Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of	)	
	)	
Upper C-band (3.98 to 4.2 GHz)	)	GN Docket No. 25-59
	)	

REPLY COMMENTS OF VERIZON

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I. INTRODUCTION AND SUMMARY.

The record provides a strong foundation for the FCC to repurpose Upper C-band spectrum to support full-power, exclusive-use licensed terrestrial wireless operations.[1] This approach is the surest way to respond to ever-growing demand for wireless services and enable the deployment of world-class 5G and 6G networks across the United States.

Commenters underscore the importance of maximizing the amount of Upper C-band spectrum that can be repurposed. The record also emphasizes the importance of auctioning Upper C-band by July 2027 and – critically – ensuring a transition that provides timely and predictable access to the spectrum. Continued government coordination and cross-industry engagements involving the wireless, satellite, and aviation sectors are necessary. And the FCC and the FAA are well-positioned to achieve a successful framework for wireless-radio altimeter coexistence.

The record confirms that several feasible paths exist for transitioning incumbent users out of the Upper C-band while ensuring that existing customers can continue to receive substantially the same service as exists today. Space station operators detail opportunities to reorganize and

[1] *Upper C-band (3.98 to 4.2 GHz)*, Notice of Proposed Rulemaking, FCC 25-78 (rel. Nov. 21, 2025) ("NPRM"). Unless otherwise noted, all comments referenced herein were filed on or about January 20, 2026 in GN Docket No. 25-59.

compress customers into a smaller segment of Upper C-band spectrum, while transitioning others to Ku-band spectrum. Other commenters demonstrate that fiber and internet protocol distribution technologies also present effective alternatives for services provided today over the Upper C-band.

Commenters broadly agree that the Commission should use the same transition structure applied in the Lower C-band, with certain improvements to further promote success. In particular, the Commission should heed comments calling for more oversight, accountability, and structure for the relocation payment clearinghouse. The Commission should also kick off the process of developing the cost catalog as soon as practicable so that stakeholders have sufficient time to weigh in, and it should finalize the cost catalog prior to the auction.

The record also demonstrates the many benefits of aligning the Upper C-band licensing and auction rules with the rules for Lower C-band. In particular, commenters stress the importance of using the same band plan and geographic areas to ensure post-auction spectrum efficiencies for licensees. The Commission should firmly reject calls to introduce shared spectrum frameworks or pursue a specialized auction. Commenters broadly support using existing Part 27 technical rules for repurposed Upper C-band spectrum, with limited changes needed.

II. THE RECORD CONFIRMS THE IMPORTANCE OF MAXIMIZING UPPER C-BAND SPECTRUM REPURPOSED FOR FULL-POWER COMMERCIAL WIRELESS AND ENSURING TIMELY ACCESS POST-AUCTION.

As NTIA explains, the Upper C-band will play an important role in "solidifying U.S. leadership in spectrum optimization and commercial innovation."[2] Accordingly, it encourages

[2] NTIA Comments at 1.

the Commission to "pursue the highest feasible allocation of spectrum."[3] Other comments strongly concur: the Commission should maximize the Upper C-band opportunity to help meet the growing demand for next-generation wireless capabilities.[4] The few calls for minimal repurposing are unsupported.[5]

Commenters underscore that "demand for wireless data continues to skyrocket" with wireless traffic topping 132 trillion megabytes in 2024, "shattering the 100 trillion megabyte record set just the year prior."[6] Ericsson precisely summarizes the current state of affairs in the United States: "America continues to have an almost insatiable appetite for wireless connectivity."[7] And wireless data demands show no signs of slowing down as use cases such as FWA, AI, IoT, smart cities and factories, autonomous vehicles, augmented reality, extended

[3] *Id*. at 2.

[4] *See*, *e.g.*, Verizon Comments; Cisco Comments (supporting "up to180 megahertz of the Upper C-band available for terrestrial wireless flexible use"); Competitive Carriers Association ("CCA") Comments at 2 ("[M]aximize spectrum available for terrestrial wireless use"); CTIA Comments at 1-2 ("A maximal transition of Upper C-band spectrum, and timely repurposing of and access to the band, is essential[.]"); Ericsson Comments at 2 ("[M]aximizing the amount of Upper c-band spectrum repurposed for high-power, flexible use."); Nokia Comments at 3 ("[M]aximiz[e] the amount of spectrum available for high-power, commercial wireless"); Qualcomm Comments at 1 ("[M]ake 180 MHz . . . available for full power terrestrial operations"); Samsung Comments at 2 ("[M]ake as much spectrum as possible available for terrestrial use"); T-Mobile Comments at 2 ("[R]epurpose the maximum amount of Upper C-band spectrum for terrestrial use"); LTN Global Communications, Inc. ("LTN") Comments at 13 ("[R]epurpose the maximum [amount of] spectrum for terrestrial use."); Information Technology Industry Council ("ITI") Comments at 2; ("[R]econfigur[e] . . . the full 180 MHz . . . for full-power, terrestrial mobile operations").

[5] The Commission, for example, should reject Lockheed Martin's claim that a 100-megahertz guard band is the "absolute minimum needed." Lockheed Martin Comments at 16. Its position flies in the face of the October 2025 joint wireless-aviation letter to the FCC describing "consensus on technical proposals" that include a "20-megahertz guard band" between the flexible use and radio altimeter bands. *See* Letter from Dorothy B. Reimold et al., Vice President, Civil Aviation, Aerospace Industries Assoc., et al., to Marlene H. Dortch, Secretary, FCC, GN Docket No. 25-59, at 1 (filed Oct. 2, 2025).

[6] *See* AT&T Comments at 2-3 (citing CTIA, Spectrum Positions (Dec. 2025), https://www.ctia.org/positions/spectrum).

[7] Ericsson Comments at 2-3.

reality, Ultra-HD mobile video, and gaming continue to expand.[8] In particular, the record reflects the importance of additional licensed spectrum to help meet the demand for FWA and the emergence of AI.[9]

The Open Technology Institute at New America and Public Knowledge ("OTI/PK") are wrong in arguing that wireless data demand is not growing and that commercial wireless operators have sufficient spectrum holdings to meet the future. OTI/PK compares percentages of wireless data growth in a way that masks the actual magnitude of increasing demand. To successfully compare the numbers that OTI/PK presents, it is necessary to look at the *actual demand numbers*, not just growth rate. When accurately compared, the Ericsson Mobility Reports that OTI/PK cite confirm that overall year-to-year data demand growth per quarter was 11.4 EB higher between the quarters shown in 2025 and 2019. In fact, the data growth from around 165 EB in Q3 of 2024 to 185 EB in Q3 of 2025 (a total increase of 20 EB) is nearly as great as the entire data demand in Q3 of 2018.[10]

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[8] *See*, *e.g.*, Cisco Comments at 3; Ericsson Comments at 3; Qualcomm Comments at 2.

[9] *See*, *e.g.*, Cisco Comments at 6 ("Licensed wireless connectivity will be a critical part of this infrastructure, enabling new capabilities for AI-driven industries, secure communications, and resilient infrastructure vital for national security."); Digital Progress Institute Comments at 2 ("[T]he current amount of spectrum is insufficient to accommodate the onslaught of data traveling over our wireless networks."); Ericsson Comments at 4 ("Consumers are also benefitting from the infusion of competition into the broadband marketplace created by 5G FWA. . . . FWA depends upon the availability of sufficient spectrum resources to support the growing consumer preference for this service.").

[10] OTI/PK states that "Ericsson's annual mobility report shows that year-over-year mobile data growth declined globally from 80 percent in 2019 to 20 percent in 2025[.]" OTI/PK Comments at 13. Although the 2019 reference to 80% comes from a chart in the Ericsson Mobility Report, the corresponding total demand was 32 EB (Exabytes) for a total growth of 32 x 0.8 = 25.6 EB. *See Ericsson Mobility Report*, Ericsson (Nov. 2019), https://www.ericsson.com/4ac657/assets/local/reports-papers/mobility-report/documents/2019/emr-november-2019.pdf. OTI/PK again correctly cites 20% for the 2025 growth number, *but* the corresponding total demand in the 2025 Ericsson Mobility Report is 185 EB for a total growth of 185 x 0.2 = 37 EB. *See Ericsson Mobility Report*, Ericsson (Nov. 2025), https://www.ericsson.com/4aca6f/assets/local/reports-papers/mobility-report/documents/2025/ericsson-mobility-report-november-2025.pdf.

To maximize the Upper C-band opportunity, it is imperative that the Commission adopt a transition schedule that provides timely access to the Upper C-band post-auction.[11] CTIA explains that "[a]ny investment decisions made by a potential bidder—and ultimately auction revenue overall—are tied to the bidder's return on investment, which hinges on certainty and timely access to the airwaves won at auction."[12] All parties involved need certainty regarding post-auction access to the spectrum and firm transition timelines. The record stresses the need for clear deadlines – for both the Upper C-band incumbent transition and the aviation retrofits – as critical to successfully repurpose and transition Upper C-band spectrum and make it available for new wireless deployments.[13]

The Commission should focus on repurposing Upper C-band spectrum for licensed full-power terrestrial wireless use, consistent with the course set by the Administration and Congress to complete an auction of wireless licenses by July 2027. The FCC should add a primary, non-federal Mobile allocation to that portion of the Upper C-band to be repurposed. The FCC should refrain from adding any additional allocations or services to the spectrum, including in that portion of the band that remains for repacked content distribution service (along with no more than a 20-megahertz guard band).[14] Congress was clear in the One Big Beautiful Bill Act that

[11] *See*, *e.g.*, AT&T Comments at 9-10; Cisco Comments at 10.

[12] CTIA Comments at 7; *see also* AT&T Comments at 10 ("Bidders need clarity on the timeline for when they will have access to the spectrum to begin deployments."); Ericsson Comments at 11 ("Certainty and timely access will enable a successful auction and Congress's expressed desire to make this spectrum available in the near term.").

[13] The Commission should reject NCTA – The Internet & Television Association's ("NCTA") suggestion that the FCC "maintain flexibility on any deadlines to account for potential delays or complications that arise in the transition process." NCTA Comments at 19. The Commission has helmed many successful spectrum transitions, and a clear timeline for when licensees can access spectrum post auction is a non-negotiable element of their success. This rulemaking process is designed to collect information about what a reasonable timeline is in which to accomplish a transition.

[14] *See* CTIA Comments at 8; Ericsson Comments at 9.

the objective is to make Upper C-band spectrum available for licensed wireless use. The FCC should focus on that goal and reject calls, for example, by SpaceX and others to introduce new satellite services into the C-band and by OTI/PK to experiment with shared spectrum regimes.[15] Simply put, sound policy dictates that the Commission stay the course, repurpose spectrum for full-power, licensed wireless use and address demand for existing FSS service, and refrain from entertaining ideas about new, other uses for the band.

Indeed, the Commission should instead work to extend the benefits of licensed, full-power terrestrial wireless spectrum by allocating at least some mid-band spectrum, including C-band spectrum, for terrestrial wireless outside the contiguous United States, such as Hawaii. AT&T agrees that there is a "significant mid-band spectrum crunch in those states and territories."[16] CTIA observes that at the very least, the Commission should encourage the submission of data regarding space and earth station operations in non-contiguous U.S. states and territories so that it can better "evaluate the potential for, and benefits of, enabling terrestrial use of C-band spectrum in OCONUS areas."[17]

III. THE RECORD REFLECTS SOUND ALTERNATIVES TO TRANSITION UPPER C-BAND USERS OUT OF REPURPOSED SPECTRUM WHILE ENSURING THAT DEMAND FOR EXISTING SERVICES CAN CONTINUE TO BE MET.

Commenters identify multiple avenues to support the repurposing of a significant amount of Upper C-band spectrum through a transition of incumbent FSS service via repacking and compression in the remaining Upper C-band; a transition to Ku-band, with appropriate solutions to safeguard reliability; a transition to fiber; and via internet protocol distribution technologies.

[15] *See*, *e.g.*, SpaceX Comments at 4; OQ Technology Comments at 1-2 (filed Dec. 31, 2025); OTI/PK Comments at 12, 24-26.

[16] AT&T Comments at 4.

[17] CTIA Comments at 14-15.

Commenters detail how these solutions will maintain substantially the same service as exists today *and* provide for timely transition and access to substantial Upper C-band spectrum for wireless providers.

SES, which distributes more than 95 percent of the video programming over C-band satellite today,[18] presents a plan that would clear 160 megahertz (or more) for wireless use, plus a 20-megahertz guard band, by repacking customers into the remaining portion of the Upper C-band and migrating some customers to Ku-band downlink spectrum.[19] SES also proposes to implement a terrestrial recovery network for the parts of the United States with the most substantial rain fade. For the Ku-band migration, SES has plans to address rain fade concerns through new hybrid satellites and "the roll-out of carefully engineered solutions to ensure that customers can enjoy 'substantially the same' service as they receive in the C-band."[20] Eutelsat similarly indicates that it could clear "at least" 130 megahertz with customers remaining "*within* the reduced Upper C-band FSS allocation,"[21] and it can clear more if it were to "migrat[e] existing customers to alternative spectrum—such as Ku-band—or to other distribution technologies."[22]

Commenters also reference the Commission's own record evidence to show that C-band use continues to decline as other distribution platforms take hold, in particular fiber.[23] CTIA, for example, points to FCC findings about the increasing availability of fiber to deliver a "high-

[18] *Applications of SES S.A. and Intelsat S.A. For Consent to Transfer Control of Licenses and Authorizations*, Memorandum Opinion and Order, 40 FCC Rcd 4919, 4930 ¶ 25 (2025) ("*SES/Intelsat Order*").

[19] SES Americom, Inc. ("SES") Comments at 10.

[20] *Id*. at 3.

[21] Eutelsat Communications S.A. ("Eutelsat") Comments at 22 (emphasis added).

[22] *Id*. at 9-10.

[23] *See*, *e.g.*, CTIA Comments at 9; Qualcomm Comments at 2-3; Verizon Comments at 2-3, 10-11.

capacity competitive alternative[] to satellite services."[24] ACA Connects confirms that "fiber stands out as a future-proof, interference-resilient, and service-protective alternative" to Upper C-band spectrum.[25] Zixi explains that its software defined video network costs less than physical infrastructure like fiber and satellite and can be configured to be just as reliable, if not more so.[26] And LTN explains how its transport stream over IP service could actually absorb all legacy C-band users and achieve 99.9999% availability while costing significantly less than fiber.[27]

Several commenters support the Commission adopting a lump sum option similar to that offered in the Lower C-band transition to enable eligible incumbent earth station operators to choose a path that best suits their needs.[28] As discussed above, the record demonstrates that Upper C-band users have several viable alternatives available.

IV. THE RECORD SUPPORTS ONGOING GOVERNMENT COORDINATION AND CONTINUED CROSS-INDUSTRY ENGAGEMENT TO ACHIEVE TIMELY RESOLUTION OF ADJACENT CHANNEL ALTIMETER COEXISTENCE CONCERNS.

Commenters across the board emphasize the importance of coordinated efforts between the FCC and its federal partners including the FAA and NTIA, and between the wireless and aviation industries more broadly.[29] Aligning the FCC's Upper C-band rules and transition schedule with the FAA's retrofit mandate is critical to ensuring that wireless operators gain

[24] *See*, *e.g.*, CTIA Comments at 10 (quoting *SES/Intelsat Order*, 40 FCC Rcd at 4925 ¶ 15).

[25] ACA Comments at 11-12.

[26] Zixi Comments at 2.

[27] LTN Comments at 5.

[28] *See*, *e.g.*, ACA Connects Comments at 11; SES Comments at 26; LTN Comments at 22.

[29] *See*, *e.g.*, AT&T Comments at 10; Airlines for America Comments at 17; Aviation Spectrum Resources Comments at 11; Boeing Comments at 5-6; CTIA Comments at 7-8; Lockheed Martin Corporation Comments at 15-16; NTIA Comments at 5-6; Qualcomm Comments at 4; Thales Comments at 3, 5-6; Verizon Comments at 5-6.

timely access to reallocated Upper C-band spectrum. The FCC and FAA must ensure the proceedings are "closely coordinated, timely completed, and result in compatible mandates."[30]

Cross-industry collaboration is critical as well. A4A explains that, since the Lower C-band auction, both industries "have worked to enhance their collective understanding of the varied interests" and together have developed "lessons learned for improved outcomes[.]"[31] This collaborative approach is important for moving forward,[32] especially as information gathering and evaluation is still underway.

One area of continued dialogue remains the analysis used to underpin the technical rules to ensure coexistence between radio altimeters in the 4.2-4.4 GHz band and commercial wireless service in the C-band. As those discussions move forward, real-world experience and lessons learned should remain front and center in the discussions of appropriate parameters. CTIA, however, recently cited a "worsening of certain modeling parameters in both the FAA and radio altimeter manufacturer modeling compared to what was previously used in FAA and aviation industry coexistence analyses."[33] Overly conservative modeling inputs that rely on "unrealistic assumptions and [that] are belied by real-world environments . . . threaten to restrict Upper C-band access without any real world safety benefit."[34] Stakeholders – both government and industry – should remain committed to finding evidence-based solutions for coexistence.

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[30] AT&T Comments at 10.

[31] Airlines for America ("A4A") Comments at 2.

[32] Calls for the FCC to "defer to the ensuing final rule resulting from the recently published FAA [RA] NPRM to define all aspects of long-term compatibility between . . . terrestrial wireless operations . . . and next-generation radio altimeters" are not helpful. *See* Garmin Comments at 10. The respective expertise of both agencies is required to develop a sustainable outcome, and the final rules for the FCC and FAA need to be aligned as the product of collaboration and, ideally, of industry consensus.

[33] Letter from Scott K. Bergmann, Senior Vice President, Regulatory Affairs, CTIA, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 25-59, at 2 (Feb. 4, 2026) ("CTIA February 4 Letter").

[34] *Id*.

Timely resolution of technical details will aid the ability of the aviation industry to meet the timelines the FAA has proposed for achieving radio altimeter retrofits. The FAA intends to adopt a compliance date for the first tranche of aircraft "by the date" the FCC "authorizes wireless service in the Upper C-band," and it proposes a timeframe within 2029 to 2032.[35] A date certain is critical information going into the Upper C-band auction and a timely and certain outcome on the earlier end of the FAA's proposed timeframe is achievable.

V. THE RECORD FAVORS USE OF THE TRANSITION STRUCTURE APPLIED IN THE LOWER C-BAND, WITH MINOR MODIFICATIONS, FOR INCUMBENT SATELLITE OPERATORS AND USERS OF UPPER C-BAND.

A. Commenters Support the Broad Mechanics of the Lower C-Band Transition for the Upper C-band Relocation Process.

Commenters overwhelmingly support the broad strokes of the transition process used in the Lower C-band and agree that using those processes again will facilitate a coordinated and timely transition of Upper C-band spectrum.[36] Stakeholders generally back the Commission's proposal to rely again on the *Emerging Technologies* framework to facilitate swift and orderly access to the Upper C-band by requiring new terrestrial licenses to reimburse the reasonable

[35] *Requirements for Interference-Tolerant Radio Altimeter Systems*, Federal Aviation Administration, 91 Fed. Reg. 459, 461 (Jan. 7, 2026).

[36] *See*, *e.g.*, AT&T Comments at 4 ("The Lower C-band framework has been an undeniable success."); National Association of Broadcasters ("NAB") Comments at 3 (calling the Lower C-band transition "a proven roadmap"); T-Mobile Comments at 7 (stating the transition should "mirror that utilized during the Lower C-band"); Synamedia Ltd Comments at 4 (suggesting the FCC "leverage[e] the proven coordination mechanisms"); Eutelsat Comments at ii (supporting a transition modeled on the "tested and approved Lower C-band transition framework"); CTIA Comments at 4 (suggesting the FCC again rely on the "successful, court-approved *Emerging Technologies* framework as a foundation"); Ericsson Comments at 1 (describing the Lower C-band transition as a "sturdy foundation"); NTIA Comments at 9 (stating the "transition framework elements from the Lower C-band . . . [are] a sound and efficient approach [that] leverage[s] established and well-exercised procedures"); NCTA Comments at 8 (describing the FCC's prior transition using its *Emerging Technologies* framework and 316 authority as "critical" for Upper C-band); Qualcomm Comments at 3 ("The FCC should rely on the learnings from the successful transition of the Lower C-Band spectrum[.]"); SES Comments at 2 (supporting the FCC's proposal to "use essentially the same framework as the one used in the Lower C-band to carry out its statutory obligations under the [OB3].").

transition costs of eligible space station operators and incumbent earth station operators that are required to clear the band.[37] Additionally, commenters support the more mechanical elements of the Lower C-band process, including the use of transition plans by space station operators (this time with more structured opportunity to comment on and modify the plans),[38] use of a relocation coordinator,[39] reliance on a third-party relocation payment clearinghouse to oversee the reimbursement and lump sum payments, and the development of a cost catalog to promote an orderly and timely transition.

Although stakeholders agree on the overall merits of the Upper C-band transition framework, several modifications to elements of the Lower C-band transition process are warranted. As detailed below, the FCC should adopt some of these proposals – such as more oversight and accountability for the clearinghouse. At the same time, it should firmly reject proposals that would undermine the success borne out by the Lower C-band process – this includes proposals that would unduly expand the entities eligible for reimbursement and codify reimbursement for costs that are neither reasonable nor necessary for the transition.

B. C-band Incumbents and Lower C-band Licensees Agree: The Clearinghouse Process Requires More Oversight, Accountability, and Structure to Ensure Prompt Processing and Avoid Excessive and Costly Delays.

Lower C-band licensees – responsible for paying relocation expenses – and C-band incumbents – responsible for carrying out the transition – are united on the need for reform to the

[37] *See*, *e.g.*, Verizon Comments at 2-3; Ericsson Comments at 9; ACA Connects Comments at 7-8; CTIA Comments at 23-24; Eutelsat Comments at 9; LTN Comments at 14; OTI/PK Comments at 9; SES Comments at 19-20; NCTA Comments at 8-9; T-Mobile Comments at 5.

[38] *See*, *e.g.*, NAB Comments at 10; Verizon Comments at 18; Eutelsat Comments at 16.

[39] *See*, *e.g.*, Summit Ridge Group ("SRG") Comments at 2; Verizon Comments at 18; Eutelsat Comments at 19-20.

reimbursement payment process.[40] Although the Clearinghouse in the Lower C-band transition got the job done, the framework did not deliver reasonable results to Lower C-band licensees or the affected incumbents (both those seeking reimbursement and those that elected lump sum payments).

Verizon's and CTIA's comments extensively detail the Lower C-band Clearinghouse cost overruns and inefficiencies.[41] SES likewise confirms that Clearinghouse processing delays "imposed significant financing costs on overlay licensees and vendors."[42] The numbers bear this out. For example, CTIA explains that the "actual total costs [] exceeded the [Clearinghouse's] estimate by more than 80 percent, with labor costs that were roughly 75 percent over budget and expenses exceeding the budget by well over 200 percent."[43] Problematically, Lower C-band licensees had no mechanism to challenge the expenses of the Clearinghouse itself.[44] For the Upper C-band transition, it is imperative that "both relocation expenses and program administration expenses . . . be reasonable"[45] and subject to Commission oversight.

Space station operators and incumbent earth station operators also express significant frustration with the Clearinghouse claim evaluation process. In particular, SES explains how the process "proved unnecessarily burdensome," "generat[ed] excessive documentation and delays for routine reimbursement claims," and "slowed the transition and imposed needless

[40] *See*, *e.g.*, Verizon Comments at 14-18; AT&T Comments at 8-9; SES Comments at 26-29; Eutelsat Comments at 18-19. *See also* ARCTEK Satellite Productions, LLC ("ARCTEK") Comments at 4; CTIA Comments at 25-28; Qualcomm Comments at 3; SRG Comments at 2.

[41] *See generally* Verizon Comments; CTIA Comments.

[42] SES Comments at 28.

[43] CTIA Comments at 25.

[44] Verizon Comments at 17.

[45] *Id*.

administrative costs on all parties involved."[46] NAB asserts that "[m]any C-band users reported delays of over two years to get reimbursed for costs consistent with the Cost Catalog."[47] And ARCTEK emphasizes that "[f]or a small operator, a three-year delay in reimbursement is effectively a permanent loss of capital that prevents critical reinvestment."[48] These timelines were too long, and it is not reasonable for incumbents to wait multiple years for a reimbursement check or lump sum payment because the Clearinghouse is not timely processing claims.[49]

As one of the licensees that funded the Lower C-band transition, we appreciate the need for a third-party arbiter to oversee the claims process and ensure that claimants are not gold plating their transitions or submitting inflated or fraudulent claims. However, excessive review processes slow down the transition and cost licensees money.[50] The FCC has had other successful transitions that demonstrate it is possible to strike a better balance.[51]

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[46] SES Comments at 26-27.

[47] NAB Comments at 8.

[48] ARCTEK Comments at 4.

[49] At the same time, we do not support requests from some commenters for the FCC to create a fund or other process for incumbents to access money up front to fund the transition. *See*, *e.g.*, ARCTEK Comments at 3; Eutelsat Comments at 8-10; NAB Comments at 8. The FCC's framework is centered on *reimbursing* incumbents, and it is important to determine costs are reasonable and necessary before money goes out the door. However, the processing improvements discussed below should go a long way toward ensuring incumbents do not end up acting like a "'bank' for the federal government." ARCTEK Comments at 3.

[50] *See*, *e.g.*, SRG Comments at 5 ("[D]elayed reimbursement may slow the overall clearing process, lowering the value of the license to the winning bidders.").

[51] The FCC's broadcast incentive auction transition reimbursement program, for routine reimbursement requests consistent with the Cost Catalog amounts, required stations to provide "an invoice, receipt, or other supporting documentation that explain[ed] the nature and cost of the expense," for example. *Post-Auction Reimbursement: Broadcaster Frequently Asked Questions*, FCC, at 18, 19 (Jan. 27, 2023), https://www.fcc.gov/sites/default/files/full-power-classa-faqs.pdf. A third-party contractor was used to conduct random audits, data validation (to demonstrate the proper payment of funds to third-party vendors), and site visits. In contrast, SES details that to obtain reimbursement for a routine single filter invoice, it had to provide "the purchase order, invoice, evidence of payment, evidence that the cash went out to the vendor, purchase order for the installer, invoice from the installer, evidence of payment to the installer, a picture of the installed filter, and evidence that the antenna was in scope." SES Comments at 28 n.61.

The record is clear that "[b]oth incumbents and new entrants would benefit from faster claims processing and a more efficient claims resolution process, reducing inefficiency and incremental costs."[52] Accordingly, the Commission should adopt several recommended approaches to extend oversight and build on and improve the previous relocation payment clearinghouse process for the Upper C-band transition:

- *More Structure with Enforceable Deadlines*. Commenters urge the Commission to set a schedule for the launch of the clearinghouse and the onboarding of incumbents; a specific window within which relocation expense claims must be submitted after they are incurred;[53] a deadline for submission of lump sum claims, if adopted; a mandatory timeline for the review of claims;[54] a firm deadline for the payment of claims after they are approved; and a final deadline for the submission and processing of final claims.[55]

- *Increase Transparency*. Commenters broadly support the FCC requiring the clearinghouse to provide more information in its quarterly reports to enable the FCC and stakeholders to track the status of incoming claims and outgoing payments, including for lump sum electees, if applicable.[56]

- *Streamline Claims Processing*. Commenters support a clearinghouse that uses a more streamlined approach to claims processing. For example, SES suggests that the required documentation should be "proportionate," with larger reimbursement amounts requiring more comprehensive documentation and routine requests relying on "sampling."[57] SRG

[52] CTIA Comments at 26; *see also* AT&T Comments at 8-9 (suggesting the FCC "streamline the Clearinghouse process for both incumbent operators and overlay licensees as well as [adopt] other guardrails to combat inefficiency and incremental costs").

[53] *See*, *e.g.*, Verizon Comments at 17 (noting the importance for claims to be submitted and reviewed on a rolling basis).

[54] *See*, *e.g.*, SES Comments at 27-28 (suggesting "firm timelines for reviewing claims and issuing payments – such as a 60- or 90-day threshold – and interest penalties should apply to late payments"); CTIA Comments at 26-27 (suggesting a "shot clock" for claims processing); Eutelsat Comments at 16-19.

[55] *See*, *e.g.*, SES Comments at 26-27; CTIA Comments at 26.

[56] *See*, *e.g.*, SES Comments at 28 (the Clearinghouse should "report on the backlog at each step in the process in quarterly reports."); *see also* CTIA Comments at 28; Verizon Comments at 15-16.

[57] SES Comments at 28; *see also* CTIA Comments at 26 (suggesting the clearinghouse could "utilize certifications and random audits for high-volume, low-value claims to reduce the time and work needed to process such claims").

suggests that for common earth stations configurations, a streamlined cost catalog with a "single cost line for the entire configuration" would be more efficient.[58]

- *Greater Accountability*. Commenters agree that the FCC should "establish a process for challenging costs of the clearinghouse itself to promote accountability and oversight of the clearinghouse process."[59] Clearinghouse applicants should "provide a more accurate cost and fee projection up front and [the FCC should] impose a cap on the amount they will be paid beyond that amount."[60] It is essential that the clearinghouse can be held accountable for exceeding cost estimates.

- *Diversify Input and Ensure Adequate Review Timeline*. Commenters also suggest that the FCC should ensure that the clearinghouse search committee's representation has "greater parity between claimants and new entrants and that it includes participation by licensees that experienced the Lower C-band" transition.[61] CTIA also recommends that the selection process not be truncated so as to "limit due diligence or the negotiation of final terms and conditions under proposals."[62]

The Commission should also establish a dispute process for Commission review and determination of discrete legal questions made by the clearinghouse.[63] Finally, the Commission should take necessary steps to address issues that arose in the context of appeals of clearinghouse reimbursement decisions and petitions for *de novo* review, in particular relating to benchmarks for lump sum elections and reimbursement for earth stations relocated to foreign countries.[64]

Although we appreciate SRG's insights into how a relocation payment clearinghouse could be run more efficiently, Verizon does not support "performance-based bonuses [for the clearinghouse] tied to early completion."[65] This would create perverse incentives; instead, when

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[58] SRG Comments at 4 ("If the Clearinghouse can quickly determine that the total cost for a standard configuration is reasonable, it's unclear whether the time and money spent reviewing the reasonableness of each element of that configuration adds value.").

[59] CTIA Comments at 28; *see also* Verizon Comments at 15-16; SRG Comments at 2 (encouraging the FCC to enable search committee oversight of the Clearinghouse).

[60] Verizon Comments at 17.

[61] CTIA Comments at 28; Verizon Comments at 18.

[62] CTIA Comments at 28-29.

[63] *Id* at 27.

[64] *Id*.

[65] SRG Comments at 2.

applying to serve as the clearinghouse, an applicant should evaluate the full task and timelines required by the Commission and put forward its best proposal for how it will accomplish that task and how much it will cost. Then the search committee can fully evaluate the claim processing approach and cost to determine which applicant will best satisfy the Commission's rules and goals.

C. The Commission Should Not Expand the List of Upper C-band Entities Eligible for Reimbursement Payments.

The Commission should use the same definitions for incumbent space station operators and incumbent earth stations used in the Lower C-band proceeding and should not reopen a filing window for the addition of more earth stations.[66] The Commission defined "incumbent earth stations" for the Lower C-band transition to include fixed and temporary fixed earth stations that were operational as of April 19, 2018, and that: (i) continue to be operational; (ii) were licensed or registered in the ICFS database on November 7, 2018; and (iii) timely certified the accuracy of the information on file with the Commission by May 28, 2019.[67] The Commission adopted a freeze on the filing of new or modification applications for earth stations registered in the C-band that still exists today.[68]

The Commission should resist calls from commenters who seek to open a window to expand the list of incumbent earth stations to add new earth stations or modifications that were made during a freeze, or to add earth stations that were correctly rejected from the definition in

[66] *See* Verizon Comments at 8 n.25; CTIA Comments at 36.

[67] *Expanding Flexible Use of the 3.7 to 4.2 GHz Band*, Report and Order and Order of Proposed Modification, 35 FCC Rcd 2343, 2392 ¶ 116 (2020) ("*Lower C-band Order*").

[68] *Temporary Freeze on Applications for New or Modified Fixed Satellite Service Earth Stations and Fixed Microwave Stations in the 3.7-4.2 GHz Band*, GN Docket No. 17-183, Public Notice, 33 FCC Rcd 3841 (IB/PSHSB/WTB 2018) ("*Freeze Notice*").

the first place.[69] Operators that deployed or made modifications during the freeze did so at the risk of the earth station operator.[70] Section 25.138(b) clearly specifies that the freeze will last until (i) the transition is completed *and* (ii) the Space Bureau announces via Public Notice that applications may be filed. No Public Notice lifting the freeze has been published, and the freeze is still in place "to preserve the current landscape of authorized operations in the 3.7-4.2 GHz band pending Commission action as part of its ongoing inquiry into the possibility of permitting mobile broadband use and more intensive fixed use of the [C-band]."[71]

Lifting the freeze at this time would undermine the careful information collection the Commission undertook over several years to assess the landscape of incumbent operations in the C-band. Further, doing so would risk reintroducing the uncertainty the Commission stated it was trying to correct by instituting the freeze in the first place. Over the course of the last five years, the Commission has exhaustively assessed and updated its record of C-band incumbent earth stations and has given operators numerous opportunities to challenge inaccuracies in its records.[72] There is no reason to deviate from the list now to expand the universe of stations

[69] *See*, *e.g.*, ACA Connects at 16-17; ARCTEK at 2; Cunningham Communications, Inc. Comments at 4-6; Jackson Energy Authority Comments at 5-7; North American Spectrum Alliance Comments at 9; SES Comments at 31.

[70] ACA Connects Comments at 17 (citing 47 C.F.R. § 25.138(b)).

[71] *Freeze Notice*, 33 FCC Rcd at 3841.

[72] *See International Bureau Releases Preliminary List of Incumbent Earth Stations in the 3.7-4.2 GHz Band in the Contiguous United States*, Public Notice, 35 FCC Rcd 17018 (IB 2020); *International Bureau Releases List of Incumbent Earth Stations in the 3.7-4.2 GHz Band in the Contiguous United States*, Public Notice, 35 FCC Rcd 16614 (IB 2020); *International Bureau Releases Updated List of Incumbent Earth Stations in the 3.7-4.2 GHz Band in the Contiguous United States*, Public Notice, 36 FCC Rcd 2016 (IB 2020); *International Bureau Releases Updated List of Incumbent Earth Stations in the 3.7-4.2 GHz Band in the Contiguous United States*, Public Notice, 36 FCC Rcd 2368 (IB 2020); *International Bureau Releases Updated List of Incumbent Earth Stations in the 3.7-4.2 GHz Band in the Contiguous United States*, Erratum, 36 FCC Rcd 3844 (IB 2020); *International Bureau Releases Updated List of Incumbent Earth Stations in the 3.7-4.2 GHz Band in the Contiguous United States*, Public Notice, 36 FCC Rcd 9974 (IB 2021); *International Bureau Releases Updated List of Incumbent Earth Stations in the 3.7-4.2 GHz Band in the Contiguous United States*, Public Notice, 36 FCC Rcd 18287 (IB 2021); *International Bureau Releases Updated List of Incumbent Earth Stations in the 3.7-4.2 GHz Band in the Contiguous United*

eligible for relocation reimbursement payments. This includes making earth stations OCONUS or international earth stations eligible for reimbursement payments.[73] OCONUS operators have been on notice since the release of the Lower C-band Order that the Commission would not consider them incumbents,[74] and the Commission has similarly made clear in disposing of challenges to Lower C-band relocation reimbursement decisions and in the NPRM that international earth stations are unequivocally ineligible.[75]

D. Consistent with the Lower C-Band Transition, Incumbent Satellite Operator and User Relocation Expenses Must Be Actual, Reasonable, and Necessary.

The record reflects broad consensus that incumbent space station operators and incumbent earth stations should be reimbursed for reasonable relocation expenses. The Commission should carry over from the Lower C-band transition its commitment to ensure that the reimbursement program does not lead to gold plating during the transition of incumbent

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States, Erratum (IB 2021); *International Bureau Releases Updated List of Incumbent Earth Stations in the 3.7-4.2 GHz Band in the Contiguous United States*, Public Notice, 37 FCC Rcd 3232 (IB 2022); *International Bureau Releases Updated List of Incumbent Earth Stations in the 3.7-4.2 GHz Band in the Contiguous United States*, Erratum (IB 2022); *International Bureau Releases Updated List of Incumbent Earth Stations in the 3.7-4.2 GHz Band in the Contiguous United States*, Public Notice, 37 FCC Rcd 14170 (IB 2022); *International Bureau Releases Updated List of Incumbent Earth Stations in the 3.7-4.2 GHz Band in the Contiguous United States*, Public Notice, 38 FCC Rcd 1414 (IB 2023); *Space Bureau Releases Updated List of Incumbent Earth Stations in the 4.0-4.2 GHz Band in the Contiguous United States*, Public Notice, DA 25-864 (SB rel. Sept. 18, 2025); *Space Bureau Releases Corrected, Updated List of Incumbent Earth Stations in the 4.0-4.2 GHz Band in the Contiguous United States*, Public Notice, DA 25-960 (SB rel. Nov. 19, 2025).

[73] *See*, *e.g.*, National Public Radio Comments at 5-6; NAB Comments at 7.

[74] *Lower C-band Order*, 35 FCC Rcd at 2407 ¶ 149 n.419 (2020) (explaining that OCONUS 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 [OCONUS] earth stations . . . may not claim protection from harmful interference from new flexible use licensees in the contiguous United States").

[75] *See*, *e.g.*, *3.7-4.2 GHz Band Transition Clearinghouse Dispute Referrals and Appeals*, Memorandum Opinion and Order, 40 FCC Rcd 2170 (WTB 2025) (denying an appeal filed by an earth station operator seeking reimbursement for expenses incurred moving C-band operations to an international earth station); NPRM ¶ 97 ("[W]e propose that costs associated with facilities outside the United States would not be eligible for any reimbursement of transition costs, independent of any arguable relationship to the transition in the contiguous United States.").

systems. The record also makes clear the importance of the Commission again setting clear expectations about what is reimbursable and ensuring that compensable expenses are only those that are actual, reasonable, and necessary.

Several commenters suggest reimbursement for incumbent earth station expenses that are beyond the bounds of what is generally reasonable under the *Emerging Technologies* framework. For example, commenters ask for reimbursement for loss of revenue/cost of business interruption/workforce impacts;[76] investment capital;[77] sunk costs;[78] value of investments made during the Lower C-band transition;[79] and the value of the spectrum.[80]

The FCC needs to maintain the guiding principles applied in the Lower C-band transition – for example, to qualify for reimbursement, all relocation costs must be reasonable; and incumbents should be required to obtain the equipment that most closely replaces their existing equipment or, as needed, provides the targeted technology upgrades necessary.[81]

In light of those principles, Verizon agrees with CTIA that the FCC should specify that "finance charges are only compensable to the extent that acquiring financing for a particular cost is part of the ordinary course of business (e.g., financing satellite purchases)"; "establish that recurring costs cannot extend beyond the final transition date"; and "require that any claim for

[76] ARCTEK Comments at 3; PSSI Global Services, LLC ("PSSI") Comments at 41.

[77] ARCTEK Comments at 3-4; LinkUp Communications Corporation Comments at 3; NCTA Comments at 15.

[78] PSSI Comments at 41.

[79] North American Spectrum Alliance Comments at 7.

[80] Citizens Against Government Waste Comments at 3.

[81] *Lower C-band Order*, 35 FCC Rcd at 2423 ¶¶ 194-95.

recurring charges be accompanied by a study of avoided costs for decommissioned facilities[.]"[82] The FCC should also adopt a hard cap on soft costs.[83]

To the extent the Commission adopts a lump sum option, it should again require that earth station operators could only "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."[84] Those average costs were determined by the Cost Catalog, and the Commission should continue to ensure against exorbitant costs going forward.

E. Comments Show the Benefits of Developing a Cost Catalog as soon as Practicable.

Commenters generally support the use of a cost catalog for the Upper C-band transition.[85] Verizon agrees with SES that the transition process would be well-served by starting from the position that in general costs that were reasonable during the Lower C-band transition likely remain reasonable.[86] The Commission should begin work on the Upper C-band cost catalog as soon as practicable. For example, the Commission could adopt a mini-order specifying, as it did in the Lower C-band Order, what "reasonable relocation expenses" means and delegate authority to the Wireless Telecommunications Bureau to begin the process of developing the catalog, which will need to go through one or more rounds of public comment. As CTIA explains, the cost catalog needs to be "finalized prior to the auction" and it should be available before the clearinghouse applicants submit applications.[87]

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[82] CTIA Comments at 27.

[83] *See*, *e.g.*, CTIA Comments at 27; Verizon Comments at 13.

[84] *Lower C-band Order*, 35 FCC Rcd at 2427 ¶ 202 (internal footnote omitted).

[85] *See*, *e.g.*, CTIA Comments at 26; Eutelsat Comments at 10; LTN Comments at 22; NAB Comments at 3.

[86] SES Comments at 27.

[87] CTIA Comments at 29.

VI. THE RECORD CONFIRMS THAT THE LICENSING AND AUCTION RULES USED IN LOWER C-BAND SHOULD GENERALLY BE EXTENDED TO UPPER C-BAND.

Commenters overwhelmingly agree that harmonizing the licensing rules between the reallocated Upper C-band and Lower C-band spectrum will "facilitate the rapid commercialization and deployment of this spectrum, bringing immediate benefits to American consumers and U.S. enterprises."[88] Commenters are clear that consistency across the Upper and Lower C-band rules is critical to "reduce regulatory friction, support equipment interoperability, and accelerate deployment."[89] Below, we address specific issues raised in the record related to license terms and renewal, spectrum configuration and licensing, the Commission's mobile spectrum holdings policies, and the application of the FCC's traditional competitive bidding framework.

License Terms and Performance. Commenters agree that the FCC should promote parity between the Upper and Lower C-band segments by adopting a 15-year license term and aligning renewal requirements.[90] Verizon also supports calls from CTIA and AT&T suggesting the Commission "ensure that performance milestones are triggered by licensees' ability to *access* the spectrum."[91] As AT&T explains, by tying performance requirement timelines to the actual date deployments can commence, the FCC can "account for the inevitable gap between the date the licenses are issued and the date on which the spectrum is actually clear."[92]

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[88] T-Mobile Comments at 3; *see also* Verizon Comments at 20-23; Nokia Comments at 4; Cisco Comments at 10; CTIA Comments at 30; Qualcomm Comments at 6; AT&T Comments at 5-6; NTIA Comments at 7.

[89] Samsung Comments at 3.

[90] *See*, *e.g.*, CTIA Comments at 32; AT&T Comments at 5-6; T-Mobile Comments at 3; Verizon Comments at 22.

[91] CTIA Comments at 32.

[92] AT&T Comments at 6.

Spectrum Configuration and Licensing. The record confirms the many benefits of adopting a band plan of 20-megahertz sub-blocks and an auction of unpaired licenses[93] on an exclusive geographic-area basis using Partial Economic Areas ("PEAs"),[94] consistent with the Lower C-band. Not only are 20-megahertz sub-blocks "widely supported in the equipment ecosystem,"[95] but harmonizing the band plan across the Lower and Upper C-band will "enhance opportunities for intra-band carrier aggregation, enabling providers to increase bandwidth and enhance use cases and applications," and will "facilitate the potential for post-auction spectrum optimization utilizing a swap mechanism," which can maximize spectrum efficiency.[96] Enabling the aggregation of 20-megahertz sub-blocks is also important to create large, contiguous blocks of mid-band spectrum that "support lower latency and faster data transmissions."[97] This will achieve "an attendant increase in network performance[.]"[98] At the same time, as commenters note, this approach "supports a wide variety of deployment models, from nationwide networks to targeted regional offerings," while also "simplify[ing] network planning and device development."[99] Consistent with these comments, the Commission should adopt its proposals to align the band plan and licensing scheme for the Upper C-band and the Lower C-band.[100]

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[93] *See*, *e.g.*, T-Mobile Comments at 4 ("The Commission should adopt its proposal to permit unpaired spectrum block configuration."); Verizon Comments at 21 ("[T]o support advanced services, the channels should be unpaired so that they are suitable for Time Division Duplexing[.]").

[94] *See*, *e.g.*, Verizon Comments at 21-22; CTIA Comments at 30-31; Nokia Comments at 4; AT&T Comments at 5-6; Qualcomm Comments at 6; T-Mobile Comments at 4; Samsung Comments at 3.

[95] Nokia Comments at 4.

[96] Cisco Comments at 10; *see also* Qualcomm Comments at 6 (stating that harmonizing the band plan and geographic area sizes will allow licensees to "combine Lower C-Band and Upper C-Band spectrum assets to deliver improved service using wider channels").

[97] CTIA Comments at 30.

[98] T-Mobile Comments at 4.

[99] Samsung Comments at 3.

[100] NPRM ¶ 26.

The Commission should roundly reject calls to license any portion of the Upper C-band in 10-megahertz blocks or by Cellular Market Areas or counties.[101] As an initial matter, vendors confirm that 20-megahertz sub-blocks are the "minimal meaningful block size for enabling the next generation of technological advancement."[102] Moreover, the results of the Lower C-band auction demonstrate that "the proposed band plan supports a diversity of licensees, provides sufficient spectrum to support robust 5G deployments, and will be capable of supporting future 6G deployments."[103] Deviation from the band plan and geographic areas used in the Lower C-band would dramatically reduce the benefits of harmonization discussed immediately above and complicate an auction that already must be conducted on a prompt timeline.

Furthermore, there is no need to offer reduced blocks with smaller geographic area licenses to promote robust use of the band, as some commenters suggest.[104] The Commission has concluded time and again that licensing at the PEA level is flexible enough to support both large and small geographic license area sizes: small enough to permit entry by providers that wish to offer localized wireless broadband service, and large and scalable enough to suit providers seeking to serve customers on a larger geographic scale.[105] While there may not be an optimal geographic size for all bidders in an auction, PEAs strike the right balance for most

[101] *See*, *e.g.*, OTI/PK Comments at 15-16; WISPA – The Association for Broadband Without Boundaries ("WISPA") Comments at 5-8; CCA Comments at 4-5; Rural Wireless Association, Inc. ("RWA") Comments at 7-9.

[102] Cisco Comments at 10.

[103] T-Mobile Comments at 4.

[104] *See*, *e.g.*, OTI/PK Comments at 15-16; WISPA Comments at 6-8; CCA Comments at 4-5; RWA Comments at 7-9.

[105] *See*, *e.g.*, *Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions*, Report and Order, 29 FCC Rcd 6567, 6575 ¶ 18 (2014); *Use of Spectrum Bands Above 24 GHz For Mobile Radio Services et al.*, Second Report and Order, Second Further Notice of Proposed Rulemaking, Order on Reconsideration, and Memorandum Opinion and Order, 32 FCC Rcd 10988, 10998 ¶ 28 (2017).

bidders. As the Commission determined in the Lower C-band Order, "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 flexible-use licenses[.]"[106] The record is clear that PEAs are the correct choice for the auction of Upper C-band spectrum and are critical to achieving the benefits of harmonization with Lower C-band spectrum.

Exclusive-Use, Full-Power Spectrum. Upper C-band spectrum is critical to supporting next-generation, full-power, commercial wireless networks. To give next-generation wireless use cases the best opportunity to flourish in the Upper C-band, capitalize on the economies of scale by harmonizing the licensing framework with the Lower C-band, and facilitate the coordination that needs to take place for the Upper C-band transition to be successful, the FCC should resoundingly reject any specialized technical parameters or sharing regime in the Upper C-band. This band is too important to undermine its use for 5G and 6G deployments.

The Upper C-band is not a band to experiment with a CBRS-like regime.[107] Imposing a CBRS opportunistic sharing framework would only serve to complicate and delay – not speed – commercial access to the band. Doing so would also introduce significant coordination challenges for Upper C-band incumbents and adjacent band aviation stakeholders. This proceeding is already complex enough without adding additional variables such as different technical parameters in a part of the band and a complicated spectrum access regime.

Along those same lines, the Commission should firmly reject the North American Spectrum Alliance's suggestion that the FCC allow occasional use FSS operators to transmit

[106] *Lower C-band Order*, 35 FCC Rcd at 2380 ¶ 79.

[107] *See* Monisha Ghosh, et al. Comments; OTI/PK Comments at 15-18; WISPA Comments at 2-3.

over auctioned C-band frequencies "where the operator can show there will be no interference with 5G operations."[108] The North American Spectrum Alliance erroneously claims that such an approach is consistent with the FCC's "use it or share it" approach to spectrum policy – it is not.[109] Such proposals eviscerate the very foundation of exclusive-use spectrum licensing via competitive bidding. The same goes for OTI/PK's suggestion, without technical support, that the FCC authorize MSS on a secondary and opportunistic use,[110] and SpaceX's similar suggestion to allow "secondary satellite use of C-band on a non-interference basis where terrestrial service is not deployed."[111]

Case-by-Case Review of Spectrum Acquisitions. The record also confirms the FCC should adopt its proposals to incorporate the Upper C-band into the existing spectrum screen and review spectrum aggregation on a case-by-case basis.[112] As CCA explains, the FCC's spectrum screen and case-by-case review allow the Commission to "evaluate competitive effects based on actual auction outcomes rather than speculative assumptions."[113] The Commission should reject calls to reserve nearly half of the spectrum offered in rural counties for rural providers[114] or otherwise adopt a pre-auction cap on the amount of spectrum a licensee can acquire in the auction.[115] To the extent aggregation concerns arise out of concerns related to a particular

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[108] North American Spectrum Alliance Comments at 4.

[109] *Id*.

[110] OTI/PK Comments at 24-26. The FCC should continue to pursue the maximum amount of spectrum for reallocation and add a primary, non-federal mobile allocation to whatever portion of the Upper C-band will be reconfigured and retain the FSS allocation in the remainder. The FCC should refrain from adding any additional services to the Upper C-band that will only further complicate this proceeding. *See*, *e.g.* OQ Technology Comments at 1-2.

[111] SpaceX Comments at 4.

[112] *See*, *e.g.*, Verizon Comments at 22-23; AT&T Comments at 5.

[113] Competitive Carriers Association Comments at 6.

[114] Coalition of Rural Wireless Carriers Comments at 15-17.

[115] OTI/PK Comments at 18.

acquisition, the Commission can address them through its well-tested and flexible case-by-case review process.

Standard Part 1 Competitive Bidding Procedures. The Commission should apply its traditional Part 1 competitive bidding procedures to the auction of Upper C-band spectrum.[116] Attempting to incorporate a "reserve auction" as the Coalition of Rural Wireless Carriers suggests would seriously complicate the auction of Upper C-band spectrum and risk delay in meeting the statutory deadline to complete the auction by July 2027. It would also undermine the benefits of harmonization with Lower C-band spectrum and generally undercut the FCC's successful market-based spectrum allocation procedures by dramatically and artificially limiting the ability of entities to participate in and acquire spectrum in an auction.

VII. COMMENTERS GENERALLY SUPPORT LEVERAGING EXISTING PART 27 TECHNICAL RULES FOR REPURPOSED UPPER C-BAND.

The record confirms that broadly applying technical rules from the Lower C-band for new terrestrial wireless Upper C-band spectrum will "reduce research and development costs, enable faster time-to-market, and promote interoperability."[117] In particular, wireless stakeholders are aligned on the benefits of the Commission's proposal to apply the power limits for base stations, measurement techniques, OOBE limits, antenna height limits, and service area boundary limits applicable to the 3.7 GHz Service to the Upper C-band.[118] Even aviation stakeholders likewise support some of the proposed technical rules, including the proposed

[116] *See*, *e.g.*, AT&T Comments at 5 ("Applying the [FCC's] Part 1 competitive bidding rules to the Upper C-band auction is consistent with recent auctions of 5G-capable spectrum, which have been undeniable successes."); RWA Comments at 1; CTIA Comments at 31 n.89.

[117] Cisco Comments at 11; *see also* Verizon Comments at 23-26; CTIA Comments at 32-37; Qualcomm Comments at 4-7; T-Mobile Comments at 4-5; Samsung Comments at 3-4.

[118] *See*, *e.g.*, Verizon Comments at 23-26; AT&T Comments at 6-7; Cisco Comments at 9; CTIA Comments at 32-37; Qualcomm Comments at 5-7; T-Mobile Comments at 4-5; Samsung Comments at 3-4; Frank Sanders Comments at 2-3; Roberson and Associates, LLC Comments at 6; WISPA Comments at 9; ITI Comments at 2.

power limits for base stations.[119] Commenters detail how aligning the technical rules for the two segments of the terrestrial wireless C-band will spur rapid deployment post-auction and promote a robust and secure equipment ecosystem.

At the same time, the wireless industry continues to consider the technical comments presented by aviation stakeholders in the initial comments and will review comments in response to the FAA's RA NPRM. As noted above, discussions continue in particular on the merits of a spurious emissions limit. The wireless industry continues to believe that "available data show that next-generation radio altimeters will deliver substantial improvements over current equipment, underscoring the appropriateness of the coexistence environment under the Commission's Part 27 framework."[120] The affected industries continue to work towards an agreement on technical rules that will enable robust and timely mobile wireless deployments without impact on radio altimeter operations.

The record shows support for modifying the power limit for user equipment that is non-nomadic and not intended to be operated close to the body to help facilitate the use of customer premises equipment that supports FWA use cases.[121] Specifically, the FCC should adopt a 4 Watt Effective Isotropic Radiated Power ("EIRP") limit for such user devices. As CTIA explains, this limit is consistent with the power limits permitted for other existing in-home user equipment and will "facilitate[e] deployment of 5G home broadband, especially in more rural residences where there may not be a competitive and/or affordable home broadband solution available today."[122] Notably, this change will not negatively impact Upper C-band incumbents

[119] *See*, *e.g.*, Boeing Comments at 11-13; Garmin Comments at 6-7.

[120] CTIA February 4 Letter at 2.

[121] AT&T Comments at 7; CTIA Comments at 33-34; Qualcomm Comments at 5-6; Verizon Comments at 24.

[122] CTIA Comments at 33.

remaining in the band or adjacent band radio altimeter operations. Incumbent earth stations are protected by means of PFD limits contained in 47 C.F.R. §27.1423. There is no proposal to modify those limits, and thus protection of incumbents will remain unchanged. Further, the necessary protections to aviation operations in the adjacent band are appropriately based on the base station characteristics, and the increase for user equipment will not alter the base station determinations.

The Commission should again adopt the incumbent FSS earth station protection measures that apply to Lower C-band licensees, including requirements for earth station filtering.[123] Both Eutelsat and SES agree that those measures are sufficient to protect FSS operations that continue in Upper C-band. Eutelsat observed that the parameters are "sufficient to ensure uninterrupted FSS operations in adjacent C-band spectrum."[124] Meanwhile, SES confirms that "the PFD limits and guard band have been effective to date in protecting FSS operations in the Upper C-band at the current band edge, and there is every reason to believe that they will be effective at the new band edge."[125]

Finally, with respect to Telemetry, Tracking, and Command ("TT&C") protections, the Commission should not extend the scope of operations protected at TT&C sites.[126] For example, AT&T asks the FCC to "clarify that the protection criteria apply only to actual TT&C operations

[123] *See*, *e.g.*, AT&T Comments at 8 ("[T]he protection criteria have worked well to promote coordination between Lower C-band licensees and incumbent FSS earth stations."); *see also* 47 C.F.R. § 27.1411(b)(5); *Lower C-band Order*, 35 FCC Rcd at 2478 ¶ 371 ("We anticipate 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.").

[124] Eutelsat Comments at 6 n.17.

[125] SES Comments at 31.

[126] *See* Verizon Comments at 25; AT&T Comments at 8; CTIA Comments at 36.

authorized for C-band FSS operations in the U.S. and not the full band or full arc of an incumbent earth station."[127]

VIII. CONCLUSION.

The record confirms that the Commission should build on the success of its Lower C-band proceeding and repurpose Upper C-band spectrum for terrestrial wireless service. In doing so, the Commission should ensure (i) a timely auction and enabling prompt network deployment post-auction, and (ii) a transition framework modeled on the framework used in the Lower C-band transition, accounting for lessons learned. The Commission should reject proposals that would introduce additional complexity or uncertainty into this proceeding.

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Respectfully submitted,

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[127] AT&T Comments at 8; *see also* CTIA Comments at 36 (urging the FCC to "underscore . . . that only TT&C operations are protected at the three remaining grandfathered TT&C sites—not the full band and arc, and not use cases other than TT&C operations").