA
191	51025	Brunswick	VA
191	51029	Buckingham	VA
191	51037	Charlotte	VA
191	51570	Colonial Heights City.	VA
191	51049	Cumberland	VA
191	51053	Dinwiddie	VA
191	51595	Emporia City	VA
191	51081	Greensville	VA
191	51670	Hopewell City	VA
191	51111	Lunenburg	VA
191	51117	Mecklenburg	VA
191	51135	Nottoway	VA
191	51730	Petersburg City	VA
191	51147	Prince Edward	VA
191	51149	Prince George	VA
191	51183	Sussex	VA
192	37051	Cumberland	NC
193	20005	Atchison	KS
193	20043	Doniphan	KS
193	20045	Douglas	KS
193	20103	Leavenworth	KS
193	29003	Andrew	MO
193	29021	Buchanan	MO
194	42023	Cameron	PA
194	42027	Centre	PA
194	42033	Clearfield	PA
194	42047	Elk	PA
194	42065	Jefferson	PA
195	16009	Benewah	ID
195	16017	Bonner	ID
195	16021	Boundary	ID
195	16035	Clearwater	ID
195	16049	Idaho	ID
195	16055	Kootenai	ID
195	16057	Latah	ID
195	16061	Lewis	ID
195	16069	Nez Perce	ID
195	16079	Shoshone	ID
196	29017	Bollinger	MO
196	29023	Butler	MO
196	29031	Cape Girardeau	MO
196	29035	Carter	MO
196	29093	Iron	MO
196	29123	Madison	MO
196	29133	Mississippi	MO
196	29143	New Madrid	MO
196	29157	Perry	MO
196	29179	Reynolds	MO
196	29181	Ripley	MO
196	29201	Scott	MO
196	29207	Stoddard	MO
196	29223	Wayne	MO
197	39013	Belmont	OH
197	39081	Jefferson	OH
197	39111	Monroe	OH
197	54009	Brooke	WV
197	54029	Hancock	WV
197	54051	Marshall	WV
197	54069	Ohio	WV
197	54095	Tyler	WV
197	54103	Wetzel	WV
198	05021	Clay	AR
198	05031	Craighead	AR
198	05055	Greene	AR
198	05075	Lawrence	AR
198	05093	Mississippi	AR
198	05111	Poinsett	AR
198	05121	Randolph	AR
198	29069	Dunklin	MO
198	29155	Pemiscot	MO
199	13111	Fannin	GA
199	13123	Gilmer	GA
199	13129	Gordon	GA
199	13213	Murray	GA
199	13227	Pickens	GA
199	13281	Towns	GA
199	13291	Union	GA
199	13313	Whitfield	GA
200	37033	Caswell	NC
200	37157	Rockingham	NC
200	51590	Danville City	VA
200	51089	Henry	VA
200	51690	Martinsville City	VA
200	51141	Patrick	VA
200	51143	Pittsylvania	VA
201	48019	Bandera	TX
201	48127	Dimmit	TX
201	48163	Frio	TX
201	48171	Gillespie	TX
201	48259	Kendall	TX
201	48265	Kerr	TX
201	48283	La Salle	TX
201	48323	Maverick	TX
201	48325	Medina	TX
201	48385	Real	TX
201	48463	Uvalde	TX
201	48507	Zavala	TX
202	01113	Russell	AL
202	13053	Chattahoochee	GA
202	13145	Harris	GA
202	13197	Marion	GA
202	13215	Muscogee	GA
202	13259	Stewart	GA
202	13307	Webster	GA
203	26009	Antrim	MI
203	26019	Benzie	MI
203	26055	Grand Traverse	MI
203	26079	Kalkaska	MI
203	26085	Lake	MI
203	26089	Leelanau	MI
203	26101	Manistee	MI
203	26105	Mason	MI
203	26113	Missaukee	MI
203	26133	Osceola	MI
203	26165	Wexford	MI
204	21055	Crittenden	KY
204	21059	Daviess	KY
204	21091	Hancock	KY
204	21101	Henderson	KY
204	21107	Hopkins	KY
204	21149	McLean	KY
204	21177	Muhlenberg	KY
204	21183	Ohio	KY
204	21225	Union	KY
204	21233	Webster	KY
205	06023	Humboldt	CA
205	06033	Lake	CA
205	06045	Mendocino	CA

PEA No.	Federal Information Processing System No.	County name	State
205	06105	Trinity	CA
206	53001	Adams	WA
206	53007	Chelan	WA
206	53017	Douglas	WA
206	53025	Grant	WA
206	53037	Kittitas	WA
206	53047	Okanogan	WA
207	13003	Atkinson	GA
207	13005	Bacon	GA
207	13025	Brantley	GA
207	13039	Camden	GA
207	13049	Charlton	GA
207	13065	Clinch	GA
207	13069	Coffee	GA
207	13127	Glynn	GA
207	13191	McIntosh	GA
207	13229	Pierce	GA
207	13299	Ware	GA
208	37097	Iredell	NC
208	37159	Rowan	NC
209	55009	Brown	WI
209	55029	Door	WI
209	55061	Kewaunee	WI
210	36007	Broome	NY
210	36107	Tioga	NY
210	42115	Susquehanna	PA
211	40005	Atoka	OK
211	40019	Carter	OK
211	40029	Coal	OK
211	40033	Cotton	OK
211	40049	Garvin	OK
211	40063	Hughes	OK
211	40067	Jefferson	OK
211	40069	Johnston	OK
211	40085	Love	OK
211	40095	Marshall	OK
211	40099	Murray	OK
211	40107	Okfuskee	OK
211	40123	Pontotoc	OK
211	40133	Seminole	OK
211	40137	Stephens	OK
212	02020	Anchorage Borough.	AK
213	41013	Crook	OR
213	41017	Deschutes	OR
213	41027	Hood River	OR
213	41031	Jefferson	OR
213	41037	Lake	OR
213	41055	Sherman	OR
213	41065	Wasco	OR
213	53039	Klickitat	WA
213	53059	Skamania	WA
214	31109	Lancaster	NE
215	37003	Alexander	NC
215	37023	Burke	NC
215	37035	Catawba	NC
216	20021	Cherokee	KS
216	20037	Crawford	KS
216	29011	Barton	MO
216	29097	Jasper	MO
216	29145	Newton	MO
216	40115	Ottawa	OK
217	48303	Lubbock	TX
218	55073	Marathon	WI
218	55097	Portage	WI
218	55141	Wood	WI
219	19019	Buchanan	IA
219	19021	Buena Vista	IA
219	19023	Butler	IA
219	19033	Cerro Gordo	IA
219	19037	Chickasaw	IA
219	19041	Clay	IA
219	19059	Dickinson	IA
219	19063	Emmet	IA
219	19065	Fayette	IA
219	19067	Floyd	IA
219	19069	Franklin	IA
219	19081	Hancock	IA
219	19109	Kossuth	IA
219	19131	Mitchell	IA
219	19147	Palo Alto	IA
219	19151	Pocahontas	IA
219	19189	Winnebago	IA
219	19195	Worth	IA
220	48135	Ector	TX
220	48329	Midland	TX
221	48247	Jim Hogg	TX
221	48479	Webb	TX
221	48505	Zapata	TX
222	47029	Cocke	TN
222	47057	Grainger	TN
222	47063	Hamblen	TN
222	47067	Hancock	TN
222	47089	Jefferson	TN
222	47155	Sevier	TN
223	19061	Dubuque	IA
223	19097	Jackson	IA
223	17085	Jo Daviess	IL
223	55043	Grant	WI
223	55045	Green	WI
223	55049	Iowa	WI
223	55065	Lafayette	WI
224	17015	Carroll	IL
224	17037	DeKalb	IL
224	17103	Lee	IL
224	17141	Ogle	IL
224	17177	Stephenson	IL
225	27055	Houston	MN
225	55053	Jackson	WI
225	55063	La Crosse	WI
225	55081	Monroe	WI
225	55121	Trempealeau	WI
225	55123	Vernon	WI
226	39003	Allen	OH
226	39011	Auglaize	OH
226	39107	Mercer	OH
226	39137	Putnam	OH
226	39161	Van Wert	OH
227	36045	Jefferson	NY
227	36049	Lewis	NY
227	36089	St. Lawrence	NY
228	51023	Botetourt	VA
228	51045	Craig	VA
228	51161	Roanoke	VA
228	51770	Roanoke City	VA
228	51775	Salem City	VA
229	32009	Esmeralda	NV
229	32017	Lincoln	NV
229	32021	Mineral	NV
229	32023	Nye	NV
229	49001	Beaver	UT
229	49017	Garfield	UT
229	49021	Iron	UT
229	49031	Piute	UT
229	49053	Washington	UT
230	37017	Bladen	NC
230	37093	Hoke	NC
230	37155	Robeson	NC
230	37165	Scotland	NC
231	31003	Antelope	NE
231	31011	Boone	NE
231	31021	Burt	NE
231	31023	Butler	NE
231	31025	Cass	NE
231	31037	Colfax	NE
231	31039	Cuming	NE
231	31053	Dodge	NE
231	31119	Madison	NE
231	31125	Nance	NE
231	31139	Pierce	NE
231	31141	Platte	NE
231	31143	Polk	NE
231	31155	Saunders	NE
231	31167	Stanton	NE
231	31177	Washington	NE
231	31179	Wayne	NE
232	20013	Brown	KS
232	20031	Coffey	KS
232	20085	Jackson	KS
232	20087	Jefferson	KS
232	20139	Osage	KS
232	20177	Shawnee	KS
233	37045	Cleveland	NC
233	37109	Lincoln	NC
233	37161	Rutherford	NC
234	37057	Davidson	NC
234	37059	Davie	NC
234	37197	Yadkin	NC
235	48375	Potter	TX
235	48381	Randall	TX
236	31001	Adams	NE
236	31015	Boyd	NE
236	31017	Brown	NE
236	31019	Buffalo	NE
236	31035	Clay	NE
236	31041	Custer	NE
236	31047	Dawson	NE
236	31071	Garfield	NE
236	31077	Greeley	NE
236	31079	Hall	NE
236	31081	Hamilton	NE
236	31089	Holt	NE
236	31093	Howard	NE
236	31103	Keya Paha	NE
236	31115	Loup	NE
236	31121	Merrick	NE
236	31129	Nuckolls	NE
236	31149	Rock	NE
236	31163	Sherman	NE
236	31175	Valley	NE
236	31181	Webster	NE
236	31183	Wheeler	NE
237	13031	Bulloch	GA
237	13043	Candler	GA
237	13109	Evans	GA
237	13179	Liberty	GA
237	13183	Long	GA
237	13251	Screven	GA
237	13267	Tattnall	GA
237	13305	Wayne	GA
238	45031	Darlington	SC
238	45041	Florence	SC
238	45089	Williamsburg	SC
239	37025	Cabarrus	NC
239	37167	Stanly	NC
240	51003	Albemarle	VA
240	51540	Charlottesville City.	VA
240	51065	Fluvanna	VA
240	51079	Greene	VA
240	51109	Louisa	VA
240	51125	Nelson	VA
241	13001	Appling	GA

PEA No.	Federal Information Processing System No.	County name	State
241	13107	Emanuel	GA
241	13141	Hancock	GA
241	13161	Jeff Davis	GA
241	13167	Johnson	GA
241	13175	Laurens	GA
241	13209	Montgomery	GA
241	13237	Putnam	GA
241	13271	Telfair	GA
241	13279	Toombs	GA
241	13283	Treutlen	GA
241	13303	Washington	GA
241	13309	Wheeler	GA
242	22019	Calcasieu Parish	LA
242	22023	Cameron Parish	LA
242	22053	Jefferson Davis Parish.	LA
243	17127	Massac	IL
243	21007	Ballard	KY
243	21033	Caldwell	KY
243	21035	Calloway	KY
243	21039	Carlisle	KY
243	21083	Graves	KY
243	21139	Livingston	KY
243	21143	Lyon	KY
243	21157	Marshall	KY
243	21145	McCracken	KY
244	20017	Chase	KS
244	20027	Clay	KS
244	20041	Dickinson	KS
244	20061	Geary	KS
244	20111	Lyon	KS
244	20117	Marshall	KS
244	20127	Morris	KS
244	20131	Nemaha	KS
244	20149	Pottawatomie	KS
244	20161	Riley	KS
244	20197	Wabaunsee	KS
244	20201	Washington	KS
245	29009	Barry	MO
245	29057	Dade	MO
245	29067	Douglas	MO
245	29091	Howell	MO
245	29109	Lawrence	MO
245	29153	Ozark	MO
245	29209	Stone	MO
245	29213	Taney	MO
246	01027	Clay	AL
246	01037	Coosa	AL
246	01081	Lee	AL
246	01087	Macon	AL
246	01123	Tallapoosa	AL
247	16027	Canyon	ID
247	16039	Elmore	ID
247	16073	Owyhee	ID
248	45027	Clarendon	SC
248	45055	Kershaw	SC
248	45061	Lee	SC
248	45085	Sumter	SC
249	48041	Brazos	TX
249	48185	Grimes	TX
250	35013	Dona Ana	NM
250	35051	Sierra	NM
251	20007	Barber	KS
251	20009	Barton	KS
251	20033	Comanche	KS
251	20047	Edwards	KS
251	20051	Ellis	KS
251	20053	Ellsworth	KS
251	20097	Kiowa	KS
251	20115	Marion	KS
251	20113	McPherson	KS
251	20135	Ness	KS
251	20145	Pawnee	KS
251	20151	Pratt	KS
251	20159	Rice	KS
251	20165	Rush	KS
251	20167	Russell	KS
251	20169	Saline	KS
251	20185	Stafford	KS
251	20195	Trego	KS
252	19035	Cherokee	IA
252	19093	Ida	IA
252	19133	Monona	IA
252	19141	O'Brien	IA
252	19149	Plymouth	IA
252	19167	Sioux	IA
252	19193	Woodbury	IA
252	46127	Union	SD
253	55001	Adams	WI
253	55021	Columbia	WI
253	55023	Crawford	WI
253	55057	Juneau	WI
253	55077	Marquette	WI
253	55103	Richland	WI
253	55111	Sauk	WI
254	55003	Ashland	WI
254	55007	Bayfield	WI
254	55019	Clark	WI
254	55041	Forest	WI
254	55067	Langlade	WI
254	55069	Lincoln	WI
254	55085	Oneida	WI
254	55099	Price	WI
254	55119	Taylor	WI
254	55125	Vilas	WI
255	28011	Bolivar	MS
255	28015	Carroll	MS
255	28027	Coahoma	MS
255	28053	Humphreys	MS
255	28055	Issaquena	MS
255	28083	Leflore	MS
255	28125	Sharkey	MS
255	28133	Sunflower	MS
255	28135	Tallahatchie	MS
255	28151	Washington	MS
256	51009	Amherst	VA
256	51011	Appomattox	VA
256	51031	Campbell	VA
256	51083	Halifax	VA
256	51680	Lynchburg City	VA
257	56001	Albany	WY
257	56005	Campbell	WY
257	56009	Converse	WY
257	56011	Crook	WY
257	56021	Laramie	WY
257	56027	Niobrara	WY
257	56031	Platte	WY
257	56045	Weston	WY
258	01009	Blount	AL
258	01043	Cullman	AL
258	01057	Fayette	AL
258	01093	Marion	AL
258	01133	Winston	AL
259	35005	Chaves	NM
259	35015	Eddy	NM
259	35025	Lea	NM
259	48165	Gaines	TX
259	48501	Yoakum	TX
260	26007	Alpena	MI
260	26029	Charlevoix	MI
260	26031	Cheboygan	MI
260	26039	Crawford	MI
260	26047	Emmet	MI
260	26119	Montmorency	MI
260	26135	Oscoda	MI
260	26137	Otsego	MI
260	26141	Presque Isle	MI
260	26143	Roscommon	MI
261	27027	Clay	MN
261	38017	Cass	ND
262	45013	Beaufort	SC
262	45049	Hampton	SC
262	45053	Jasper	SC
263	35019	Guadalupe	NM
263	35028	Los Alamos	NM
263	35033	Mora	NM
263	35047	San Miguel	NM
263	35049	Santa Fe	NM
264	02013	Aleutians East Borough.	AK
264	02016	Aleutians West Census Area.	AK
264	02050	Bethel Census Area.	AK
264	02060	Bristol Bay Borough.	AK
264	02070	Dillingham Census Area.	AK
264	02122	Kenai Peninsula Borough.	AK
264	02150	Kodiak Island Borough.	AK
264	02164	Lake and Peninsula Borough.	AK
264	02170	Matanuska-Susitna Borough.	AK
264	02261	Valdez-Cordova Census Area.	AK
265	19089	Howard	IA
265	19191	Winneshiek	IA
265	27039	Dodge	MN
265	27045	Fillmore	MN
265	27099	Mower	MN
265	27157	Wabasha	MN
265	27169	Winona	MN
265	55011	Buffalo	WI
266	37009	Ashe	NC
266	37011	Avery	NC
266	37027	Caldwell	NC
266	37189	Watauga	NC
266	47091	Johnson	TN
267	55071	Manitowoc	WI
267	55117	Sheboygan	WI
268	19031	Cedar	IA
268	19045	Clinton	IA
268	19115	Louisa	IA
268	19139	Muscatine	IA
268	17131	Mercer	IL
268	17195	Whiteside	IL
269	55101	Racine	WI
270	17011	Bureau	IL
270	17099	La Salle	IL
270	17105	Livingston	IL
270	17155	Putnam	IL
271	36015	Chemung	NY
271	42015	Bradford	PA
271	42117	Tioga	PA
272	48035	Bosque	TX
272	48049	Brown	TX
272	48083	Coleman	TX
272	48093	Comanche	TX
272	48133	Eastland	TX

PEA No.	Federal Information Processing System No.	County name	State
272	48143	Erath	TX
272	48193	Hamilton	TX
272	48217	Hill	TX
272	48333	Mills	TX
272	48425	Somervell	TX
273	17039	De Witt	IL
273	17113	McLean	IL
274	16013	Blaine	ID
274	16025	Camas	ID
274	16031	Cassia	ID
274	16047	Gooding	ID
274	16053	Jerome	ID
274	16063	Lincoln	ID
274	16067	Minidoka	ID
274	16083	Twin Falls	ID
275	48001	Anderson	TX
275	48213	Henderson	TX
275	48349	Navarro	TX
276	30011	Carter	MT
276	38001	Adams	ND
276	46019	Butte	SD
276	46033	Custer	SD
276	46047	Fall River	SD
276	46063	Harding	SD
276	46081	Lawrence	SD
276	46093	Meade	SD
276	46103	Pennington	SD
276	46105	Perkins	SD
277	20035	Cowley	KS
277	20049	Elk	KS
277	20073	Greenwood	KS
277	20077	Harper	KS
277	20079	Harvey	KS
277	20095	Kingman	KS
277	20155	Reno	KS
277	20191	Sumner	KS
278	20001	Allen	KS
278	20019	Chautauqua	KS
278	20099	Labette	KS
278	20125	Montgomery	KS
278	20133	Neosho	KS
278	20205	Wilson	KS
278	20207	Woodson	KS
278	40035	Craig	OK
278	40105	Nowata	OK
278	40147	Washington	OK
279	16041	Franklin	ID
279	16071	Oneida	ID
279	49003	Box Elder	UT
279	49005	Cache	UT
280	20025	Clark	KS
280	20055	Finney	KS
280	20057	Ford	KS
280	20067	Grant	KS
280	20069	Gray	KS
280	20071	Greeley	KS
280	20075	Hamilton	KS
280	20081	Haskell	KS
280	20083	Hodgeman	KS
280	20093	Kearny	KS
280	20101	Lane	KS
280	20119	Meade	KS
280	20129	Morton	KS
280	20171	Scott	KS
280	20175	Seward	KS
280	20187	Stanton	KS
280	20189	Stevens	KS
280	20203	Wichita	KS
280	40007	Beaver	OK
280	40025	Cimarron	OK
280	40139	Texas	OK
281	40091	McIntosh	OK
281	40101	Muskogee	OK
281	40111	Okmulgee	OK
281	40121	Pittsburg	OK
282	17057	Fulton	IL
282	17095	Knox	IL
282	17123	Marshall	IL
282	17125	Mason	IL
282	17109	McDonough	IL
282	17175	Stark	IL
282	17187	Warren	IL
283	36019	Clinton	NY
283	36031	Essex	NY
283	36033	Franklin	NY
284	45001	Abbeville	SC
284	45047	Greenwood	SC
284	45059	Laurens	SC
284	45065	McCormick	SC
285	04001	Apache	AZ
285	35006	Cibola	NM
285	35031	McKinley	NM
286	46099	Minnehaha	SD
287	55059	Kenosha	WI
288	48059	Callahan	TX
288	48253	Jones	TX
288	48441	Taylor	TX
289	49007	Carbon	UT
289	49013	Duchesne	UT
289	49015	Emery	UT
289	49019	Grand	UT
289	49029	Morgan	UT
289	49043	Summit	UT
289	49047	Uintah	UT
289	49051	Wasatch	UT
289	49055	Wayne	UT
290	27011	Big Stone	MN
290	27117	Pipestone	MN
290	27133	Rock	MN
290	27155	Traverse	MN
290	46005	Beadle	SD
290	46011	Brookings	SD
290	46025	Clark	SD
290	46029	Codington	SD
290	46039	Deuel	SD
290	46051	Grant	SD
290	46057	Hamlin	SD
290	46077	Kingsbury	SD
290	46079	Lake	SD
290	46097	Miner	SD
290	46101	Moody	SD
290	46109	Roberts	SD
290	46111	Sanborn	SD
291	37123	Montgomery	NC
291	37125	Moore	NC
291	37153	Richmond	NC
292	08101	Pueblo	CO
293	21221	Trigg	KY
293	47081	Hickman	TN
293	47083	Houston	TN
293	47085	Humphreys	TN
293	47099	Lawrence	TN
293	47101	Lewis	TN
293	47135	Perry	TN
293	47161	Stewart	TN
293	47181	Wayne	TN
294	19013	Black Hawk	IA
294	19017	Bremer	IA
295	40071	Kay	OK
295	40103	Noble	OK
295	40117	Pawnee	OK
295	40119	Payne	OK
296	42107	Schuylkill	PA
297	41001	Baker	OR
297	41021	Gilliam	OR
297	41023	Grant	OR
297	41049	Morrow	OR
297	41059	Umatilla	OR
297	41061	Union	OR
297	41063	Wallowa	OR
297	41069	Wheeler	OR
298	02068	Denali Borough	AK
298	02090	Fairbanks North Star Borough.	AK
298	02180	Nome Census Area.	AK
298	02185	North Slope Borough.	AK
298	02188	Northwest Arctic Borough.	AK
298	02240	Southeast Fairbanks Census Area.	AK
298	02270	Wade Hampton Census Area.	AK
298	02290	Yukon-Koyukuk Census Area.	AK
299	29001	Adair	MO
299	29025	Caldwell	MO
299	29033	Carroll	MO
299	29049	Clinton	MO
299	29061	Daviess	MO
299	29063	DeKalb	MO
299	29079	Grundy	MO
299	29081	Harrison	MO
299	29103	Knox	MO
299	29117	Livingston	MO
299	29129	Mercer	MO
299	29171	Putnam	MO
299	29197	Schuyler	MO
299	29211	Sullivan	MO
300	01011	Bullock	AL
300	01013	Butler	AL
300	01041	Crenshaw	AL
300	01047	Dallas	AL
300	01085	Lowndes	AL
300	01105	Perry	AL
300	01109	Pike	AL
301	27109	Olmsted	MN
302	40003	Alfalfa	OK
302	40011	Blaine	OK
302	40015	Caddo	OK
302	40047	Garfield	OK
302	40053	Grant	OK
302	40073	Kingfisher	OK
302	40093	Major	OK
302	40151	Woods	OK
303	30005	Blaine	MT
303	30013	Cascade	MT
303	30015	Chouteau	MT
303	30035	Glacier	MT
303	30041	Hill	MT
303	30051	Liberty	MT
303	30073	Pondera	MT
303	30099	Teton	MT
303	30101	Toole	MT
304	37171	Surry	NC
304	37193	Wilkes	NC
305	40009	Beckham	OK
305	40039	Custer	OK
305	40043	Dewey	OK
305	40045	Ellis	OK
305	40055	Greer	OK

PEA No.	Federal Information Processing System No.	County name	State
305	40057	Harmon	OK
305	40059	Harper	OK
305	40065	Jackson	OK
305	40075	Kiowa	OK
305	40129	Roger Mills	OK
305	40149	Washita	OK
305	40153	Woodward	OK
306	48077	Clay	TX
306	48485	Wichita	TX
307	19119	Lyon	IA
307	31027	Cedar	NE
307	31107	Knox	NE
307	46009	Bon Homme	SD
307	46027	Clay	SD
307	46061	Hanson	SD
307	46067	Hutchinson	SD
307	46083	Lincoln	SD
307	46087	McCook	SD
307	46125	Turner	SD
307	46135	Yankton	SD
308	13079	Crawford	GA
308	13081	Crisp	GA
308	13093	Dooly	GA
308	13193	Macon	GA
308	13207	Monroe	GA
308	13249	Schley	GA
308	13261	Sumter	GA
308	13269	Taylor	GA
309	37015	Bertie	NC
309	37029	Camden	NC
309	37041	Chowan	NC
309	37073	Gates	NC
309	37091	Hertford	NC
309	37139	Pasquotank	NC
309	37143	Perquimans	NC
310	29055	Crawford	MO
310	29187	St. Francois	MO
310	29186	Ste. Genevieve	MO
310	29221	Washington	MO
311	08003	Alamosa	CO
311	08009	Baca	CO
311	08011	Bent	CO
311	08017	Cheyenne	CO
311	08021	Conejos	CO
311	08023	Costilla	CO
311	08025	Crowley	CO
311	08055	Huerfano	CO
311	08061	Kiowa	CO
311	08071	Las Animas	CO
311	08079	Mineral	CO
311	08089	Otero	CO
311	08099	Prowers	CO
311	08105	Rio Grande	CO
311	08109	Saguache	CO
311	35007	Colfax	NM
312	35045	San Juan	NM
313	48021	Bastrop	TX
313	48055	Caldwell	TX
313	48287	Lee	TX
314	48073	Cherokee	TX
314	48365	Panola	TX
314	48401	Rusk	TX
315	30003	Big Horn	MT
315	30009	Carbon	MT
315	30017	Custer	MT
315	30025	Fallon	MT
315	30075	Powder River	MT
315	30079	Prairie	MT
315	30087	Rosebud	MT
315	30103	Treasure	MT
315	56003	Big Horn	WY
315	56019	Johnson	WY
315	56029	Park	WY
315	56033	Sheridan	WY
316	16007	Bear Lake	ID
316	16029	Caribou	ID
316	49009	Daggett	UT
316	49033	Rich	UT
316	56007	Carbon	WY
316	56023	Lincoln	WY
316	56035	Sublette	WY
316	56037	Sweetwater	WY
316	56041	Uinta	WY
317	31059	Fillmore	NE
317	31067	Gage	NE
317	31095	Jefferson	NE
317	31097	Johnson	NE
317	31127	Nemaha	NE
317	31131	Otoe	NE
317	31133	Pawnee	NE
317	31147	Richardson	NE
317	31151	Saline	NE
317	31159	Seward	NE
317	31169	Thayer	NE
317	31185	York	NE
318	27069	Kittson	MN
318	27077	Lake of the Woods.	MN
318	27089	Marshall	MN
318	27113	Pennington	MN
318	27125	Red Lake	MN
318	27135	Roseau	MN
318	38005	Benson	ND
318	38019	Cavalier	ND
318	38027	Eddy	ND
318	38063	Nelson	ND
318	38067	Pembina	ND
318	38071	Ramsey	ND
318	38079	Rolette	ND
318	38091	Steele	ND
318	38095	Towner	ND
318	38097	Traill	ND
318	38099	Walsh	ND
319	13095	Dougherty	GA
319	13177	Lee	GA
320	48235	Irion	TX
320	48413	Schleicher	TX
320	48435	Sutton	TX
320	48451	Tom Green	TX
321	18029	Dearborn	IN
321	18047	Franklin	IN
321	18115	Ohio	IN
321	18137	Ripley	IN
321	18155	Switzerland	IN
322	38009	Bottineau	ND
322	38013	Burke	ND
322	38023	Divide	ND
322	38049	McHenry	ND
322	38053	McKenzie	ND
322	38061	Mountrail	ND
322	38075	Renville	ND
322	38101	Ward	ND
322	38105	Williams	ND
323	35003	Catron	NM
323	35053	Socorro	NM
323	35057	Torrance	NM
323	35061	Valencia	NM
324	42103	Pike	PA
324	42127	Wayne	PA
325	38015	Burleigh	ND
325	38059	Morton	ND
326	27005	Becker	MN
326	27087	Mahnomen	MN
326	27107	Norman	MN
326	27111	Otter Tail	MN
326	27167	Wilkin	MN
327	45017	Calhoun	SC
327	45075	Orangeburg	SC
328	04017	Navajo	AZ
329	48047	Brooks	TX
329	48131	Duval	TX
329	48249	Jim Wells	TX
329	48261	Kenedy	TX
329	48273	Kleberg	TX
329	48297	Live Oak	TX
329	48311	McMullen	TX
330	17033	Crawford	IL
330	17047	Edwards	IL
330	17101	Lawrence	IL
330	17159	Richland	IL
330	17185	Wabash	IL
330	17191	Wayne	IL
330	17193	White	IL
331	48079	Cochran	TX
331	48189	Hale	TX
331	48219	Hockley	TX
331	48279	Lamb	TX
331	48305	Lynn	TX
331	48437	Swisher	TX
331	48445	Terry	TX
332	37007	Anson	NC
332	45025	Chesterfield	SC
332	45069	Marlboro	SC
333	39037	Darke	OH
333	39149	Shelby	OH
334	48011	Armstrong	TX
334	48065	Carson	TX
334	48075	Childress	TX
334	48087	Collingsworth	TX
334	48101	Cottle	TX
334	48129	Donley	TX
334	48179	Gray	TX
334	48191	Hall	TX
334	48195	Hansford	TX
334	48211	Hemphill	TX
334	48233	Hutchinson	TX
334	48295	Lipscomb	TX
334	48357	Ochiltree	TX
334	48393	Roberts	TX
334	48483	Wheeler	TX
335	22031	De Soto Parish	LA
335	22069	Natchitoches Parish.	LA
335	22081	Red River Parish.	LA
335	22085	Sabine Parish	LA
336	27119	Polk	MN
336	38035	Grand Forks	ND
337	48097	Cooke	TX
337	48237	Jack	TX
337	48337	Montague	TX
337	48363	Palo Pinto	TX
338	08007	Archuleta	CO
338	08033	Dolores	CO
338	08067	La Plata	CO
338	08083	Montezuma	CO
338	08111	San Juan	CO
339	31007	Banner	NE
339	31013	Box Butte	NE
339	31033	Cheyenne	NE
339	31045	Dawes	NE
339	31105	Kimball	NE
339	31123	Morrill	NE

PEA No.	Federal Information Processing System No.	County name	State
339	31157	Scotts Bluff	NE
339	31165	Sioux	NE
339	56015	Goshen	WY
340	35009	Curry	NM
340	35011	DeBaca	NM
340	35021	Harding	NM
340	35037	Quay	NM
340	35041	Roosevelt	NM
340	35059	Union	NM
341	35027	Lincoln	NM
341	35035	Otero	NM
342	46003	Aurora	SD
342	46015	Brule	SD
342	46017	Buffalo	SD
342	46023	Charles Mix	SD
342	46035	Davison	SD
342	46043	Douglas	SD
342	46053	Gregory	SD
342	46059	Hand	SD
342	46065	Hughes	SD
342	46069	Hyde	SD
342	46073	Jerauld	SD
342	46085	Lyman	SD
342	46117	Stanley	SD
342	46119	Sully	SD
342	46123	Tripp	SD
343	48043	Brewster	TX
343	48103	Crane	TX
343	48105	Crockett	TX
343	48243	Jeff Davis	TX
343	48301	Loving	TX
343	48371	Pecos	TX
343	48377	Presidio	TX
343	48383	Reagan	TX
343	48389	Reeves	TX
343	48443	Terrell	TX
343	48461	Upton	TX
343	48475	Ward	TX
343	48495	Winkler	TX
344	01007	Bibb	AL
344	01021	Chilton	AL
344	01065	Hale	AL
345	45039	Fairfield	SC
345	45071	Newberry	SC
345	45081	Saluda	SC
346	37039	Cherokee	NC
346	37043	Clay	NC
346	37075	Graham	NC
346	37113	Macon	NC
347	22037	East Feliciana Parish.	LA
347	22077	Pointe Coupee Parish.	LA
347	22091	St. Helena Parish.	LA
347	22125	West Feliciana Parish.	LA
347	28157	Wilkinson	MS
348	46013	Brown	SD
348	46021	Campbell	SD
348	46037	Day	SD
348	46041	Dewey	SD
348	46045	Edmunds	SD
348	46049	Faulk	SD
348	46091	Marshall	SD
348	46089	McPherson	SD
348	46107	Potter	SD
348	46115	Spink	SD
348	46129	Walworth	SD
348	46137	Ziebach	SD
349	37111	McDowell	NC
349	37121	Mitchell	NC
349	37199	Yancey	NC
350	05037	Cross	AR
350	05077	Lee	AR
350	05107	Phillips	AR
350	05123	St. Francis	AR
351	30109	Wibaux	MT
351	38007	Billings	ND
351	38011	Bowman	ND
351	38025	Dunn	ND
351	38029	Emmons	ND
351	38033	Golden Valley	ND
351	38037	Grant	ND
351	38041	Hettinger	ND
351	38043	Kidder	ND
351	38047	Logan	ND
351	38051	McIntosh	ND
351	38055	McLean	ND
351	38057	Mercer	ND
351	38065	Oliver	ND
351	38085	Sioux	ND
351	38087	Slope	ND
351	38089	Stark	ND
351	46031	Corson	SD
352	48177	Gonzales	TX
352	48255	Karnes	TX
352	48493	Wilson	TX
353	17075	Iroquois	IL
353	18073	Jasper	IN
353	18111	Newton	IN
354	55135	Waupaca	WI
354	55137	Waushara	WI
355	56025	Natrona	WY
356	53019	Ferry	WA
356	53043	Lincoln	WA
356	53051	Pend Oreille	WA
356	53065	Stevens	WA
357	35039	Rio Arriba	NM
357	35055	Taos	NM
358	48031	Blanco	TX
358	48053	Burnet	TX
358	48299	Llano	TX
359	08075	Logan	CO
359	08087	Morgan	CO
359	08095	Phillips	CO
359	08121	Washington	CO
359	08125	Yuma	CO
359	31057	Dundy	NE
360	02100	Haines Borough	AK
360	02105	Hoonah-Angoon Census Area.	AK
360	02110	Juneau Borough	AK
360	02130	Ketchikan Gateway Borough.	AK
360	02195	Petersburg	AK
360	02198	Prince of Wales-Hyder.	AK
360	02220	Sitka Borough	AK
360	02230	Skagway Municipality.	AK
360	02275	Wrangell	AK
360	02282	Yakutat Borough	AK
361	49023	Juab	UT
361	49027	Millard	UT
361	49039	Sanpete	UT
361	49041	Sevier	UT
362	16003	Adams	ID
362	16015	Boise	ID
362	16045	Gem	ID
362	16075	Payette	ID
362	16085	Valley	ID
362	16087	Washington	ID
363	48003	Andrews	TX
363	48033	Borden	TX
363	48115	Dawson	TX
363	48173	Glasscock	TX
363	48227	Howard	TX
363	48317	Martin	TX
364	30001	Beaverhead	MT
364	30007	Broadwater	MT
364	30023	Deer Lodge	MT
364	30043	Jefferson	MT
364	30093	Silver Bow	MT
365	40141	Tillman	OK
365	48009	Archer	TX
365	48023	Baylor	TX
365	48155	Foard	TX
365	48197	Hardeman	TX
365	48429	Stephens	TX
365	48447	Throckmorton	TX
365	48487	Wilbarger	TX
365	48503	Young	TX
366	53003	Asotin	WA
366	53023	Garfield	WA
366	53075	Whitman	WA
367	29007	Audrain	MO
367	29137	Monroe	MO
367	29175	Randolph	MO
367	29205	Shelby	MO
368	20029	Cloud	KS
368	20039	Decatur	KS
368	20065	Graham	KS
368	20089	Jewell	KS
368	20105	Lincoln	KS
368	20123	Mitchell	KS
368	20137	Norton	KS
368	20141	Osborne	KS
368	20143	Ottawa	KS
368	20147	Phillips	KS
368	20153	Rawlins	KS
368	20157	Republic	KS
368	20163	Rooks	KS
368	20183	Smith	KS
369	19003	Adams	IA
369	19071	Fremont	IA
369	19129	Mills	IA
369	19137	Montgomery	IA
369	19145	Page	IA
369	19173	Taylor	IA
369	29005	Atchison	MO
370	19011	Benton	IA
370	19095	Iowa	IA
370	19183	Washington	IA
371	37005	Alleghany	NC
371	51640	Galax City	VA
371	51077	Grayson	VA
371	51197	Wythe	VA
372	08039	Elbert	CO
372	08063	Kit Carson	CO
372	08073	Lincoln	CO
372	20023	Cheyenne	KS
372	20063	Gove	KS
372	20109	Logan	KS
372	20179	Sheridan	KS
372	20181	Sherman	KS
372	20193	Thomas	KS
372	20199	Wallace	KS
373	53013	Columbia	WA
373	53071	Walla Walla	WA
374	08115	Sedgwick	CO
374	31005	Arthur	NE
374	31009	Blaine	NE

PEA No.	Federal Information Processing System No.	County name	State
374	31029	Chase	NE
374	31049	Deuel	NE
374	31069	Garden	NE
374	31091	Hooker	NE
374	31101	Keith	NE
374	31111	Lincoln	NE
374	31113	Logan	NE
374	31117	McPherson	NE
374	31135	Perkins	NE
374	31171	Thomas	NE
375	35017	Grant	NM
375	35023	Hidalgo	NM
375	35029	Luna	NM
376	48111	Dallam	TX
376	48117	Deaf Smith	TX
376	48205	Hartley	TX
376	48341	Moore	TX
376	48359	Oldham	TX
376	48421	Sherman	TX
377	01023	Choctaw	AL
377	01063	Greene	AL
377	01091	Marengo	AL
377	01119	Sumter	AL
378	13033	Burke	GA
378	13125	Glascock	GA
378	13163	Jefferson	GA
378	13165	Jenkins	GA
378	13301	Warren	GA
379	26033	Chippewa	MI
379	26095	Luce	MI
379	26097	Mackinac	MI
380	26003	Alger	MI
380	26041	Delta	MI
380	26153	Schoolcraft	MI
381	48137	Edwards	TX
381	48271	Kinney	TX
381	48465	Val Verde	TX
382	56013	Fremont	WY
382	56017	Hot Springs	WY
382	56043	Washakie	WY
383	19039	Clarke	IA
383	19053	Decatur	IA
383	19117	Lucas	IA
383	19159	Ringgold	IA
383	19175	Union	IA
383	19185	Wayne	IA
384	19005	Allamakee	IA
384	19043	Clayton	IA
384	19055	Delaware	IA
385	29111	Lewis	MO
385	29127	Marion	MO
385	29173	Ralls	MO
386	45005	Allendale	SC
386	45009	Bamberg	SC
386	45011	Barnwell	SC
387	38003	Barnes	ND
387	38021	Dickey	ND
387	38039	Griggs	ND
387	38045	LaMoure	ND
387	38073	Ransom	ND
387	38077	Richland	ND
387	38081	Sargent	ND
388	19009	Audubon	IA
388	19029	Cass	IA
388	19085	Harrison	IA
388	19165	Shelby	IA
389	31061	Franklin	NE
389	31063	Frontier	NE
389	31065	Furnas	NE
389	31073	Gosper	NE
389	31083	Harlan	NE
389	31085	Hayes	NE
389	31087	Hitchcock	NE
389	31099	Kearney	NE
389	31137	Phelps	NE
389	31145	Red Willow	NE
390	48151	Fisher	TX
390	48335	Mitchell	TX
390	48353	Nolan	TX
390	48415	Scurry	TX
391	41025	Harney	OR
391	41045	Malheur	OR
392	29075	Gentry	MO
392	29087	Holt	MO
392	29147	Nodaway	MO
392	29227	Worth	MO
393	29041	Chariton	MO
393	29115	Linn	MO
393	29121	Macon	MO
394	46007	Bennett	SD
394	46055	Haakon	SD
394	46071	Jackson	SD
394	46075	Jones	SD
394	46095	Mellette	SD
394	46113	Shannon	SD
394	46121	Todd	SD
395	38031	Foster	ND
395	38069	Pierce	ND
395	38083	Sheridan	ND
395	38093	Stutsman	ND
395	38103	Wells	ND
396	19001	Adair	IA
396	19077	Guthrie	IA
396	19121	Madison	IA
397	01075	Lamar	AL
397	01107	Pickens	AL
398	31043	Dakota	NE
398	31051	Dixon	NE
398	31173	Thurston	NE
399	48281	Lampasas	TX
399	48411	San Saba	TX
400	48017	Bailey	TX
400	48069	Castro	TX
400	48369	Parmer	TX
401	48045	Briscoe	TX
401	48107	Crosby	TX
401	48125	Dickens	TX
401	48153	Floyd	TX
401	48169	Garza	TX
401	48263	Kent	TX
401	48345	Motley	TX
402	48095	Concho	TX
402	48267	Kimble	TX
402	48319	Mason	TX
402	48307	McCulloch	TX
402	48327	Menard	TX
403	30027	Fergus	MT
403	30045	Judith Basin	MT
403	30059	Meagher	MT
403	30071	Phillips	MT
403	30107	Wheatland	MT
404	49025	Kane	UT
404	49037	San Juan	UT
405	56039	Teton	WY
406	19105	Jones	IA
407	16023	Butte	ID
407	16037	Custer	ID
407	16059	Lemhi	ID
408	48081	Coke	TX
408	48399	Runnels	TX
408	48431	Sterling	TX
409	48207	Haskell	TX
409	48269	King	TX
409	48275	Knox	TX
409	48417	Shackelford	TX
409	48433	Stonewall	TX
410	31031	Cherry	NE
410	31075	Grant	NE
410	31161	Sheridan	NE
411	48109	Culberson	TX
411	48229	Hudspeth	TX
412	72001	Adjuntas	PR
412	72003	Aguada	PR
412	72005	Aguadilla	PR
412	72007	Aguas Buenas	PR
412	72009	Aibonito	PR
412	72011	Anasco	PR
412	72013	Arecibo	PR
412	72015	Arroyo	PR
412	72017	Barceloneta	PR
412	72019	Barranquitas	PR
412	72021	Bayamon	PR
412	72023	Cabo Rojo	PR
412	72025	Caguas	PR
412	72027	Camuy	PR
412	72029	Canovanas	PR
412	72031	Carolina	PR
412	72033	Catano	PR
412	72035	Cayey	PR
412	72037	Ceiba	PR
412	72039	Ciales	PR
412	72041	Cidra	PR
412	72043	Coamo	PR
412	72045	Comerio	PR
412	72047	Corozal	PR
412	72049	Culebra	PR
412	72051	Dorado	PR
412	72053	Fajardo	PR
412	72054	Florida	PR
412	72055	Guanica	PR
412	72057	Guayama	PR
412	72059	Guayanilla	PR
412	72061	Guaynabo	PR
412	72063	Gurabo	PR
412	72065	Hatillo	PR
412	72067	Hormigueros	PR
412	72069	Humacao	PR
412	72071	Isabela	PR
412	72073	Jayuya	PR
412	72075	Juana Diaz	PR
412	72077	Juncos	PR
412	72079	Lajas	PR
412	72081	Lares	PR
412	72083	Las Marias	PR
412	72085	Las Piedras	PR
412	72087	Loiza	PR
412	72089	Luquillo	PR
412	72091	Manati	PR
412	72093	Maricao	PR
412	72095	Maunabo	PR
412	72097	Mayaguez	PR
412	72099	Moca	PR
412	72101	Morovis	PR
412	72103	Naguabo	PR
412	72105	Naranjito	PR
412	72107	Orocovis	PR
412	72109	Patillas	PR
412	72111	Penuelas	PR
412	72113	Ponce	PR
412	72115	Quebradillas	PR
412	72117	Rincon	PR
412	72119	Rio Grande	PR
412	72121	Sabana Grande	PR

PEA No.	Federal Information Processing System No.	County name	State
412	72123	Salinas	PR
412	72125	San German	PR
412	72127	San Juan	PR
412	72129	San Lorenzo	PR
412	72131	San Sebastian	PR
412	72133	Santa Isabel	PR
412	72135	Toa Alta	PR
412	72137	Toa Baja	PR
412	72139	Trujillo Alto	PR
412	72141	Utuado	PR
412	72143	Vega Alta	PR
412	72145	Vega Baja	PR
412	72147	Vieques	PR
412	72149	Villalba	PR
412	72151	Yabucoa	PR
412	72153	Yauco	PR
413	66010	Guam	GU.
413	69085	Northern Islands	MP
413	69100	Rota	MP
413	69110	Saipan	MP
413	69120	Tinian	MP
414	78010	St. Croix	VI
414	78020	St. John	VI
414	78030	St. Thomas	VI
415	60010	Eastern District	AS
415	60020	Manu'a District	AS
415	60030	Rose Island	AS
415	60040	Swains Island	AS
415	60050	Western District	AS
416	99023	Gulf of Mexico Central and East.	GM
416	99001	Gulf of Mexico West.	GM

■ 18. Amend § 27.11 by adding paragraph (l) to read as follows:

§ 27.11 Initial authorization.

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(l) *3700–3980 MHz band.* Authorizations for licenses in the 3.7 GHz Service will be based on Partial Economic Areas (PEAs), as specified in § 27.6(m), and the frequency sub-blocks specified in § 27.5(m).

■ 19. Amend § 27.13 by adding paragraph (m) to read as follows:

§ 27.13 License period.

* * * * *

(m) *3700–3980 MHz band.* Authorizations for licenses in the 3.7 GHz Service in the 3700–3980 MHz band will have a term not to exceed 15 years from the date of issuance or renewal.

■ 20. Amend § 27.14 by revising the first sentence of paragraphs (a) and (k) and adding paragraph (v) to read as follows:

§ 27.14 Construction requirements.

(a) AWS and WCS licensees, with the exception of WCS licensees holding authorizations for the 600 MHz band, Block A in the 698–704 MHz and 728–734 MHz bands, Block B in the 704–710 MHz and 734–740 MHz bands, Block E in the 722–728 MHz band, Block C, C1 or C2 in the 746–757 MHz and 776–787 MHz bands, Block A in the 2305–2310 MHz and 2350–2355 MHz bands, Block B in the 2310–2315 MHz and 2355–2360 MHz bands, Block C in the 2315–2320 MHz band, Block D in the 2345–2350 MHz band, and in the 3700–3980 MHz band, and with the exception of licensees holding AWS authorizations in the 1915–1920 MHz and 1995–2000 MHz bands, the 2000–2020 MHz and 2180–2200 MHz bands, or 1695–1710 MHz, 1755–1780 MHz and 2155–2180 MHz bands, must, as a performance requirement, make a showing of ''substantial service'' in their license area within the prescribed license term set forth in § 27.13. * * *

* * * * *

(k) Licensees holding WCS or AWS authorizations in the spectrum blocks enumerated in paragraphs (g), (h), (i), (q), (r), (s), (t), and (v) of this section, including any licensee that obtained its license pursuant to the procedures set forth in paragraph (j) of this section, shall demonstrate compliance with performance requirements by filing a construction notification with the Commission, within 15 days of the expiration of the applicable benchmark, in accordance with the provisions set forth in § 1.946(d) of this chapter. * * *

* * * * *

(v) The following provisions apply to any licensee holding an authorization in the 3700–3980 MHz band:

(1) Licensees relying on mobile or point-to-multipoint service shall provide reliable signal coverage and offer service within eight (8) years from the date of the initial license to at least forty-five (45) percent of the population in each of its license areas (''First Buildout Requirement''). Licensee shall provide reliable signal coverage and offer service within twelve (12) years from the date of the initial license to at least eighty (80) percent of the population in each of its license areas (''Second Buildout Requirement''). Licensees relying on point-to-point service shall demonstrate within eight years of the license issue date that they have four links operating and providing service to customers or for internal use if the population within the license area is equal to or less than 268,000 and, if the population is greater than 268,000, that they have at least one link in operation and providing service to customers, or for internal use, per every 67,000 persons within a license area (''First Buildout Requirement''). Licensees relying on point-to-point service shall demonstrate within 12 years of the license issue date that they have eight links operating and providing service to customers or for internal use if the population within the license area is equal to or less than 268,000 and, if the population within the license area is greater than 268,000, shall demonstrate they are providing service and have at least two links in operation per every 67,000 persons within a license area (''Second Buildout Requirement'').

(2) In the alternative, a licensee offering Internet of Things-type services shall provide geographic area coverage within eight (8) years from the date of the initial license to thirty-five (35) percent of the license (''First Buildout Requirement''). A licensee offering Internet of Things-type services shall provide geographic area coverage within twelve (12) years from the date of the initial license to sixty-five (65) percent of the license (''Second Buildout Requirement'').

(3) If a licensee fails to establish that it meets the First Buildout Requirement for a particular license area, the licensee's Second Buildout Requirement deadline and license term will be reduced by two years. If a licensee fails to establish that it meets the Second Buildout Requirement for a particular license area, its authorization for each license area in which it fails to meet the Second Buildout Requirement shall terminate automatically without Commission action, and the licensee will be ineligible to regain it if the Commission makes the license available at a later date.

(4) To demonstrate compliance with these performance requirements, licensees shall use the most recently available decennial U.S. Census Data at the time of measurement and shall base their measurements of population or geographic area served on areas no larger than the Census Tract level. The population or area within a specific Census Tract (or other acceptable identifier) will be deemed served by the licensee only if it provides reliable signal coverage to and offers service within the specific Census Tract (or other acceptable identifier). To the extent the Census Tract (or other acceptable identifier) extends beyond the boundaries of a license area, a licensee with authorizations for such areas may include only the population or geographic area within the Census Tract (or other acceptable identifier) towards meeting the performance requirement of a single, individual license. If a licensee does not provide reliable signal coverage to an entire license area, the license must provide a map that accurately depicts the boundaries of the area or areas within each license area not being served. Each

licensee also must file supporting documentation certifying the type of service it is providing for each licensed area within its service territory and the type of technology used to provide such service. Supporting documentation must include the assumptions used to create the coverage maps, including the propagation model and the signal strength necessary to provide reliable service with the licensee's technology.

■ 21. Amend § 27.50 by adding paragraph (j) to read as follows:

§ 27.50 Power limits and duty cycle.

* * * * *

(j) The following power requirements apply to stations transmitting in the 3700–3980 MHz band:

(1) The power of each fixed or base station transmitting in the 3700–3980 MHz band and located in any county with population density of 100 or fewer persons per square mile, based upon the most recently available population statistics from the Bureau of the Census, is limited to an equivalent isotropically radiated power (EIRP) of 3280 Watts/MHz. This limit applies to the aggregate power of all antenna elements in any given sector of a base station.

(2) The power of each fixed or base station transmitting in the 3700–3980 MHz band and situated in any geographic location other than that described in paragraph (j)(1) of this section is limited to an EIRP of 1640 Watts/MHz. This limit applies to the aggregate power of all antenna elements in any given sector of a base station.

(3) Mobile and portable stations are limited to 1 Watt EIRP. Mobile and portable stations operating in these bands must employ a means for limiting power to the minimum necessary for successful communications.

(4) Equipment employed must be authorized in accordance with the provisions of § 27.51. Power measurements for transmissions by stations authorized under this section may be made either in accordance with a Commission-approved average power technique or in compliance with paragraph (j)(5) of this section. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

(5) Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage. The measurement results shall be properly adjusted for any instrument limitations, such as detector response times, limited resolution bandwidth capability when compared to the emission bandwidth, sensitivity, and any other relevant factors, so as to obtain a true peak measurement for the emission in question over the full bandwidth of the channel.

■ 22. Amend § 27.53 by adding paragraph (l) to read as follows:

§ 27.53 Emission limits.

* * * * *

(l) *3.7 GHz Service.* The following emission limits apply to stations transmitting in the 3700–3980 MHz band:

(1) For base station operations in the 3700–3980 MHz band, the conducted power of any emission outside the licensee's authorized bandwidth shall not exceed −13 dBm/MHz. Compliance with this paragraph (l)(1) is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 megahertz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

(2) For mobile operations in the 3700–3980 MHz band, the conducted power of any emission outside the licensee's authorized bandwidth shall not exceed −13 dBm/MHz. Compliance with this paragraph (l)(2) is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 megahertz bands immediately outside and adjacent to the licensee's frequency block, the minimum resolution bandwidth for the measurement shall be either one percent of the emission bandwidth of the fundamental emission of the transmitter or 350 kHz. In the bands between 1 and 5 MHz removed from the licensee's frequency block, the minimum resolution bandwidth for the measurement shall be 500 kHz. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

* * * * *

■ 23. Amend § 27.55 by adding paragraph (d) to read as follows:

§ 27.55 Power strength limits.

* * * * *

(d) *Power flux density for stations operating in the 3700–3980 MHz band.* For base and fixed stations operation in the 3700–3980 MHz band in accordance with the provisions of § 27.50(j), the power flux density (PFD) at any location on the geographical border of a licensee's service area shall not exceed −76 dBm/m^2/MHz. This power flux density will be measured at 1.5 meters above ground. Licensees in adjacent geographic areas may voluntarily agree to operate under a higher PFD at their common boundary.

■ 24. Amend § 27.57 by revising paragraph (c) to read as follows:

§ 27.57 International coordination.

* * * * *

(c) Operation in the 1695–1710 MHz, 1710–1755 MHz, 1755–1780 MHz, 1915–1920 MHz, 1995–2000 MHz, 2000–2020 MHz, 2110–2155 MHz, 2155–2180 MHz, 2180–2200 MHz, and 3700–3980 MHz bands is subject to international agreements with Mexico and Canada.

■ 25. Amend § 27.75 by adding paragraph (a)(3) to read as follows:

§ 27.75 Basic interoperability requirement.

(a) * * *

(3) Mobile and portable stations that operate on any portion of frequencies in the 3700–3980 MHz band must be capable of operating on all frequencies in the 3700–3980 MHz band using the same air interfaces that the equipment utilizes on any frequencies in the 3700–3980 MHz band.

* * * * *

■ 26. Add subpart O to read as follows:

Subpart O—3.7 GHz Service (3700–3980 MHz)

Sec.

§ 27.1401 Licenses in the 3.7 GHz Service are subject to competitive bidding.

Mutually exclusive initial applications for licenses in the 3.7 GHz Service are subject to competitive bidding. The general competitive bidding procedures set forth in 47 CFR part 1, subpart Q, will apply unless otherwise provided in this subpart.

§ 27.1402 Designated entities in the 3.7 GHz Service.

(a) *Eligibility for small business provisions*—(1) *Definitions*—(i) *Small business.* A small business is an entity that, together with its affiliates, its controlling interests, and the affiliates of its controlling interests, has average gross revenues not exceeding $55 million for the preceding five (5) years.

(ii) *Very small business.* A very small business is an entity that, together with its affiliates, its controlling interests, and the affiliates of its controlling interests, has average gross revenues not exceeding $20 million for the preceding five (5) years.

(2) *Bidding credits.* A winning bidder that qualifies as a small business, as defined in this section, or a consortium of such small businesses as provided in § 1.2110(c)(6) of this chapter, may use a bidding credit of 15 percent, subject to the cap specified in § 1.2110(f)(2)(ii) of this chapter. A winning bidder that qualifies as a very small business, as defined in this section, or a consortium of such very small businesses as provided in § 1.2110(c)(6) of this chapter, may use a bidding credit of 25 percent, subject to the cap specified in § 1.2110(f)(2)(ii) of this chapter.

(b) *Eligibility for rural service provider bidding credit.* A rural service provider, as defined in § 1.2110(f)(4)(i) of this chapter, that has not claimed a small business bidding credit may use the bidding credit of 15 percent specified in § 1.2110(f)(4) of this chapter.

§ 27.1411 Transition of the 3700–3980 MHz band to the 3.7 GHz Service.

(a) *Transition of the 3700–3798 MHz Band.* The 3700–3980 MHz band is being transitioned in the lower 48 contiguous states and the District of Columbia from geostationary satellite orbit (GSO) fixed-satellite service (space-to-Earth) and fixed service operations to the 3.7 GHz Service.

(b) *Definitions*—(1) *Incumbent space station operator.* An incumbent space station operator is defined as a space station operator authorized to provide C-band service to any part of the contiguous United States pursuant to an FCC-issued license or grant of market access as of June 21, 2018.

(2) *Eligible space station operator.* For purposes of determining eligibility to receive reimbursement for relocation costs incurred as a result of the transition of FSS operations to the 4000–4200 MHz band, an eligible space station operators may receive reimbursement for relocation costs incurred as a result of the transition of FSS operations to the 4000–4200 MHz band. An eligible space station operator is defined as an incumbent space station operator that has demonstrated as of February 1, 2020, that it has an existing relationship to provide service via C-band satellite transmission to one or more incumbent earth stations in the contiguous United States. Such existing relationships may be directly with the incumbent earth station, or indirectly through content distributors or other entities, so long as the relationship requires the provision of C-band satellite services to one or more specific incumbent earth stations in the contiguous United States.

(3) *Incumbent earth station.* An incumbent earth station for this subpart is defined as an earth station that is entitled to interference protection pursuant to § 25.138(c) of this chapter. An incumbent earth station must transition above 4000 MHz pursuant to this subpart. An incumbent earth station will be able to continue receiving uninterrupted service both during and after the transition.

(4) *Earth station migration.* Earth station migration includes any necessary changes that allow the uninterrupted reception of service by an incumbent earth station on new frequencies in the upper portion of the band, including, but not limited to retuning and repointing antennas, ''dual illumination'' during which the same programming is simultaneously downlinked over the original and new frequencies, and the installation of new equipment or software at earth station uplink and/or downlink locations for customers identified for technology upgrades necessary to facilitate the repack, such as compression technology or modulation.

(5) *Earth station filtering.* A passband filter must be installed at the site of each incumbent earth station at the same time or after it has been migrated to new frequencies to block signals from adjacent channels and to prevent harmful interference from licensees in the 3.7 GHz Service. Earth station filtering can occur either simultaneously with, or after, the earth station migration, or can occur at any point after the earth station migration so long as all affected earth stations in a given Partial Economic Area and surrounding areas are filtered prior to a licensee in the 3.7 GHz Service commencing operations.

(6) *Contiguous United States* (CONUS). For the purposes of the rules established in this subpart, contiguous United States consists of the contiguous 48 states and the District of Columbia as defined by Partial Economic Areas Nos. 1–41, 43–211, 213–263, 265–297, 299–359, and 361–411, which includes areas within 12 nautical miles of the U.S. Gulf coastline (*see* § 27.6(m)). In this context, the rest of the United States includes the Honolulu, Anchorage, Kodiak, Fairbanks, Juneau, Puerto Rico, Guam-Northern Mariana Islands, U.S. Virgin Islands, American Samoa, and the Gulf of Mexico PEAs.

(7) *Relocation Payment Clearinghouse.* A Relocation Payment Clearinghouse is a neutral, independent third-party to administer the cost management for the transition of the 3700–4000 MHz band from the Fixed Satellite Service and Fixed Service to the 3.7 GHz Service.

(8) *Relocation Coordinator.* A Relocation Coordinator is a third party that will ensure that all incumbent space station operators are relocating in a timely matter, and that is selected consistent with § 27.1413. The Relocation Coordinator will have technical experience in understanding and working on earth stations and will manage the migration and filtering of incumbent earth stations of eligible space station operators that decline accelerated relocation payment.

§ 27.1412 Transition Plan.

(a) *Relocation deadlines.* Eligible space station operators are responsible for all necessary actions to clear their transponders from the 3700–4000 MHz band (*e.g.,* launching new satellites, reprogramming transponders, exchanging customers) and to migrate the existing services of incumbent earth stations in CONUS to the 4000–4200 MHz band (unless the incumbent earth station opts out of the formal relocation process, per paragraph (e) of this section), as of December 5, 2025. Eligible space station operators that fail to do so will be in violation of the conditions of their license authorization and potentially subject to forfeitures and other sanctions.

(b) *Accelerated relocation deadlines.* An eligible space station operator shall qualify for accelerated relocation payments by completing an early transition of the band to the 3.7 GHz Service.

(1) *Phase I deadline.* An eligible space station operator shall receive an accelerated relocation payment if it clears its transponders from the 3700–

3820 MHz band and migrates all associated incumbent earth stations in CONUS above 3820 MHz no later than December 5, 2021 (Phase I deadline). To satisfy the Phase I deadline, an eligible space station operator must also provide passband filters to block signals from the 3700–3820 MHz band on all associated incumbent earth stations in PEAs 1–4, 6–10, 12–19, 21–41, and 43–50 no later than December 5, 2021 (see § 27.6(m)). If an eligible space station operator receives an accelerated relocation payment for meeting this deadline, it must also satisfy the second early clearing deadline of December 5, 2023.

(2) *Phase II deadline.* An eligible space station operator shall receive an accelerated relocation payment if it clears its transponders from the 3700–4000 MHz band and migrates incumbent earth stations in CONUS above 4000 MHz no later than December 5, 2023 (Phase II deadline). To satisfy the Phase II deadline, an eligible space station operator must also provide passband filters on all associated incumbent earth stations in CONUS no later than December 5, 2023.

(3) *Transition delays.* An eligible space station operator shall not be held responsible for circumstances beyond their control related to earth station migration or filtering.

(i) An eligible space station operator must submit a notice of any incumbent earth station transition delays to the Wireless Telecommunications Bureau within 7 days of discovering an inability to accomplish the assigned earth station transition task. Such a request must include supporting documentation to allow for resolution as soon as practicable and must be submitted before the accelerated relocation deadlines.

(4) *Responsibility for meeting accelerated relocation deadlines.* An eligible space station operator's satisfaction of the accelerated relocation deadlines shall be determined on an individual basis.

(c) *Accelerated relocation election.* An eligible space station operator may elect to receive accelerated relocation payments to transition the 3700–4000 MHz band to the 3.7 GHz Service according to the Phase I and Phase II deadlines via a written commitment by filing an accelerated relocation election in GN Docket No. 18–122 no later than May 29, 2020.

(1) The Wireless Telecommunications Bureau will prescribe the precise form of such election via Public Notice no later than May 12, 2020.

(2) Each eligible space station operator that that makes an accelerated relocation election will be required, as part of its filing of this accelerated relocation election, to commit to paying the administrative costs of the Clearinghouse until the Commission awards licenses to the winning bidders in the auction, at which time those administrative costs will be repaid to those space station operators.

(d) *Transition Plan.* Eligible space station operators must file with the Commission in GN Docket No. 18–122 no later than June 12, 2020, a Transition Plan that describes the actions that must be taken to clear transponders on space stations and to migrate and filter earth stations. Eligible space station operators must make any necessary updates or resolve any deficiencies in their individual Transition Plans by August 14, 2020.

(1) The Transition Plan must detail the eligible space station operator's individual timeline and necessary actions for clearing its transponders from the 3700–4000 MHz band, including:

(i) All existing space stations with operations that will need to be transitioned to operations above 4000 MHz;

(ii) The number of new satellites, if any, that the space station operator will need to launch in order to maintain sufficient capacity post-transition, including detailed descriptions of why such new satellites are necessary;

(iii) The specific grooming plan for migrating existing services above 4000 MHz, including the pre- and post-transition frequencies that each customer will occupy;

(iv) Any necessary technology upgrades or other solutions, such as video compression or modulation, that the space station operator intends to implement;

(v) The number and location of incumbent earth stations antennas currently receiving the space station operator's transmissions that will need to be transitioned above 4000 MHz;

(vi) An estimate of the number and location of incumbent earth station antennas that will require retuning and/or repointing in order to receive content on new transponder frequencies post-transition; and

(vii) The specific timeline by which the space station operator will implement the actions described in its plan including any commitments to satisfy an early clearing.

(2) To the extent that incumbent earth stations are not accounted for in eligible space station operators' Transition Plans, the Relocation Coordinator must prepare an Earth Station Transition Plan for such incumbent earth stations and may require each associated space station operator to file the information needed for such a plan with the Relocation Coordinator.

(i) Where space station operators do not elect to clear by the accelerated relocation deadlines and therefore are not responsible for earth station relocation, the Earth Station Transition Plan must provide timelines that ensure all earth station relocation is completed no later than the relocation deadline.

(ii) The Relocation Coordinator will describe and recommend the respective responsibility of each party for earth station migration and filtering obligations in the Earth Station Transition Plan and assist incumbent earth stations in transitioning including, for example, by installing filters or hiring a third party to install such filters to the extent necessary.

(e) *Incumbent earth station opt-out.* An incumbent earth station within the contiguous United States may opt out of the formal relocation process and accept a lump sum payment equal to the estimated reasonable transition costs of earth station migration and filtering, as determined by the Wireless Telecommunications Bureau, in lieu of actual relocation costs. Such an incumbent earth station is responsible for coordinating with the relevant space station operator as necessary and performing all relocation actions on its own, including switching to alternative transmission mechanisms such as fiber, and it will not receive further reimbursement for any costs exceeding the lump sum payment. An incumbent earth station electing to opt out must inform the appropriate space station operator(s) and the Relocation Coordinator that earth station migration and filtering will not be necessary for the relevant earth station site and must coordinate with operators to avoid any disruption of video and radio programming.

(f) *Space station status reports.* On a quarterly basis, beginning December 31, 2020: Each eligible space station operator must provide a status report of its clearing efforts. Eligible space station operators may file joint status reports.

(g) *Certification of accelerated relocation.* Each eligible space station operator must file a timely certification that it has completed the necessary clearing actions to satisfy each accelerated relocation deadline. The certification must be filed once the eligible space station operator completes its obligations but no later than the applicable accelerated relocation deadline. The Wireless Telecommunication Bureau will prescribe the form of such certification.

(1) The Bureau, Clearinghouse, and relevant stakeholders will have the opportunity to review the certification of accelerated relocation and identify potential deficiencies. The Wireless Telecommunications Bureau will prescribe the form of any challenges by relevant stakeholders as to the validity of the certification and will establish the process for how such challenges will impact the incremental decreases in the accelerated relocation payment as set-forth in § 27.1422(d).

(2) If credible challenges as to the space station operator's satisfaction of the relevant deadline are made, the Bureau will issue a public notice identifying such challenges and will render a final decision as to the validity of the certification no later than 60 days from its filing. Absent notice from the Bureau of any such deficiencies within 30 days of the filing of the certification, the certification of accelerated relocation will be deemed validated.

(h) *Delegated authority.* The Wireless Telecommunications Bureau is delegated the role of providing clarifications or interpretations to eligible space station operators of the Commission's orders for all aspects of the transition.

§ 27.1413 Relocation Coordinator.

(a) *Search committee.* If eligible space station operators elect to receive accelerated relocation payments no later than May 29, 2020, so that a supermajority (80%) of accelerated relocation payments are accepted, each such electing eligible space station operator shall be eligible to appoint one member to a search committee that will seek proposals for a third-party with technical experience in understanding and working on earth stations to serve as a Relocation Coordinator and to manage the migration and filtering of incumbent earth stations of eligible space station operators that decline accelerated relocation payment.

(1) The search committee should proceed by consensus; however, if a vote on selection of a Relocation Coordinator is required, it shall be by a supermajority (80%).

(i) The search committee shall notify the Commission of its choice of Relocation Coordinator.

(ii) The Wireless Telecommunications Bureau shall issue a Public Notice inviting comment on whether the entity selected satisfies the criteria established in paragraph (b) of this section and issue a final order announcing whether the criteria has been satisfied;

(iii) Should the Wireless Telecommunications Bureau be unable to find the criteria have been satisfied, the selection process will start over and the search committee will submit a new proposed entity.

(2) If eligible space station operators select a Relocation Coordinator, they shall be responsible for paying its costs.

(3) In the event that the search committee fails to select a Relocation Coordinator and to notify the Commission by July 31, 2020, or in the case that at least 80% of accelerated relocation payments are not accepted (and thus accelerated relocation is not triggered):

(i) The search committee will be dissolved without further action by the Commission.

(ii) The Commission will initiate a procurement of a Relocation Coordinator to facilitate the transition. Specifically, the Office of the Managing Director will initiate the procurement, and the Wireless Telecommunications Bureau will take all other necessary actions to meet the accelerated relocation deadlines (to the extent applicable to any given operator) and the relocation deadline.

(iii) In the case that the Wireless Telecommunications Bureau selects the Relocation Coordinator, overlay licensees will, collectively, pay for the services of the Relocation Coordinator and staff. The Relocation Coordinator shall submit its own reasonable costs to the Relocation Clearinghouse, who will then collect payments from overlay licensees. It shall also provide additional financial information as requested by the Bureau to satisfy the Commission's oversight responsibilities and/or agency specific/government-wide reporting obligations.

(b) *Relocation Coordinator criteria.* The Relocation Coordinator must be able to demonstrate that it has the requisite expertise to perform the duties required, which will include:

(1) Coordinating the schedule for clearing the band;

(2) Performing engineering analysis, as necessary to determine necessary earth station migration actions;

(3) Assigning obligations, as necessary, for earth station migrations and filtering;

(4) Coordinating with overlay licensees throughout the transition process;

(5) Assessing the completion of the transition in each PEA and determining overlay licensees' ability to commence operations; and

(6) Mediating scheduling disputes.

(c) *Relocation Coordinator duties.* The Relocation Coordinator shall:

(1) Establish a timeline and take actions necessary to migrate and filter incumbent earth stations to ensure uninterrupted service during and following the transition.

(2) Review the Transition Plans filed by all eligible space station operators and recommend any changes to those plans to the Commission to the extent needed to ensure a timely transition.

(3) To the extent that incumbent earth stations are not accounted for in eligible space station operators' Transition Plans, the Relocation Coordinator must include those incumbent earth stations in an Earth Station Transition Plan.

(i) May require each associated space station operator to file the information needed for such a plan with the Relocation Coordinator.

(ii) Will describe and recommend the respective responsibility of each party for earth station migration obligations in the Earth Station Transition Plan and assist incumbent earth stations in transitioning including, for example, by installing filters or hiring a third party to install such filters to the extent necessary.

(4) Coordinate its operations with overlay licensees.

(5) Be responsible for receiving notice from earth station operators or other satellite customers of any disputes related to comparability of facilities, workmanship, or preservation of service during the transition and shall subsequently notify the Wireless Telecommunications Bureau of the dispute and provide recommendations for resolution.

(6) Must make real time disclosures of the content and timing of and the parties to communications, if any, from or to applicants to participate in the competitive bidding, as defined by § 1.2105(c)(5)(i) of this chapter whenever the prohibition in § 1.2105(c) of this chapter applies to competitive bidding for licenses in the 3.7 GHz Service.

(7) Incumbent space station operators must cooperate in good faith with the Relocation Coordinator throughout the transition.

(d) *Status reports.* On a quarterly basis, beginning December 31, 2020, the Relocation Coordinator must provide a report on the overall status of clearing efforts.

(e) *Document requests.* The Wireless Telecommunications Bureau, in consultation with the Office of Managing Director, may request any documentation from the Relocation Coordinator necessary to provide guidance or carry out oversight.

§ 27.1414 Relocation Payment Clearinghouse.

A Relocation Payment Clearinghouse shall be selected and serve to administer

the cost-related aspects of the transition in a fair, transparent manner, pursuant to Commission rules and oversight, to mitigate financial disputes among stakeholders, and to collect and distribute payments in a timely manner for the transition of the 3700–4000 MHz band to the 3.7 GHz Service.

(a) *Selection process.* (1) A search committee will select the Relocation Payment Clearinghouse. The search committee shall consist of member appointed by each of following nine entities: ACA Connects, Intelsat, SES, Eutelsat S.A., National Association Broadcasters, National Cable Television Association, CTIA, Competitive Carriers Association, and WISPA.

(2) The search committee shall convene no later than June 22, 2020 and shall notify the Commission of the detailed selection criteria for the position of Relocation Payment Clearinghouse no later than June 1, 2020. Such criteria must be consistent with the qualifications, roles, and duties of the Relocation Payment Clearinghouse specified in this subpart. The Wireless Telecommunications Bureau (Bureau) is directed, on delegated authority, to issue a Public Notice notifying the public that the search committee has published criteria, outlining submission requirements, and providing the closing dates for the selection of the Relocation Payment Clearinghouse and source (*i.e.,* web page).

(3) The search committee should proceed by consensus; however, if a vote on selection of a Relocation Payment Clearinghouse is required, it shall be by a majority.

(4) In the event that the search committee fails to select a Relocation Payment Clearinghouse and to notify the Commission by July 31, 2020, the search committee will be dissolved without further action by the Commission. In the event that the search committee fails to select a Clearinghouse and to notify the Commission by July 31, 2020, two of the nine members of the search committee will be dropped therefrom by lot, and the remaining seven members of the search committee shall select a Clearinghouse by majority vote by August 14, 2020.

(5) During the course of the Relocation Payment Clearinghouse's tenure, the Commission will take such measures as are necessary to ensure timely compliance, including, should it become necessary, issuing subsequent public notices to select new Relocation Payment Clearinghouses(s).

(b) *Selection criteria.* (1) The Relocation Payment Clearinghouse must be a neutral, independent entity with no conflicts of interest (organizational or personal) on the part of the organization or its officers, directors, employees, contractors, or significant subcontractors.

(i) Organizational conflicts of interest means that because of other activities or relationships with other entities, the Relocation Payment Clearinghouse, its contractors, or significant subcontractors are unable or potentially unable to render impartial services, assistance or advice; the Relocation Payment Clearinghouse's objectivity in performing its function is or might be otherwise impaired; or the Relocation Payment Clearinghouse might gain an unfair competitive advantage.

(ii) Personal conflict of interest means a situation in which an employee, officer, or director of the Relocation Payment Clearinghouse, the Relocation Payment Clearinghouse's contractors or significant subcontractors has a financial interest, personal activity, or relationship that could impair that person's ability to act impartially and in the best interest of the transition when performing their assigned role, or is engaged in self-dealing.

(2) The Relocation Payment Clearinghouse must be able to demonstrate that it has the requisite expertise to perform the duties required, which will include collecting and distributing relocation and accelerated relocation payments, auditing incoming and outgoing estimates, mitigating cost disputes among parties, and generally acting as clearinghouse.

(3) The search committee should ensure that the Relocation Payment Clearinghouse meets relevant best practices and standards in its operation to ensure an effective and efficient transition. First, the Relocation Payment Clearinghouse should be required, in administering the transition, to:

(i) Engage in strategic planning and adopt goals and metrics to evaluate its performance;

(ii) Adopt internal controls for its operations;

(iii) Utilize enterprise risk management practices; and

(iv) Use best practices to protect against improper payments and to prevent fraud, waste and abuse in its handling of funds. The Relocation Payment Clearinghouse must be required to create written procedures for its operations, using the Government Accountability Office's Green Book to serve as a guide in satisfying such requirements.

(4) The search committee must also ensure that the Relocation Payment Clearinghouse adopts robust privacy and data security best practices in its operations, given that it will receive and process information critical to ensuring a successful and expeditious transition.

(i) When the prohibition in § 1.2105(c) of this chapter applies to competitive bidding for licenses in the 3.7 GHz service, the Relocation Payment Clearinghouse must make real time disclosures of the content and timing of and the parties to communications, if any, from or to applicants to participate in the competitive bidding, as defined by § 1.2105(c)(5)(i) of this chapter.

(ii) The Relocation Payment Clearinghouse should also comply with, on an ongoing basis, all applicable laws and Federal Government guidance on privacy and information security requirements such as relevant provisions in the Federal Information Security Management Act, National Institute of Standards and Technology publications, and Office of Management and Budget guidance.

(iii) The Relocation Payment Clearinghouse must hire a third-party firm to independently audit and verify, on an annual basis, the Relocation Payment Clearinghouse's compliance with privacy and information security requirements and to provide recommendations based on any audit findings; to correct any negative audit findings and adopt any additional practices suggested by the auditor; and to report the results to the Bureau.

(c) *Reports and information.* (1) The Relocation Payment Clearinghouse must provide quarterly reports that detail the status of reimbursement funds available for clearing obligations, the relocation and accelerated relocation payments issued, the amounts collected from overlay licensees, and any certifications filed by incumbents. The reports must account for all funds spent to transition the 3.7 GHz Service Band, including the Relocation Payment Clearinghouse's own expenses, *e.g.,* salaries and fees paid to law firms, accounting firms, and other consultants. The report shall include descriptions of any disputes and the manner in which they were resolved.

(2) The Relocation Payment Clearinghouse shall provide to the Office of the Managing Director and the Wireless Telecommunications Bureau, by March 1 of each year, an audited statement of funds expended to date, including salaries and expenses of the Clearinghouse.

(3) The Relocation Clearing House shall provide to the Wireless Telecommunications Bureau additional information upon request.

§ 27.1415 Documentation of expenses.

Parties seeking reimbursement of compensable relocation costs must document their actual expenses and the Relocation Payment Clearinghouse, or a third-party on behalf of the Relocation Payment Clearinghouse, may conduct audits of entities that receive reimbursements. Entities receiving reimbursements must make available all relevant documentation upon request from the Relocation Payment Clearinghouse or its contractor.

§ 27.1416 Reimbursable costs.

(a) *Determining reimbursable costs.* The Relocation Payment Clearinghouse shall review reimbursement requests to determine whether they are reasonable and to ensure they comply with the requirements adopted in this sub-part. The Relocation Payment Clearinghouse shall give parties the opportunity to supplement any reimbursement claims that the Relocation Payment Clearinghouse deems deficient. Reimbursement submissions that fall within the estimated range of costs in the cost category schedule issued by the Wireless Telecommunications Bureau shall be presumed reasonable. If the Relocation Payment Clearinghouse determines that the amount sought for reimbursement is unreasonable, it shall notify the party of the amount it deems eligible for reimbursement. The Wireless Telecommunications Bureau shall make further determinations related to reimbursable costs, as necessary, throughout the transition process.

(b) *Payment procedures.* Following a determination of the reimbursable amount, the Relocation Payment Clearinghouse shall incorporate approved claims into invoices, which it shall issue to each licensee indicating the amount to be paid. The Relocation Payment Clearinghouse shall pay approved claims within 30 days of invoice submission. The Relocation Payment Clearinghouse shall also include its own reasonable costs in the invoices.

§ 27.1417 Reimbursement fund.

The Relocation Payment Clearinghouse will establish and administer an account that will fund the costs for the transition of this band to the 3.7 GHz Service after an auction for the 3.7 GHz Service concludes. Licensees in the 3.7 GHz Service shall pay their *pro rata* share of six months' worth of estimated transition costs into a reimbursement fund, administered by the Relocation Payment Clearinghouse, shortly after the auction and then every six months until the transition is complete. The Relocation Payment Clearinghouse shall draw from the reimbursement fund to pay approved, invoiced claims, consistent with § 27.1418. If the reimbursement fund does not have sufficient funds to pay approved claims before a six-month replenishment, the Relocation Payment Clearinghouse shall provide 3.7 GHz Service licensees with 30 days' notice of the additional *pro rata* shares they must contribute. At the end of the transition, the Relocation Payment Clearinghouse shall refund any unused amounts to 3.7 GHz Service licensees according to their *pro rata* shares.

§ 27.1418 Payment obligations.

(a) Each eligible space station operator is responsible for the payment of its own satellite transition costs until the auction winners have been announced.

(b) Licensees in the 3.7 GHz Service shall pay their *pro rata* share of:

(1) The reasonable costs of the Relocation Payment Clearinghouse and, in the event the Wireless Telecommunications Bureau selects the Relocation Coordinator, the services of the Relocation Coordinator and its staff;

(2) The actual relocation costs, provided that they are not unreasonable, for eligible space station operators and incumbent fixed service licensees; the actual transition costs, provided they are not unreasonable, associated with the necessary migration and filtering of incumbent earth stations;

(3) Any lump sum payments, if elected by incumbent earth station operators in lieu of actual relocation costs; and

(4) Specified accelerated relocation payments for space station operators that clear on an accelerated timeframe. Licensees in the 3.7 GHz Service shall be responsible for the full costs of space station transition, the Relocation Payment Clearinghouse, and, if selected and established by the Wireless Telecommunications Bureau, the Relocation Coordinator, based on their *pro rata* share of the total auction bids of each licensee's gross winning bids in the auction overall; they shall be responsible for incumbent earth station and incumbent fixed service transition costs in a Partial Economic Area based on their *pro rata* share of the total gross bids for that Partial Economic Area.

(c) Following the auction, and every six months until the close of the transition, licensees in the 3.7 GHz Service shall submit their portion of estimated transition costs to a reimbursement fund, and the Relocation Payment Clearinghouse will reimburse parties incurring transition costs. If actual costs exceed estimated costs, the Relocation Payment Clearinghouse shall perform a true-up for additional funds from 3.7 GHz Service licensees.

(d) If 3.7 GHz band license is relinquished to the Commission prior to all relocation cost reimbursements and accelerated relocation payments being paid, the remaining payments will be distributed among other similarly situated 3.7 GHz band licensees. If a new license is issued for the previously relinquished rights prior to final payments becoming due, the new 3.7 GHz band licensee will be responsible for the same *pro rata* share of relocation costs and accelerated relocation payments as the initial 3.7 GHz band license. If a 3.7 GHz band licensee sells its rights on the secondary market, the new 3.7 GHz band licensee will be obligated to fulfill all payment obligations associated with the license.

§ 27.1419 Lump sum payment for earth station opt out.

The Wireless Telecommunications Bureau shall announce a lump sum that will be available per each incumbent earth station that elects to opt out from the formal relocation process, per § 27.1412(e), as well as the process for electing lump sum payments. Incumbent earth station owners must make the lump sum payment election no later than 30 days after the Bureau announces the lump sum payment amounts, and must indicate whether each incumbent earth station for which it elects the lump sum payment will be transitioned to the upper 200 megahertz in order to maintain C-band services or will discontinue C-band services.

§ 27.1420 Cost-sharing formula.

(a) For space station transition and Relocation Payment Clearinghouse costs, and in the event the Wireless Telecommunications Bureau selects a Relocation Coordinator pursuant to § 27.1413(a), Relocation Coordinator costs, the *pro rata* share of each flexible-use licensee will be the sum of the final clock phase prices (*P*) for the set of all license blocks that a bidder wins divided by the total final clock phase prices for all *N* license blocks sold in the auction. To determine a licensee's reimbursement obligation (*RO*), that *pro rata* share would then be multiplied by the total eligible reimbursement costs (*RC*). Mathematically, this is represented as:

$$RO = \left(\frac{\sum_{i \in I} P_i}{\sum_{j=1}^{N} P_j} \right) \times RC$$

(b) For incumbent earth stations and fixed service incumbent licensee transition costs, a flexible-use licensee's

pro rata share will be determined on a PEA-specific basis, based on the final clock phase prices for the license blocks it won in each PEA. To calculate the *pro rata* share for incumbent earth station transition costs in a given PEA, the same formula identified in § 27.1412(a) will be used, except *I* is the set of licenses a bidder won in the PEA, *N* is the total blocks sold in the PEA and *RC* is the PEA-specific earth station and fixed service relocation costs.

(c) For the Phase I accelerated relocation payments, the *pro rata* share of each flexible use licensee of the 3.7 to 3.8 MHz in the 46 PEAs that are cleared by December 5, 2021, will be the sum of the final clock phase prices (*P*) that the licensee won divided by the total final clock phase prices for all *M* license blocks sold in those 46 PEAs. To determine a licensee's *RO* the *pro rata* share would then be multiplied by the total accelerated relocation payment due for Phase I, *A1.* Mathematically, this is represented as:

$$RO = \left(\frac{\sum_{i \in I} P_i}{\sum_{j=1}^{M} P_j}\right) \times A1$$

(d) For Phase II accelerated relocation payments, the *pro rata* share of each flexible use licensee will be the sum of the final clock phase prices (*P*) that the licensee won in the entire auction, divided by the total final clock phase prices for all *N* license blocks sold in the auction. To determine a licensee's *RO* the *pro rata* share would then be multiplied by the total accelerated relocation payment due for Phase II, *A2.* Mathematically, this is represented as:

$$RO = \left(\frac{\sum_{i \in I} P_i}{\sum_{j=1}^{N} P_j}\right) \times A2$$

§ 27.1421 Disputes over costs and cost-sharing.

(a) Parties disputing a cost estimate, cost invoice, or payment or cost-sharing obligation must file an objection with the Relocation Payment Clearinghouse.

(b) The Relocation Payment Clearinghouse may mediate any disputes regarding cost estimates or payments that may arise in the course of band reconfiguration; or refer the disputant parties to alternative dispute resolution fora.

(1) Any dispute submitted to the Relocation Payment Clearinghouse, or other mediator, shall be decided within 30 days after the Relocation Payment Clearinghouse has received a submission by one party and a response from the other party.

(2) Thereafter, any party may seek expedited non-binding arbitration, which must be completed within 30 days of the recommended decision or advice of the Relocation Payment Clearinghouse or other mediator.

(3) The parties will share the cost of this arbitration if it is before the Relocation Payment Clearinghouse.

(c) Should any issues still remain unresolved, they may be referred to the Bureau within ten days of recommended decision or advice of the Relocation Payment Clearinghouse or other mediator and any decision of the Relocation Payment Clearinghouse can be appealed to the Chief of the Bureau.

(1) When referring an unresolved matter, the Relocation Payment Clearinghouse shall forward the entire record on any disputed issues, including such dispositions thereof that the Relocation Payment Clearinghouse has considered.

(2) Upon receipt of such record and advice, the Bureau will decide the disputed issues based on the record submitted. The Bureau is directed to resolve such disputed issues or designate them for an evidentiary hearing before an Administrative Law Judge. If the Bureau decides an issue, any party to the dispute wishing to appeal the decision may do so by filing with the Commission, within ten days of the effective date of the initial decision, a Petition for *de novo* review; whereupon the matter will be set for an evidentiary hearing before an Administrative Law Judge.

(3) Parties seeking *de novo* review of a decision by the Bureau are advised that, in the course of the evidentiary hearing, the Commission may require complete documentation relevant to any disputed matters; and, where necessary, and at the presiding judge's discretion, require expert engineering, economic or other reports or testimony. Parties may therefore wish to consider possibly less burdensome and expensive resolution of their disputes through means of alternative dispute resolution.

§ 27.1422 Accelerated relocation payment.

(a) Eligible space station operators that meet the applicable early-clearing benchmark(s), as confirmed in their Certification of Accelerated Relocation set-forth in § 27.1412(g), will be eligible for their respective accelerated relocation payment.

(b) The Relocation Payment Clearinghouse will distribute the accelerated relocation payments accordingly:

TABLE 1 TO PARAGRAPH (b)—ACCLERATED RELOCATION PAYMENT BY OPERATOR

	Payment	Phase I payment	Phase II payment
Intelsat	$4,865,366,000	$1,197,842,000	$3,667,524,000
SES	3,968,133,000	976,945,000	2,991,188,000
Eutelsat	506,978,000	124,817,000	382,161,000
Telesat	344,400,000	84,790,000	259,610,000
Star One	15,124,000	3,723,000	11,401,000
Totals	9,700,001,000	2,388,117,000	7,311,884,000

(c) The Relocation Payment Clearinghouse shall promptly notify 3.7 GHz Service licensees following validation of the certification of accelerated relocations as set-forth in Section 27.1412(g). 3.7 GHz Service licensees shall pay the accelerated relocation payments to the Clearinghouse within 60 days of the notice that eligible space station operators have met their respective accelerated clearing benchmark. The Clearinghouse shall disburse accelerated relocation payments to relevant space station operators within seven days of receiving the payment from overlay licensees.

(d) For eligible space station operators that fail to meet either the Phase I or Phase II benchmarks as of the relevant accelerated relocation deadline, the accelerated relocation payment will be reduced according to the following schedule of declining accelerated relocation payments for the six months following the relevant deadline:

TABLE 2 TO PARAGRAPH (d)

Date of completion	Incremental reduction (percent)	Accelerated relocation payment (percent)
By Deadline	.....	100
1–30 Days Late	5	95
31–60 Days Late	5	90
61–90 Days Late	10	80
91–120 Days Late	10	70
121–150 Days Late	20	50
151–180 Days Late	20	30
181+ Days Late	30	0

§ 27.1423 Protection of incumbent operations.

(a) To protect incumbent earth stations from out-of-band emissions from fixed stations, base stations and mobiles, the power flux density (PFD) of any emissions within the 4000–4200 MHz band must not exceed −124 dBW/m²/MHz as measured at the earth station antenna.

(b) To protect incumbent earth stations from blocking, the power flux density (PFD) of any emissions within the 3700–3980 MHz band must not exceed −16 dBW/m²/MHz as measured at the earth station antenna.

(c) All 3.7 GHz Service licensees, prior to initiating operations from any base or fixed station, must coordinate cochannel frequency usage with all incumbent Telemetry, Tracking, and Command (TT&C) earth stations within a 70 km radius. The licensee must ensure that the aggregated power from its operations meets an interference to noise ratio (I/N) of −6 dB to the TT&C earth station receiver. A base station's operation will be defined as cochannel when any of the 3.7 GHz Service licensee's authorized frequencies are separated from the center frequency of the TT&C earth station by less than 150% of the maximum emission bandwidth in use by the TT&C earth station.

(d) All 3.7 GHz Service licensees operating on an adjacent channel to an incumbent TT&C earth station must ensure that the aggregated power from its operations meets an interference to noise ratio (I/N) of −6 dB to the TT&C earth station receiver.

(e) To protect incumbent TT&C earth stations from blocking, the power flux density (PFD) of any emissions within the 3700–3980 MHz band must not exceed −16 dBW/m²/MHz as measured at the TT&C earth station antenna.

§ 27.1424 Agreements between 3.7 GHz Service licensees and C-Band earth station operators.

The PFD limits in § 27.1423 may be modified by the private agreement of licensees of 3.7 GHz Service and entities operating earth stations in the 4000–4200 MHz band or TT&C operations in the 3700–3980 MHz band. A licensee of the 3.7 GHz Service who is a party to such an agreement must maintain a copy of the agreement in its station files and disclose it, upon request, to prospective license assignees, transferees, or spectrum lessees, and to the Commission.

PART 101—FIXED MICROWAVE SERVICES

■ 27. The authority citation for part 101 continues to read as follows:

Authority: 47 U.S.C. 154, 303.

■ 28. Amend § 101.3 by adding a definition for ''Contiguous United States'' in alphabetical order to read as follows:

§ 101.3 Definitions.

* * * * *

Contiguous United States. For the 3700–4200 MHz band, the contiguous United States consists of the contiguous 48 states and the District of Columbia as defined by Partial Economic Areas Nos. 1–41, 43–211, 213–263, 265–297, 299–359, and 361–411, which includes areas within 12 nautical miles of the U.S. Gulf coastline (*see* § 27.6(m) of this chapter). In this context, the rest of the United States includes the Honolulu, Anchorage, Kodiak, Fairbanks, Juneau, Puerto Rico, Guam-Northern Mariana Islands, U.S. Virgin Islands, American Samoa, and the Gulf of Mexico PEAs (Nos. 42, 212, 264, 298, 360, 412–416).

* * * * *

■ 29. Amend § 101.101 by revising the table heading ''Other'' and the entry ''3700–4200'' and adding Note 2 to read as follows:

§ 101.101 Frequency availability.

Frequency band (MHz)	Radio service				
	Common carrier (part 101)	Private radio (part 101)	Broadcast auxiliary (part 74)	Other (parts 15, 21, 22, 24, 25, 27, 74, 78 & 100)	Notes
* *	*	*	*	*	*
3700–4200	CC LTTS	OFS	.....	SAT, ET	(2).
* *	*	*	*	*	*

* * * * *

Notes

* * * * *

(2) Frequencies in this band are shared with stations in the fixed satellite service outside the contiguous United States. Applications for new permanent or temporary facilities in these bands will not be accepted for locations in the contiguous United States. Licensees, as of April 19, 2018, of existing permanent and temporary point-to-point Fixed Service links in the contiguous United States have until

December 5, 2023, to self-relocate their point-to-point links out of the 3,700–4,200 MHz band. Such licensees may seek reimbursement of their reasonable costs based on the ''comparable facilities'' standard used for the transition of microwave links out of other bands, *see* § 101.73(d) of this chapter (defining comparable facilities as facilities possessing certain characteristics in terms of throughput, reliability and operating costs) subject to the demonstration requirements and reimbursement administrative provisions administrative provisions in part 27, subpart O, of this chapter.

■ 30. Amend § 101.147 by revising Notes 8, 14, and 25 to paragraph (a) and the heading of paragraph (h) to read as follows:

§ 101.147 Frequency assignments.

(a) * * *

Notes

* * * * *

(8) This frequency band is shared with station(s) in the Local Television Transmission Service for locations outside the contiguous United States and applications for new permanent or temporary facilities in this band will not be accepted for locations in the contiguous United States. Existing licensees as of April 19, 2018, for permanent and temporary point-to-point Fixed Service links in the contiguous United States have until December 5, 2023, to self-relocate their point-to-point links out of the 3,700–4,200 MHz band. This frequency band is also shared in the U.S. Possessions in the Caribbean area, with stations in the International Fixed Public Radiocommunications Services.

* * * * *

(14) Frequencies in this band are shared with stations in the fixed satellite service. For 3,700–4,200 MHz, frequencies are only available for locations outside the contiguous United States and applications for new permanent or temporary facilities in this band will not be accepted for locations in the contiguous United States. Existing licensees as of April 19, 2018, of permanent and temporary point-to-point Fixed Service links in the contiguous United States have until December 5, 2023, to self-relocate their point-to-point links out of the 3,700–4,200 MHz.

* * * * *

(25) Frequencies in these bands are available for assignment to television STL stations. For 3,700–4,200 MHz, frequencies are only available for locations outside the contiguous United States and applications for new permanent or temporary facilities in this band will not be accepted for locations in the contiguous United States. Existing licensees as of April 19, 2018, of permanent and temporary point-to-point Fixed Service links in the contiguous United States have until December 5, 2023, to self-relocate their point-to-point links out of the 3,700–4,200 MHz band.

* * * * *

(h) *3,700 to 4,200 MHz outside the contiguous United States.* * * *

* * * * *

■ 31. Amend § 101.803 by revising Note 1 to paragraph (d) to read as follows:

§ 101.803 Frequencies.

* * * * *

(d) * * *

Notes

(1) This frequency band is shared with stations in the Point to Point Microwave Radio Service and, in United States Possessions in the Caribbean area, with stations in the International Fixed Radiocommunications Services. For 3,700–4,200 MHz frequencies are only available for locations outside the contiguous United States and applications for new permanent or temporary facilities in this band will not be accepted for locations in the contiguous United States. In the contiguous United States, licensees of existing licenses, as of April 19, 2018, for permanent point-to-point Fixed Service links have until December 5, 2023, to self-relocate their point-to-point links out of the 3,700–4,200 MHz band.

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[FR Doc. 2020–05164 Filed 4–22–20; 8:45 a.m.]

BILLING CODE 6712–01–P