Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Expanding Flexible Use of the 3.7 to 4.2 GHz Band	)	GN Docket No. 18-122
	)	
Petition for Rulemaking to Amend and Modernize Parts 25 and 101 of the Commission's Rule to Authorize and Facilitate the Deployment of Licensed Point-to-Multipoint Fixed Wireless Broadband Service in the 3.7-4.2 GHz Band	)	RM-11791
	)	
Fixed Wireless Communications Coalition, Inc., Request for Modified Coordination Procedures in Band Shared Between the Fixed Service and the Fixed Satellite Service	)	RM-11778
	)	

REPLY COMMENTS OF ACA CONNECTS – AMERICA'S COMMUNICATIONS ASSOCIATION, COMPETITIVE CARRIERS ASSOCIATION, AND CHARTER COMMUNICATIONS, INC.

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INTRODUCTION AND SUMMARY

ACA Connects – America's Communications Association ("ACA Connects"), Competitive Carriers Association ("CCA"), and Charter Communications, Inc. ("Charter") (collectively, the "Coalition") file these reply comments in response to the Commission's July 19, 2019 Public Notice.[1] The Coalition's 5G Plus Plan ("5G Plus Plan" or "Plan")[2] remains the only C-Band solution that serves the broader public interest, maximizing the availability of mid-

[1] *See Wireless Telecommunications Bureau, International Bureau, Office of Engineering and Technology, and Office of Economics and Analytics Seek Focused Additional Comment in 3.7-4.2 GHz Band Proceeding*, Public Notice, GN Docket No. 18-122, DA 19-678 (rel. July 19, 2019).

[2] *See* Letter from Elizabeth Andrion, Charter Communications, Inc., Ross Lieberman, ACA Connects – America's Communications Association, and Alexi Maltas, Competitive Carriers Association, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 18-122 (July 2, 2019).

band spectrum and providing considerable additional benefits to the American public. The 5G Plus Plan would reallocate at least 370 megahertz of the 3.7-4.2 GHz band ("C-Band") spectrum from satellite to terrestrial use, providing more of the raw material necessary to win the race to 5G and opening up opportunities for participation by new entrants and small bidders; award terrestrial authorizations through a Commission-led auction that ensures fairness and transparency, and *guarantees* a return to the American taxpayer; transition multichannel video programming distributors ("MVPDs") and programmers to a future-proof fiber delivery system that will also serve as a platform for driving high-speed broadband to rural and remote areas; and reimburse incumbent licensees and earth station registrants for their relocation costs, and allow for additional incentive payments to these incumbents.

Against these indisputable benefits of the 5G Plus Plan, the C-Band Alliance ("CBA") continues to press for its cramped alternative. The CBA's assertions regarding the alleged infeasibility of the Plan are baseless, as we demonstrate below and in the attached submission from Cartesian.[3] Cartesian's analysis confirms the feasibility of transitioning incumbent MVPD earth stations to fiber. As Cartesian explains, new fiber builds would be required for only about 30 percent of route miles where redundant paths and capacity do not exist or cannot be procured.

Cartesian also responds to unfounded criticisms by the CBA and others regarding fiber's reliability. As Cartesian notes, all distribution networks—including satellite—experience occasional outages, but fiber networks are typically designed with redundancy to ensure that occasional fiber cuts to do not diminish the level of service to customers or disrupt the network

[3] *See* Cartesian Consulting, Public Notice Reply Comments (Aug. 14, 2019) ("Supplemental Cartesian Analysis").

more generally. Indeed, over-the-top video providers like YouTube TV and DIRECTV NOW rely primarily on fiber networks and data centers to deliver reliable service.

Finally, the Coalition shares the interests of video programmers in ensuring a robust, reliable video distribution network. Two of the Coalition's members, Charter and ACA Connects, are (or represent) MVPDs whose business is dependent on ensuring continued high quality video distribution services. Cartesian's analysis confirms that the transition to fiber under the 5G Plus Plan will ensure this objective. The Coalition will continue its outreach to the programming community to identify any further improvements to the Plan that may be necessary to provide the appropriate assurances concerning a fiber-based video distribution model.

The CBA's claims obscure the tremendous private windfall and public cost associated with its opaque "market-based" proposal. The continued drumbeat for rapid adoption of the CBA's proposal may foster the financial interests of its foreign-owned members and their investors, but at a substantial cost to the public. The National Association of Broadcasters ("NAB") likewise would prefer the comfortable status quo rather than cooperating in an effort to enhance video distribution and broadband.

The 5G Plus Plan offers *more*—more spectrum, more competition, a statutorily-guaranteed benefit to taxpayers, and more fiber for broadband and backhaul—and it is well within the capabilities of industry and the legal authority of the Commission. Numerous commenters, representing large and small wireless carriers and public interest groups, have expressed support for the Plan,[4] and AT&T has agreed that the Plan warranted further study.[5]

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[4] *See, e.g.*, Comments of T-Mobile USA, Inc. at 4-14, GN Docket No. 18-122 (Aug. 7, 2019) ("T-Mobile August Comments"); Comments of NTCA–The Rural Broadband Association at 2-4, GN Docket No. 18-122 (Aug. 7, 2019); Comments of United States Cellular Corp. at 3-10, GN Docket No. 18-122 (Aug. 7, 2019); Comments of the Public Interest Spectrum Coalition at 20-22, GN Docket No. 18-122 (Aug. 7, 2019).

[5] *See* Comments of AT&T Inc. at 10-12, GN Docket No. 18-122 (Aug. 7, 2019).

The Coalition urges the Commission not to let the CBA's self-interested "rush to 5G" supplant the "race to 5G" that will benefit all Americans.

I. THE 5G PLUS PLAN OFFERS IMMEASURABLE BENEFITS TO AMERICAN CONSUMERS

At the outset, it is important to establish what is at stake for the public in this debate. Unlike the CBA's proposal, which has been designed by its members to serve their interests, the benefits of the 5G Plus Plan are wide-ranging and substantial. First, by making available a significant amount of mid-band spectrum, the Plan will better enable the deployment of 5G services while providing new entrants and smaller carriers with the opportunity to participate in the marketplace. Mid-band spectrum will be a critical component in the nationwide deployment of 5G, given its mix of capacity and propagation characteristics, and the C-Band is the best opportunity to allocate a large enough swath of mid-band spectrum to have multiple providers deploy true 5G for mobile devices. The increased competition made possible by the allocation of at least 370 megahertz of this band will benefit consumers by enhancing choice and promoting innovation.

Additionally, by requiring winning bidders to reimburse incumbent C-Band earth station registrants for their costs to transition to fiber, the Commission will enable video providers to transition away from an aging satellite fleet to a superior future-proof distribution medium that can accommodate bandwidth-heavy video formats such as 4K and 8K (and beyond). Because fiber is the future of video programming delivery and a crucial component in the delivery of high-speed broadband, building out this network is not only necessary, but inevitable. It is simply a question of when it will occur, where it will occur, and how it will be funded. Doing so now will allow the United States to more quickly advance to a video delivery system that is at least as reliable and significantly more technologically advanced, as well as place the country in

position to expeditiously deploy nationwide 5G services. Fostering the construction of fiber networks will also help bring high-speed connectivity to rural areas that currently lack access to true high-speed broadband services or have only limited access to such services, and provide the fiber backhaul that will be necessary for 5G wireless deployments.[6]

Finally, a Commission-led auction of terrestrial C-Band licenses will ensure the openness and transparency that is essential to wide participation and robust bidding. A public auction will also guarantee *by law* that American taxpayers are compensated for the use of these valuable frequencies by depositing billions of dollars into the U.S. Treasury.

II. THE 5G PLUS PLAN OFFERS A VIABLE MEANS TO TRANSITION INCUMBENT C-BAND MVPD USERS TO A RELIABLE FIBER-BASED DELIVERY MECHANISM

The CBA argues in essence that building out our Nation's fiber infrastructure is just too hard and therefore should not be done at all,[7] and that the United States should therefore be satisfied with almost less than half the spectrum of the 5G Plus Plan under a proposal that continues to rely primarily on satellite technology. In fact, as the attached Cartesian analysis demonstrates, these claims are unfounded.

Feasibility of the Transition to Fiber. The 5G Plus Plan proposes to migrate only approximately 2,500 incumbent MVPD earth stations in the C-Band, not the entire incumbent

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[6] *See*, *e.g.*, T-Mobile August Comments at 8 ("additional fiber deployment will promote enhanced connectivity in unserved and underserved areas").

[7] *See* Comments of the C-Band Alliance at 4-16, GN Docket No. 18-122 (Aug. 7, 2019) ("CBA August Comments"); *see also* Comments of the National Association of Broadcasters at 5-7, GN Docket No. 18-122 (Aug. 7, 2019) ("NAB Comments"); Comments of the Content Companies at 5-13, GN Docket No. 18-122 (Aug. 7, 2019) ("Content Companies Comments"); Comments of Cumulus Media, Inc. and Westwood One, LLC at 2-3, 6-7, GN Docket No. 18-122 (Aug. 7, 2019); Comments of Globecast America, Inc. at 5-7, GN Docket No. 18-122 (Aug. 7, 2019) ("Globecast Comments").

earth station population of roughly 20,000.[8] The principal reason is straightforward. MVPD earth stations are already in close proximity to existing fiber today. Indeed, the vast majority of MVPDs in urban areas already have fiber connecting their headends to their fiber networks, and the MVPDs are already collocated in major data centers; most of the urban MVPDs already receive some portion of their programming via fiber. Accordingly, about 70 percent of the fiber route miles that incumbent MVPD earth stations will need are available via long-term fiber leases (*i.e.*, Indefeasible Rights of Use) on existing fiber facilities.[9] New fiber construction would be required for only about 30 percent of route miles where redundant paths and capacity do not exist or cannot be procured.

By leveraging and expanding existing fiber backhaul, the 5G Plus Plan avoids the exponential costs of rural fiber-to-the-home economics and focuses on improving the reliability of fiber backhaul connections in those areas, setting the foundation for improved and faster broadband connectivity and for future 5G backhaul.[10]

Impact on Programmers. The Coalition shares the interests of video programmers in ensuring a robust, reliable, and future-proofed video distribution network. After all, two of the three Coalition members themselves are or represent MVPDs, whose business is dependent upon ensuring continued high quality video distribution services. We also share an interest in

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[8] *See* CBA August Comments at 13-16.

[9] *See* Supplemental Cartesian Analysis at 1; *see also* T-Mobile August Comments at 7 ("[S]ubstantial fiber runs are already available in both urban and rural areas."). Despite the CBA's assertions to the contrary, *see* CBA August Comments at 14, this analysis is not exclusively based on the Commission's Form 477 data. Cartesian has supplemented the Commission's Form 477 data with MVPD information obtained by other reliable sources. *See* Supplemental Cartesian Analysis at 1.

[10] The Coalition acknowledges that locations outside the Contiguous United States ("CONUS") represent a special case. *See, e.g.*, Comments of Alaska Telecom Association at 2-4, GN Docket No. 18-122 (Aug. 7, 2019); Comments of National Public Radio, Inc. at 14-15, GN Docket No. 18-122 (Oct. 29, 2018) ("NPR Comments"). The Plan therefore only addresses CONUS.

avoiding increases in the cost of video distribution, which would most likely be passed through from programmers to MVPDs.

The programmers raised a number of concerns with the 5G Plus Plan. One concern appears to be based on a misunderstanding. Contrary to some commenters' claims,[11] the 5G Plus Plan does not require programmers to establish a presence across the 42 data centers in the country or the installation of additional antennas at every MVPD headend. Instead, programmers will have multiple fiber-based solution providers available to them that meet very high standards for reliability and service quality that can deliver video content from their studios to the data centers. The service provider(s) chosen by the programmer would have sole responsibility for providing end-to-end service management of the service provided to the programmer.[12]

Under the 5G Plus Plan, programmers would continue to use the C-Band for video distribution for up to five years. During the 18-month window in select urban markets, MVPDs will turn off their earth stations and non-MVPD users will be moved to the upper portion of the band. Outside of these urban markets, the Coalition recognizes that it will take three years in the majority of the remaining areas to transition MVPD earth stations to fiber, and up to five years in a handful of other areas.[13]

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[11] *See, e.g.*, CBA August Comments at 6 n.19, 7; NAB Comments at 5-8; Content Companies Comments at 6.

[12] *See* Supplemental Cartesian Analysis at 4.

[13] *See* Letter from Elizabeth Andrion, Charter Communications, Inc., Ross Lieberman, ACA Connects – America's Communications Association, and Alexi Maltas, Competitive Carriers Association, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 18-122 (July 15, 2019) (attaching Cartesian C-Band Spectrum Clearing Plan Analysis) ("Cartesian C-Band Clearing Plan Analysis").

Transition Period. As explained in Cartesian's prior submission,[14] the 5G Plus Plan contemplates an 18-month transition period for select urban areas. Contrary to the claims of some commenters,[15] this timeframe is reasonable. First, the group of urban markets that the 5G Plus Plan proposes to transition in 18 months includes only those markets where no fiber deployment is necessary because it already exists. No party will need to secure any city permit. Second, the 18-month period could begin when the Commission makes the relocation funds available upon the completion of its spectrum auction. Before then, parties would have time to begin the planning for the transition, such as negotiating contracts.[16] Importantly, under the 5G Plus Plan, spectrum clearing will be conducted on a market-by-market basis, once the nationwide auction takes place. A delay in clearing a single market at any of the stages will therefore not restrict the ability to launch services in other markets.

Satellite Capacity. The CBA claims that the 5G Plus Plan underestimates the amount of spectrum required in reserve for live, occasional use events such as sports finals and pay-per-view. Relatedly, the CBA suggests that the Plan does not account for the need for dual illumination to transition services that will remain on a satellite from one transponder to another.[17] Neither of these claims withstands scrutiny.

Data published by Northern Sky Research estimates that approximately 100 transponder equivalents are used for non-MVPD use, including occasional use and other uses not related to cable distribution. This is in comparison to approximately 138 transponder equivalents that

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[14] *See id.*

[15] *See, e.g.*, CBA Comments at 10-13; Content Companies Comments at 9-11; Globecast Comments at 5; Comments of Airspan Networks Inc. at 2-3, GN Docket No. 18-122 (Aug. 7, 2019).

[16] *See* Supplemental Cartesian Analysis at 3.

[17] *See* CBA August Comments at 8-9; *see also* Content Companies Comments at 9.

Cartesian has estimated would be available in the remaining 130 megahertz of the C-Band. This headroom makes it possible to maintain the supply of transponders above demand without needing to launch additional satellites within three years.[18]

The 5G Plus Plan also takes the need for dual illumination into account. This is a necessity during the period when satellite customers switch from one transponder to another and their earth station users repoint their antennas to the services' new location. The lower portion of the C-Band (3.70 – 4.07 GHz) will be available to accommodate dual illumination in a market prior to the spectrum being turned over to its new owner. For instance, the 5G Plus Plan contemplates that some MVPD programmers will dual illuminate for at least 9 months.[19] The Coalition invites the CBA and the satellite industry to submit further details on the question of demand for C-Band satellite capacity and to work with the Coalition to fine-tune the 5G Plus Plan so that it promotes the interests of all relevant stakeholders.

Competition and Cost of Video Distribution. Far from reducing competition or increasing costs in the video distribution market,[20] the 5G Plus Plan will enable programmers to choose from a number of fiber-based, video solution providers to deliver their content across the approximately 42 data centers. As mentioned, programmers will not be expected to establish a

[18] *See* Supplemental Cartesian Analysis at 5 nn.8, 9.

[19] *See id.* at 4.

[20] *See, e.g.*, CBA August Comments at 5-7; NAB Comments at 7-8; Comments of North American Broadcasters Association at 2-3, GN Docket No. 18-122 (Aug. 7, 2019) ("NABA Comments"); Comments of the Wireless Internet Service Providers Association at 7-8, GN Docket No. 18-122 (Aug. 7, 2019); Comments of LinkUp Communications Corp. at 3, GN Docket No. 18-122 (Aug. 3, 2019) ("LinkUp Comments"); Comments of WTVY-TV at 2-3, GN Docket No. 18-122 (Aug. 7, 2019) ("WTVY-TV Comments").

presence at these data centers themselves. Notably, fiber construction does not face the spectrum/orbital scarcity barriers with which satellite construction must contend.[21]

Additionally, while the initial capital expenditures needed to establish fiber connectivity are high, these costs would be fully reimbursed under the 5G Plus Plan. Subsequent ongoing, steady-state operating expenses (*e.g.*, fiber maintenance and fiber video solution provider service fees) are expected to be lower than those paid to the satellite operators today.[22] Moreover, the 5G Plus Plan accounts for these ongoing expenses, which would be reimbursed during the transitional period.[23]

III. THE 5G PLUS PLAN WILL ENSURE AND ENHANCE THE CONTINUITY OF VIDEO PROGRAMMING DISTRIBUTION

Despite assertions to the contrary,[24] the 5G Plus Plan will ensure the continued reliable distribution of video programming. Indeed, substituting fiber for satellite will enhance the distribution of video programming by providing the capability necessary for advanced video transmission formats such as 4K, 8K, and beyond. The Coalition has the same interests as video programmers in ensuring that the transition to fiber is done in a timely and efficient manner and that this new network offers a reliable alternative to satellite-delivery. As noted above, ACA Connects' members and Charter depend on video programmers in order to provide their own services. We therefore have powerful incentives to avoid disrupting the delivery of video programming services. The Coalition has had numerous conversations with many video programmers to ensure that the 5G Plus Plan is implemented in a manner that serves their needs

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[21] *See* Supplemental Cartesian Analysis at 3.

[22] *See id.*

[23] *See id.*

[24] *See, e.g.*, Content Companies Comments at 5-13; NAB Comment at 3-8.

and protects their interests, and plans to provide additional detail in response to their concerns within the next few weeks.[25]

Some skeptics[26] ignore the fact that fiber is the primary communication path for the vast majority of global communications today. In fact, fiber is the primary way satellite companies get content from the programmers' studios to their uplink earth stations. Some satellite operators themselves provide fiber as a backup to their satellite services. Likewise, programmers use fiber both to transport their content from their studios to uplink earth stations and, in many cases, as the primary or secondary way to deliver content overseas.[27] Moreover, MVPDs use fiber to move video programming between cable headends, and in some cases, receive direct feeds from programmers.

NAB overstates the unreliability of a fiber-based video distribution network.[28] While

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[25] *See, e.g.*, Letter from Ross Lieberman, ACA Connects – America's Communications Association, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 18-122 (Aug. 6, 2019) (stating that ACA Connects "has had conversations about its plan with most of the MVPD programmers that use the C-band for delivery of video programming and . . . ACA Connects will be supplementing its original proposal[, which] will further detail how the fiber network would be designed, established, launched, maintained, and paid for, particularly the part of the network that connects programmers to data centers").

[26] *See, e.g.*, NAB Comments at 5-7; NABA Comments at 2-3.

[27] *See* Supplemental Cartesian Analysis at 1-2.

[28] *See* NAB Comments at 3-5; *see also* Globecast Comments at 4-5; Comments of Alaska Communications Internet, LLC at 7, GN Docket No. 18-122 (Aug. 7, 2019); LinkUp Comments at 2; NABA Comments at 3; Comments of QVC, Inc. and HSN, Inc. at 8, GN Docket No. 18-122 (Aug. 7, 2019); WTVY-TV Comments at 2. NAB's attacks on Charter, NAB Comments at 6, 8, are baseless and irrelevant. It is a matter of public record that Charter and the New York Public Service Commission recently settled their build-out dispute. *See* Case 18-M-0178, *Proceeding to Investigate Whether Charter Communications, Inc. and its Subsidiaries Providing Service Under the Trade Name "Spectrum" Have Materially Breached Their New York City Franchises*, Order Adopting 2019 Settlement Agreement and Reconsidering Other Related Actions (N.Y. Pub. Serv. Comm'n July 11, 2019). In Louisville, Charter's concerns with Google Fiber's entry into the market were related to the potential for damage to Charter's network presented by Google's proposed self-help access to poles to which Charter's network facilities were attached.

some commenters highlight a few instances of recent fiber outages,[29] service providers design their fiber networks with redundancy and optical budget margins that compensate for an anticipated number of fiber cuts per year. By adding redundancy to network design, fiber transport can be engineered to provide 99.999 percent availability.[30] Redundancy can be built-in at the connection level, data center level, and the equipment level to ensure that there is no single point of failure at any point within the network. Every data center can be interconnected with multiple other data centers to ensure traffic can be rerouted in the event of failure in one data center. Each point-to-point connection (*i.e.*, between data centers) can consist of multiple fiber connections which traverse completely different geographical paths and enter the data center at different locations. The network can be designed to ensure minimum separation distances between redundant fiber connections, which can be verified by review of fiber maps, and by using more than one fiber vendor, if desired. Reliability can be further ensured by using redundant equipment in data centers that can automatically recover from failure without manual intervention.[31]

Reliability is a hard-fought objective for both satellite and fiber transmission. In fact, satellite delivery must avert risks to reliability that are unknown to fiber, such as transponder and satellite failures, launch delays, sun outages,[32] weather, space collisions, solar panel impairment, and many other damages that cannot be resolved by a technician's visit 22,500 miles above the

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[29] *See* NAB Comments at 3-5; Content Companies Comments at 7-8; Further Supplemental Comments of PSSI Global Services, LLC at 4-5, GN Docket No. 18-122 (Aug. 7, 2019).

[30] *See* Supplemental Cartesian Analysis at 2.

[31] *Id.*

[32] Spring Sun Outages 2019, Optimum by Altice, https://www.optimum.net/pages/sunoutages.html?v_cid=vanity-_-url-_-sunoutages (last visited Aug. 13, 2019) (explaining that sun outages are "interruption[s] in satellite signals caused by interference from solar radiation").

Equator. In fact, only a few months ago, a "micrometeoroid impact" contributed to the destruction of an Intelsat satellite.[33] Moreover, SES, Intelsat, and Telesat have all individually reported damages to satellites in the last few years where downtime can range from hours to two or more weeks. To fault fiber with reliability problems ignores these significant problems of satellite delivery.

Notwithstanding the contention of some commenters to the contrary,[34] fiber provides "reliable delivery of content and can be deployed at a fraction of the value of the C-band spectrum."[35] The 5G Plus Plan would ensure a redundant, geographically diverse fiber network that would be capable of meeting both the current and future needs of video content delivery. The Coalition looks forward to continuing its discussions with programmers regarding the capabilities of fiber delivery, including the redundancy offered by fiber as described above, and any additional safeguards for fiber delivery systems that may be necessary to achieve the reliability thresholds that programmers and their MVPD customers expect.[36]

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[33] Caleb Henry, *Intelsat Pins Intelsat-29e Failure on External Event, Readies Replacement Order*, Space News (July 31, 2019), https://spacenews.com/intelsat-pins-intelsat-29e-failure-on-external-event-readies-replacement-order/.

[34] *See, e.g.*, NAB Comments at 3-5; NABA Comments at 3.

[35] Letter from Steve Sharkey, Vice President, Government Affairs, T-Mobile USA, Inc., to Marlene H. Dortch, Secretary, FCC, GN Docket No. 18-122 at 3 (June 21, 2019); *see also* T-Mobile August Comments at 7, 10.

[36] Commenters raising questions about the transition to fiber also ignore the fact that satellite providers will be reimbursed for lost revenue under the 5G Plus Plan, thus making them "whole" during any transition period and for several years following. *See* Supplemental Cartesian Analysis at 5-6 (indicating that "the industry understands that the continued evolution of the C-Band satellite industry beyond seven years is an unknown variable under any solution likely adopted by the Commission").

IV. THE 5G PLUS PLAN CAN BE ADMINISTERED BY A PRIVATE CLEARINGHOUSE SERVING AS A TRANSITION FACILITATOR

Some commenters raise questions about how the 5G Plus Plan will be administered,[37] but it is well-established that the Commission can designate a private entity to serve as a Transition Facilitator overseeing the clearing of the reallocated C-Band spectrum band, including the reimbursement process. Relying on its broad Title III authority,[38] and as embodied in its rules,[39] the Commission has from the earliest auctions created private clearinghouses to manage the clearing process for reallocated spectrum bands under the Commission's oversight and supervision.[40] The Commission also remained the final arbiter in the event any disputes arose.[41]

In 1996, for instance, the Wireless Bureau designated two industry groups to act as clearinghouses to administer the Commission's plan for reimbursing the relocation costs of

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[37] *See* CBA August Comments at 5-6; *see also* Content Companies Comments at 8.

[38] *See Amendment to the Commission's Rules Regarding a Plan for Sharing the Costs of Microwave Relocation*, First Report and Order and Further Notice of Proposed Rulemaking, 11 FCC Rcd 8825, 8875 ¶ 108 (1996) ("*Microwave Relocation Cost Order*") (adopting a plan for sharing the costs of relocating microwave links, including establishing a clearinghouse to oversee the Commission's cost-sharing plan, by relying in part on Sections 303(c), 303(f), 303(g), 303(r) and 332 of the Act); *see also In re Amendment of Part 2 of the Commission's Rules to Allocate Spectrum Below 3 GHz for Mobile and Fixed Services to Support the Introduction of New Advanced Wireless Services, Including Third Generation Wireless Systems*, Ninth Report and Order and Order, 21 FCC Rcd 4473, 4534 ¶ 133 (2006) ("*AWS-1 Cost Relocation Order*") (adopting the order, including the rules governing the use of clearinghouses, pursuant in part to Sections 301, 303(f), 303(g), 303(r), 307, 316, and 332 of the Act); *In re Improving Public Safety Communications in the 800 MHz Band*, Report and Order, Fifth Report and Order, Fourth Memorandum Opinion and Order, and Order, 19 FCC Rcd 14969, 15128 ¶ 340 (2004) ("*2004 800 MHz Order*") (relying in part on Sections 303(f) and (r), 309, 316, and 332 of the Act to implement the relocation rules for the 800 MHz band, including the adoption of a Transition Administrator), *aff'd sub nom. Mobile Relay Assocs. v. FCC*, 457 F.3d 1 (D.C. Cir. 2006).

[39] *See* 47 C.F.R. § 27.1160 *et seq*.

[40] *See* 47 C.F.R. § 27.1162 (directing the Wireless Telecommunications Bureau to select one or more entities to serve as the clearinghouse(s)).

[41] *See, e.g.*, *2004 800 MHz Order*, 19 FCC Rcd at 15070-72 ¶¶ 191-194 (establishing a Transition Administrator subject to oversight by the Commission and authorizing Wireless Bureau to settle any disputes that remained unresolved); *Microwave Relocation Cost Order*, 11 FCC Rcd at 8866 ¶ 80 (the Commission retains "the full realm of enforcement mechanisms available to us in order to ensure that reimbursement obligations are satisfied").

incumbents in the 2 GHz band.[42] The clearinghouses determined whether relocation expenses were compensable, and administered the cost-sharing framework that allocated reimbursement responsibilities among PCS licensees.[43]

In 2004, as part of the 800 MHz proceeding, the Commission appointed an independent Transition Administrator with even broader responsibility to oversee the reconfiguration of the band to help facilitate the relocation of incumbent public safety licensees under Commission supervision.[44] The Commission explained that the Transition Facilitator would "serve both a ministerial role and a function similar to a special master in a judicial proceeding," such as by mediating any disputes arising from the band configuration or referring the disputing parties to alternative dispute mediation.[45] Among other responsibilities, the Transition Administrator was tasked with obtaining estimates from licensees regarding the costs of reconfiguring their systems, establishing a relocation schedule, ensuring that relocated facilities did not cause harmful interference to existing facilities, providing quarterly progress reports to the Commission, and submitting to the Wireless Bureau an annual audited statement of the relocation funds that had been expended, including the salaries and expenses of the Transition Administrator.[46]

In 2006, the Commission once again selected two independent clearinghouses to manage the reimbursement obligations for AWS licensees and Mobile Satellite Service entrants benefiting from the relocation of incumbent fixed service and Broadband Radio Service

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[42] *See In re Amendment of the Commission's Rules Regarding a Plan for Sharing the Costs of Microwave Relocation*, Memorandum Opinion and Order, 11 FCC Rcd 9394, 9394-95 ¶ 2 (WTB 1996). The Commission appointed two clearinghouses as it wanted to increase competition which would lower prices. *Id*. at 9401 ¶ 23.

[43] *See Microwave Relocation Cost Order*, 11 FCC Rcd at 8862-63 ¶ 74.

[44] *See 2004 800 MHz Order*, 19 FCC Rcd at 15070 ¶ 191.

[45] *See id.* at 15071 ¶ 194.

[46] *See id.* at 15072-73 ¶¶ 195-196.

operators in the AWS-1 band.[47] The clearinghouses were charged with "determining the cost-sharing obligations" of the new entrants for expenses incurred by incumbent operators in their transition to another band[48] and resolving disputes arising out of the cost-sharing plan.[49] In establishing these guidelines, the Commission found that the clearinghouses "would accelerate the relocation process and promote rapid deployment of new advanced wireless services in the 2.1 GHz band."[50]

In marked distinction from the Transition Facilitator proposed by the CBA, these clearinghouses implemented spectrum policies adopted and effectuated *by the Commission*. They did not determine the amount of spectrum to reallocate or preside over the sale of the reallocated frequencies, but rather served as neutral entities to administer cost-sharing and relocation plans adopted by the Commission.

Consistent with its precedent, the Commission could set forth the basic framework for reimbursing incumbent licensees, including a definition of eligible costs and requirements for cost-sharing among new entrants in the C-Band. It could then designate one or more clearinghouses to review and approve the reimbursement of relocation costs, the cost-sharing among new wireless licensees, and the transition of incumbent earth station operators to the remaining satellite spectrum or to fiber-based delivery. Since clearing the C-Band will need to

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[47] *See Wireless Telecommunications Bureau Finds CTIA and PCIA Qualified to Administer the Relocation Cost-Sharing Plan for Licensees in the 2.1 GHz Bands*, Public Notice, 21 FCC Rcd 11265 (WTB 2006); *see also In re Amendment of Part 2 of the Commission's Rules to Allocate Spectrum Below 3 GHz for Mobile & Fixed Services to Support the Introduction of New Advanced Wireless Services, Including Third Generation Wireless Systems*, Order, 22 FCC Rcd 4680, 4681, 4684 ¶¶ 1, 8 (WTB 2007) ("*AWS-1 Clearinghouse Order*").

[48] *AWS-1 Clearinghouse Order*, 22 FCC Rcd at 4684 ¶ 8.

[49] *Id.* at 4690 ¶¶ 24-25.

[50] *AWS-1 Cost Relocation Order*, 21 FCC Rcd at 4513 ¶ 74.

be undertaken on a national basis, the Commission would require the clearinghouse to aggregate relocation reimbursement contributions from winning bidders into a single fund for covering the relocation costs of all affected incumbent satellite licensees and earth station registrants, without regard to whether a particular incumbent is currently providing service in a given winning bidder's service area.[51] The reimbursement would be subject to a true-up for additional costs or unused monies.

The Transition Facilitator could also identify the locations of the data centers, the markets suitable for transitioning in the first stage, the second stage, and the final stage, as well as retain the authority to delay any stage at the request of an affected party as long as certain conditions are met. Not every decision need be coordinated through the administrator, however. Programmers and MVPDs can make their own independent decisions with respect to obtaining the fiber connectivity they need from a service provider or construction company.

Building on its past experience with clearinghouses, the Commission could also prescribe strict deadlines and other rules to "foster accountability, timeliness, cost-effectiveness, transparency, and integrity" of the administrator.[52] As it has in prior instances, the Commission would retain an oversight role, with implementation given to the clearinghouses.

V. ADOPTING REASONABLE EMISSIONS LIMITS IN THE C-BAND IS IMPERATIVE IN ORDER TO FULFILL THE PROMISES OF 5G

It is critical for the Commission to ensure that the C-Band is usable for ubiquitous 5G operations, including for both uplink and downlink operations, in order for consumers to obtain the full benefits of this technology. In order to achieve this, an out-of-band emissions ("OOBE")

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[51] Requiring such a framework is well within the Commission's authority under Section 303(r). *See* Sec. VI, *infra*.

[52] *See* Letter from Colby May, Counsel for Trinity Broadcasting Network and Ravi Potharlanka, CEO, LPN Spectrum LLC, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 18-122 at 14 (May 16, 2019).

limit must be implemented to protect incumbent C-Band users from harmful interference without hindering the deployment of 5G services in the band.

While the CBA originally proposed an OOBE limit that was unworkable,[53] the Coalition is pleased to see the CBA revaluating its own analysis and acknowledging that there may be a more appropriate approach.[54] The Coalition appreciates the CBA's new interference information, and it looks forward to reviewing that information and working with both the Commission and industry to craft technical rules for the C-Band that will permit the robust deployment of 5G while protecting the remaining incumbent operations in the band.

VI. THE COMMISSION HAS AMPLE AUTHORITY TO IMPLEMENT THE 5G PLUS PLAN

The CBA argues that the 5G Plus Plan is "unlawful,"[55] but the Commission has ample authority to implement all aspects of the Plan, including the funding of fiber transition costs and the provision of incentive payments to incumbents. The Commission's authority is derived from three statutory sources: its authority under Section 303 of the Communications Act ("Act") to allocate spectrum and prescribe "restrictions and conditions" on licenses; its obligation under Section 309(j) to use a system of competitive bidding to award licenses when there are mutually exclusive applicants, as will clearly be true with respect to terrestrial C-Band licenses; and its authority to modify licenses under Section 316. Implementation of the Plan would draw on these sources of authority:

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[53] *See* Comments of the C-Band Alliance, Technical Annex at 10, GN Docket No. 18-122 (Oct. 29, 2018).

[54] CBA August Comments at 32-34 ("[W]ith this new proposal for base station and user equipment OOBE limits at an earth station, the C-Band Alliance does not see the need to specify OOBE masks for both base stations and user equipment beyond that which has been specified by 3GPP for band n77.").

[55] CBA August Comments at 17-19.

- Pursuant to Section 303(c),[56] the Commission can designate at least 370 megahertz of C-Band spectrum for reallocation from satellite to terrestrial use.

- Section 309(j)[57] requires the Commission to award mutually exclusive terrestrial C-Band licenses through a system of competitive bidding, either through a traditional auction or an incentive auction.

- Using its broad authority under Section 303(r)[58] to adopt rules and impose restrictions and conditions on licenses, the Commission can establish a framework for transitioning earth station registrants from satellite to fiber and to require winning auction bidders to reimburse earth station registrants and satellite operators for the relocation costs they incur in connection with the refarming of the C-Band. Such a framework would be completely consistent with Commission practice over the last 25 years. The Commission can likewise require winning bidders to compensate incumbent licensees and registrants for the value of the spectrum they relinquish in the refarming.

- Section 316[59] empowers the Commission to modify the C-Band satellite licenses and earth station authorizations to accommodate the reallocation of spectrum for terrestrial use by restricting the frequencies that remain available for satellite use and restricting satellite users to particular geographic area.

There is little question regarding the Commission's authority to reallocate spectrum bands to meet new demands,[60] and its obligation to conduct an auction to award terrestrial

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[56] 47 U.S.C. § 303(c) (authorizing the Commission to "[a]ssign bands of frequencies to the various classes of stations, and assign frequencies for each individual station").

[57] 47 U.S.C. § 309(j)(1).

[58] 47 U.S.C. § 303(r) (authorizing the Commission 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 chapter . . . .").

[59] 47 U.S.C. § 316(a)(1) ("Any station license or construction permit may be modified by the Commission either for a limited time or for the duration of the term thereof, if in the judgment of the Commission such action will promote the public interest, convenience, and necessity[.]").

[60] *See, e.g.*, *In re Redevelopment of Spectrum to Encourage Innovation in the Use of New Telecommunications Technologies*, First Report and Order and Third Notice of Proposed Rulemaking, 7 FCC Rcd 6886, 6890 ¶ 24 (1992) ("*Emerging Technologies Order*"), *aff'd sub nom. Ass'n of Pub.-Safety Commc'ns Officials-Int'l, Inc. v. FCC*, 76 F.3d 395 (D.C. Cir. 1996); *In re Redesignation of the 17.7-19.7 GHz Frequency Band, Blanket Licensing of Satellite Earth Stations in the 17.7-20.2 GHz and 27.5-30.0 GHz Frequency Bands, and the Allocation of Additional Spectrum in the 17.3-17.8 GHz and 24.75-25.25 GHz Frequency Bands for Broadcast Satellite-Service Use*, Report and Order, 15 FCC Rcd 13430, 13469-70 ¶ 82 (2000) ("*Redesignation of the 17.7-19.7 GHz Frequency Band*"), *aff'd sub nom. Teledesic LLC v. FCC*, 275 F.3d 75 (D.C. Cir. 2001); *AWS-1 Cost Relocation Order*, 21 FCC Rcd at 4514 ¶ 75; *In re Service Rules for the 746-764 and 776-794 MHz Bands, and Revisions to Part 27 of the Commission's Rules*, Third Report and Order, 16 FCC Rcd 2703, 2720

licenses in the C-Band has been well-documented in the record of this proceeding.[61] As demonstrated below, the Commission likewise has clear authority to implement the other elements of the 5G Plus Plan.

A. Section 303(r) Provides Authority to Impose Reimbursement Obligations on C-Band Terrestrial Licensees

Under Section 303(r), the Commission has the authority to "[m]ake such rules and regulations and prescribe such restrictions and conditions . . . as may be necessary to carry out the provisions of this chapter."[62] The courts have repeatedly explained that "[t]he Commission's power under § 303(r) is broad."[63] As it has done on numerous prior occasions, the Commission can use this authority to establish the framework for refarming the C-Band, including reimbursing satellite operators for their relocation costs and reimbursing video programmers and MVPD receive-only registrants for their costs of transitioning from C-Band satellite service to

¶ 42 (2001) ("*DTV Third Report and Order*"); *In re Service Rules for Advanced Wireless Services H Block—Implementing Section 6401 of the Middle Class Tax Relief and Job Creation Act of 2012 Related To the 1915-1920 MHZ and 1995-2000 MHZ Bands*, Report and Order, 28 FCC Rcd 9483, 9548 ¶ 167 (2013) ("*H-Block*"); *In re Service Rules for Advanced Wireless Services in the 2000-2020 MHz and 2180-2200 MHz Bands*, Report and Order and Order of Proposed Modification, 27 FCC Rcd 16102, 16214 ¶ 304 (2012) ("*AWS-4*").

[61] Letter from Elizabeth Andrion, Senior Vice President, Regulatory Affairs, Charter Communications, Inc., to Marlene H. Dortch, Secretary, FCC, GN Docket No. 18-122 at 3-5 (Feb. 22, 2019) ("Charter Feb. 22, 2019 Letter"); Comments of T-Mobile USA, Inc. at 1-2, GN Docket No. 18-122 (July 3, 2019) ("T-Mobile July Comments"); Reply Comments of Comcast Corporation and NBCUniversal Media, LLC at 3, 7, GN Docket No. 18-122 (July 18, 2019) ("Comcast Reply Comments"); Reply Comments of United States Cellular Corporation at 4-6, GN Docket No. 18-122 (Dec. 11, 2018); Reply Comments of Dynamic Spectrum Alliance at 16-17, GN Docket No. 18-122 (Dec. 11, 2018).

[62] 47 U.S.C. § 303(r).

[63] *United Video, Inc., v. FCC*, 890 F.2d 1173, 1183 (D.C. Cir. 1989); *see also FCC v. Nat'l Citizens Comm. for Broad.*, 436 U.S. 775, 793 (1978) ("[I]t is now well established that [Section 303(r)] supplies a statutory basis for the Commission to issue regulations codifying its view of the public-interest licensing standard, so long as that view is based on consideration of permissible factors and is otherwise reasonable."); *United States v. Storer Broad. Co.*, 351 U.S. 192, 202-03 (1956) ("47 U.S.C. § 154(i) and § 303(r), 47 U.S.C.A. §§ 154(i), 303(r), grant general rulemaking power not inconsistent with the Act or law."); *Cellco P'ship v. FCC*, 700 F.3d 534, 542-43 (D.C. Cir. 2012) ("section 303(r) … supplements the Commission's ability to carry out its mandates via rulemaking").

terrestrial fiber for the distribution of video programming, as well as incentivizing incumbent users of the spectrum.

Since the earliest auctions, the Commission has required winning bidders of new licenses in the affected bands to either negotiate a voluntary relocation of incumbent users or an involuntary relocation, and to reimburse incumbents for their costs to relocate to another band.[64] The Commission required the new licensees to offer the incumbent comparable replacement facilities that would allow it to maintain at least the same service in terms of throughput, reliability, and operating costs.[65] Applying the *Emerging Technologies* framework, the Commission subsequently adopted a spectrum transition mechanism in the 18 GHz proceeding, the Advanced Wireless Service ("AWS")-1 proceeding, the H Block proceeding, and the AWS-4 proceeding.[66] Notably, the Commission has specifically found that "comparable" facilities could include the substitution of fiber for radio facilities.[67] As noted above and explained in prior

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64 *See Emerging Technologies Order*, 7 FCC Rcd at 6890 ¶ 24.

65 *See Microwave Relocation Cost Order*, 11 FCC Rcd at 8838-44 ¶¶ 23-34; *Emerging Technologies Order*, 7 FCC Rcd at 6890, 6892 ¶¶ 24, 36.

66 *See Redesignation of the 17.7-19.7 GHz Frequency Band*, 15 FCC Rcd at 13469 ¶ 82; *see also AWS-1 Cost Relocation Order*, 21 FCC Rcd at 4496 ¶ 40; *In re Amendment of Section 2.106 of the Commission's Rules to Allocate Spectrum at 2 GHz for use by the Mobile-Satellite Service*, Second Report and Order and Second Memorandum Opinion and Order, 15 FCC Rcd 12315, 12351 ¶ 108 (2000); *H-Block*, 28 FCC Rcd at 9548 ¶ 167; *AWS-4*, 27 FCC Rcd at 16214 ¶ 304.

67 *See, e.g.*, *AWS-1 Cost Relocation Order*, 21 FCC Rcd at 4487 ¶ 24 ("We reject parties' suggestions that comparable facilities requires only a wireless solution."); *In re Redevelopment of Spectrum to Encourage Innovation in the Use of New Telecommunications Technologies*, Third Report and Order and Memorandum Opinion and Order, 8 FCC Rcd 6589, 6596 ¶ 16 (1993) ("incumbents subject to involuntary relocation will have the entire relocation cost paid by the emerging technology service provider…and in fact will benefit to the degree that aging equipment using older technology may be replaced with new equipment using state-of-the-art technology."), *aff'd sub nom. Ass'n of Pub.-Safety Commc'ns Officials-Int'l, Inc. v. FCC*, 76 F.3d 395 (D.C. Cir. 1996); *see also In re Amendment of Part 2 of Commission's Rules to Allocate Spectrum Below 3 GHz for Mobile & Fixed Servs. to Support Introduction of New Advanced Wireless Services, Including Third Generation Wireless Systems*, Notice of Proposed Rulemaking and Order, 16 FCC Rcd 596, 619 ¶ 56 (2001) ("Additionally, we note that relocation is not strictly a spectrum issue. Incumbents can be relocated using other mediums, such as fiber, and our relocation policies take this factor into consideration in allowing for the provision of comparable facilities.").

Coalition filings, fiber offers a comparable alternative to satellite in terms of throughput, reliability, and operating costs for the distribution of video programming.[68]

The Commission may also condition the grant of terrestrial C-Band licenses on the payment of compensation to incumbents beyond their relocation costs, including reimbursement for the lost opportunity to derive value from an incumbent's existing infrastructure as well as incentive compensation and payments structured to "provid[e] incentives to incumbents to relocate."[69] The Commission has also exhorted new entrants to offer "premiums" to incumbents to encourage them to relocate.[70] Finally, in addition to the "hard costs" of new equipment, the Commission has often recognized as reimbursable certain soft costs, including transaction costs for attorneys and consultants.[71] In at least one proceeding, the Commission explicitly declined to cap these soft costs, which included lost advertising revenues.[72]

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[68] *See* Cartesian C-Band Spectrum Clearing Plan Analysis; *see also* Letter from Steve B. Sharkey, Vice President, Government Affairs, T-Mobile USA, Inc., to Marlene H. Dortch, Secretary, FCC, GN Docket No. 18-122 at 2-4 (June 21, 2019) (detailing how "[f]iber is widely deployed today and is used for the delivery of services and content that require extremely high reliability, including telecommunications and emergency services").

[69] *Teledesic LLC v. FCC*, 275 F.3d 75, 86-87 (D.C. Cir. 2001).

[70] *Microwave Relocation Cost Order*, 11 FCC Rcd at 8835 ¶ 15 ("We have stated in the past that PCS licensees may choose to offer incumbents premiums to relocate quickly. 'Premiums' could include: replacing the analog facilities with digital facilities, paying all of the incumbent's transactions costs, or relocating an entire system as opposed to just the interfering links." (footnotes omitted)); *In re Amendment to the Commission's Rules Regarding a Plan for Sharing the Costs of Microwave Relocation*, Notice of Proposed Rulemaking, 11 FCC Rcd 1923, 1927 ¶ 6 (1995) ("Our rules do not require microwave incumbents to meet or negotiate with emerging technology licensees during this period; rather, negotiations are strictly voluntary and are not defined by any parameters. Thus, an emerging technology licensee may choose to offer premium payments or superior facilities as an incentive to the incumbent to relocate quickly.").

[71] *In re Improving Public Safety Communications in the 800 MHz Band*, Supplemental Order and Order on Reconsideration, 19 FCC Rcd 25120, 25151 ¶ 70 (2004) ("[O]utside expertise may be required in the negotiation of agreements and in analysis of 'comparable facilities' proposals. We can foresee that such outside costs could raise the transactional cost above two percent of the 'hard costs.'"), *aff'd sub nom. Mobile Relay Assocs. v. FCC*, 457 F.3d 1 (D.C. Cir. 2006).

[72] *DTV Third Report and Order*, 16 FCC Rcd at 2724 ¶ 49; *id*. at 2724 ¶ 50 ("At this time, we will not adopt cost recovery guidelines. Broadcasters strongly oppose capping costs. Paxson, for example, argues that '[b]roadcasters are being asked to assume significant business, construction, and operating risks in prematurely

It is also well-established that the Commission itself may provide the licensee with incentive compensation in order to encourage incumbent relocation. The Commission did exactly that in the 800 MHz proceeding,[73] concluding that "[i]n light of [the] substantial public interest benefits, . . . it is appropriate for Nextel to receive equitable compensation in the form of spectrum rights . . . ."[74] While the compensation at issue was in-kind, the Commission has no less authority to provide for monetary compensation, at least if such compensation is to be paid by new licensees under a condition to their licenses.

The Commission also has clear authority to condition the grant of a new license on the payment for spectrum rights over and above relocation costs.[75] In *Mtel*, for instance, the Commission required Mtel to pay a fee for its license equivalent to an auction payment, even though the license was awarded outside of the auction. Although Mtel claimed that the Commission lacked authority to do this because no specific provision affirmatively authorized it,

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terminating reliable and familiar analog service.' To the extent that such risks exist, the Commission believes that private parties are best suited to assess, quantify, and reach agreement on the appropriate sharing of risk. We believe that both voluntary clearing agreements and a private secondary auction plan would be more likely to succeed without the use of cost guidelines." (footnotes and citations omitted)).

[73] *See 2004 800 MHz Order*.

[74] *Id.* at 15081 ¶ 211.

[75] *See, e.g.*, *Mobile Commc'ns Corp. of Am. v. FCC (Mtel)*, 77 F.3d 1399, 1406-07 (D.C. Cir. 1996) (holding that the FCC has authority to require payment for license if it finds that the payment is "necessary to 'ensure the achievement of the Commission's statutory responsibilit[y]' to grant a license only where the grant would serve the public interest, convenience, and necessity" (citation omitted) (bracket in original)); *In re Service Rules for the 746-764 and 776-794 MHz Bands, and Revisions to Part 27 of the Commission's Rules*, First Report and Order, 15 FCC Rcd 476, 533-34 ¶¶ 142-145 (2000) ("*Service Rules*") (permitting new licensees in the 700 MHz band to reach voluntary agreements with incumbent licensees "that would compensate incumbents for (1) converting to DTV-only transmission before the end of the statutory transition period; (2) accepting higher levels of interference than allowed by the protection standards; or (3) otherwise accommodating new licensees." (footnotes omitted)); *see also In re Service Rules for 746-764 and 776-794 MHz Bands, and Revisions to Part 27 of the Commission's Rules*, Memorandum Opinion and Order and Further Notice of Proposed Rulemaking, 15 FCC Rcd 20845, 20863-67 ¶¶ 46-53 (2000) ("*700 MHz*") (finding that the Commission had statutory authority under Sections 309(j)(14) and 337(d)(2) of the Act to review and approve voluntary agreements between incumbent broadcasters and new 700 MHz band wireless licensees to expedite the clearing process.).

the D.C. Circuit held that it was well within the Commission's authority, as long as the Commission found that it would "serve the public interest, convenience, and necessity."[76] By extension, the Commission may require C-Band terrestrial licensees to make payments to incumbent licensees over and above relocation costs on a finding that such payments would serve the public interest in clearing the C-Band for 5G services.

Finally, the CBA argues that the Commission lacks the authority to require reimbursement of receive-only earth station registrants' relocation costs because these entities are not Commission "licensees."[77] As the Coalition members and others have demonstrated, however, earth station registrations are in fact licenses for purposes of the Communications Act.[78] In any event, the Commission has broad authority under Section 303(r) to order the reimbursement of relocation costs incurred by incumbent users of the C-Band regardless of

[76] *Mtel*, 77 F.3d at 1406. *Cf. Service Rules*, 15 FCC Rcd at 533-34 ¶¶ 142-145 (permitting new licensees in the 700 MHz band to reach voluntary agreements with incumbent licensees "that would compensate incumbents for (1) converting to DTV-only transmission before the end of the statutory transition period; (2) accepting higher levels of interference than allowed by the protection standards; or (3) otherwise accommodating new licensees." (footnotes omitted)); *see also 700 MHz*, 15 FCC Rcd at 20863-67 ¶¶ 46-53 (finding that the Commission had statutory authority under Sections 309(j)(14) and 337(d)(2) of the Act to review and approve voluntary agreements between incumbent broadcasters and new 700 MHz band wireless licensees to expedite the clearing process.).

[77] CBA August Comments at 18-19.

[78] Comments of Charter Communications, Inc. at 4, GN Docket No. 18-122 (July 3, 2019) ("Charter July Comments"); Comments of ACA Connects – America's Communications Association, at 4, GN Docket No. 18-122 (July 3, 2019) ("ACA July Comments"); Comments of Competitive Carriers Association, at 27-29, GN Docket No. 18-122 (July 3, 2019); T-Mobile July Comments at 6.

whether they are considered licensees,[79] as the Commission itself has suggested.[80]

B. Section 316 Provides the Authority to Modify C-Band Satellite Licenses to Implement the 5G Plus Plan

Section 316 authorizes the Commission to modify incumbent licenses subject to certain procedural safeguards and its determination that "such action will promote the public interest, convenience, and necessity[.]"[81] As the court in *California Metro* explained, "Section 316 grants the Commission broad power to modify licenses; the Commission need only find that the proposed modification serves the public interest, convenience and necessity."[82] Similarly, the D.C. Circuit has upheld license modifications that ranged from imposing data roaming obligations to requiring transitioning TV signals from analog to digital.[83]

The Commission has also used its modification authority to refarm spectrum bands, including reallocating satellite bands for terrestrial use. For example, the Commission may reassign spectrum frequencies as part of a modification.[84] Exercising this authority, the

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[79] *See* Reply Comments of Charter Communications, Inc. at 5, GN Docket No. 18-122 (July 18, 2019); *see also* Charter July Comments at 7-10; ACA July Comments at 13-15; Supplemental Comments of PSSI Global Services, LLC, at 6-7, GN Docket No. 18-122 (July 5, 2019); Comcast Reply Comments at 2-3; Letter from Scott Blake Harris, Counsel to Small Satellite Operators, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 18-122 at 3 (Mar. 25, 2019) (stating that Section 303(r) reinforce[es] "the breadth of Commission's authority over spectrum allocation and licensing decisions"); Charter Feb. 22, 2019 Letter at 5-6 (explaining that the Commission has broad authority under Section 303(r)).

[80] *See In re Expanding Flexible Use of the 3.7 to 4.2 GHz Band*, Order and Notice of Proposed Rulemaking, 33 FCC Rcd 6915, 6926-27 ¶ 29 (2018); *see also International Bureau and Wireless Telecommunications Bureau Seek Focused Additional Comment In 3.7-4.2 GHz Band Proceeding*, Public Notice, at 6-7, GN Docket No. 18-122, DA 19-385 (rel. May 3, 2019).

[81] 47 U.S.C. § 316(a)(1).

[82] *Cal. Metro Mobile Commc'ns Inc. v. FCC*, 365 F.3d 38, 45 (D.C. Cir. 2004).

[83] *Cellco P'ship*, 700 F.3d at 543-44 (upholding modification of licenses to require data roaming); *see also Community Television Inc. v. FCC*, 216 F.3d 1133, 1140-41 (D.C. Cir. 2000) (upholding rule requiring analog to digital transition for television broadcasting as a reasonable modification of licenses).

[84] *See 2004 800 MHz Order*, 19 FCC Rcd at 15013 ¶ 69 ("[T]he D.C. Circuit has found that reassignments to new spectrum are not fundamental changes to the original licenses that themselves trigger the requirements for license revocation and reissuance." (citing *Cmty. Television, Inc. v. FCC*, 216 F.3d 1133 (D.C. Cir. 2000)));

Commission relocated Sprint from the 800 MHz band to the 1.9 GHz band after finding that such action was in the public interest in the 800 MHz proceeding.[85] Similarly, it may also modify a license by reducing the amount of spectrum available to a licensee. In repurposing the L-Band from satellite to terrestrial use, for instance, the Commission reduced the amount of spectrum that satellite operator Motient Services, Inc. ("Motient") was authorized to use, reasoning that Motient was able to provide the same quality of service in the decreased band.[86] Of course, this authority is subject to the procedural requirements of Section 316—30 day notice and opportunity to protest[87]—and the Administrative Procedure Act's requirement of reasoned decision-making.[88]

This precedent provides a solid legal footing for implementing the 5G Plus Plan. The Commission has the power to modify satellite licenses and earth station authorizations by restricting operators to the 130 megahertz of spectrum that would remain available for satellite services. If necessary, the Commission could also limit the geographic areas of the incumbents' licenses if it deems such limitations necessary to the provision of 5G services on the reallocated

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Rainbow Broad. v. FCC, 949 F.2d 405, 410 (D.C. Cir. 1991); *see also 2004 800 MHz Order*, 19 FCC Rcd at 15012 ¶ 67 ("The D.C. Circuit also has upheld license modifications that involve relocating existing licensees to new spectrum, outside of the auction process."); *see also In re Establishing Rules & Policies for the Use of Spectrum for Mobile Satellite Services in Upper and Lower L-Band*, Report and Order, 17 FCC Rcd 2704, 2713 ¶ 22 (2002) ("*Upper and Lower L-Band*") ("The language of Section 316 is clear and unequivocal: '[A]ny station license . . . may be modified by the Commission . . . if in the judgment of the Commission such action will promote the public interest, convenience, and necessity.' The original license authorized Motient to use the upper L-band frequencies. Now, because many of these frequencies are not available because of international coordination, we intend to modify Motient's license. If and when the spectrum becomes available, we will realign frequencies that are unavailable in the upper L-band and include frequencies in the lower L-band, up to the 20 megahertz that we intend to authorize to Motient.").

[85] *See 2004-800 MHz Order*, 19 FCC Rcd at 14988, 15012-13 ¶¶ 32, 68.

[86] *Upper and Lower L-Band*, 17 FCC Rcd at 2705, 2712-13 ¶¶ 1, 21, 29.

[87] *See* 47 U.S.C. § 316.

[88] *See* 5 U.S.C. § 500 *et seq.*

portion of the C-Band.[89] The Commission could further require new wireless licensees to compensate earth station registrants for the costs of fiber or microwave to transport signals from these designated areas to the registrants' business locations.

The 5G Plus Plan's modifications would be well within the Commission's Section 316 authority because they would not constitute "fundamental changes" to the incumbents' authorizations or result in terminating the rights of the incumbent licensees.[90] To the contrary, the incumbents would be able to "provide essentially the same services."[91] The proposed modifications constitute nothing more than a reasonable "modification[] of existing licenses"[92] of the sort the Commission has ordered in past reorganizations of spectrum bands.

The Commission's broad authority under Section 316 also provides a backstop against potential MVPD earth station "holdouts," although such holdouts are extremely unlikely. Most, if not all, MVPDs, given the opportunity to transition from satellite to fiber delivery with their costs reimbursed by new wireless licensees, will opt to make that transition. With respect to satellite operators, the Commission's modification power could easily address holding-out behavior by satellite licensees as well, in the event they were to holdout for more despite the promise of cost reimbursement *and* substantial incentive payments.[93]

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[89] *See In re Use of Spectrum Bands Above 24 GHz for Mobile Radio Services*, Fourth Report and Order, 33 FCC Rcd 12168, 12174 ¶¶ 15-16 (2018) (citing to Section 316 for support that "the Commission has authority to modify the holdings of existing licensees 'if in the judgment of the Commission such action will promote the public interest, convenience, and necessity'" in order to reconfigure incumbent 39 GHz licenses to more closely align with the "new band plan and service areas").

[90] *Cellco P'ship*, 700 F.3d at 543-44 (stating that the Commission cannot make fundamental changes to authorizations); *Cmty. Television, Inc.*, 216 F.3d at 1140-41 (same).

[91] *Cmty. Television, Inc.*, 216 F.3d at 1141, *see also* CBA August Comments at 17.

[92] *Cmty. Television, Inc. v. FCC*, 216 F.3d at 1141.

[93] Letter from Russell H. Fox, Counsel for T-Mobile USA, Inc., to Marlene H. Dortch, Secretary, FCC, GN Docket No. 18-122 at 8 (Apr. 11, 2019) ("[T]he Commission may be required to exercise its authority under Section 316 to modify satellite operators' licenses to address any "holdout" satellite operators or it may simply

CONCLUSION

The Commission should adopt the 5G Plus Plan set forth by the Coalition. In marked contrast to the CBA's proposal, the Plan offers unparalleled public benefits, including increased wireless and broadband competition, improved connectivity in rural areas, and a significant deposit in the U.S. Treasury. It will also result in the quick and efficient deployment of 5G services in the C-Band, thus ensuring that the United States remains a technological leader.

Respectfully submitted,

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wish to modify the licenses of satellite operators to reflect that the full 500 megahertz is no longer required to provide service.").

Public Notice Reply Comments

GN Docket No. 18-122

Version 9.1

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Background & Context

Cartesian, on behalf of its client, ACA Connects - America's Communications Association ("ACA Connects"), submits this analysis in response to comments filed by various stakeholders on the Commission's July 19, 2019 public notice ("Public Notice") in this docket.[1] This analysis clarifies and provides further details on various operational and technical aspects of the C-Band reallocation plan jointly submitted by ACA Connects, the Competitive Carriers Association, and Charter Communications, Inc. ("5G Plus Plan").[2] ACA Connects intends that the 5G Plus Plan is implemented in a manner that serves multichannel video programming distributor ("MVPD") video programmers' needs and protects their interests. ACA Connects and Cartesian intend to supplement this analysis with further information about various aspects of the plan in a subsequent filing.

Reply Comments

1. Scope of Rural Fiber Deployment

The 5G Plus Plan proposes to migrate to fiber only MVPD programmers and MVPD earth station operators. It does not propose migrating to fiber the entire population of C-Band users (e.g., television and radio stations, viewers of religious programming), and it does not require any fiber-to-the-home deployment, as some commenters suggest when they liken the plan to laying fiber to the curb.[3] With MVPDs already using fiber to provide internet services to subscribers, this population of earth station users is particularly well-suited to migrate to fiber. Indeed, approximately 70% of the fiber connectivity required under the 5G Plus Plan would come from existing fiber backhaul links. In arriving at this percentage, Cartesian relied on data obtained from the FCC's Form 477 data program and other reliable sources. By leveraging and expanding upon this existing infrastructure, the 5G Plus Plan avoids the exponential costs of rural fiber-to-the-home distribution economics, and focuses on improving the reliability of rural fiber backhaul connections, increasing the connectivity and capacity of rural broadband, and laying the foundations for future 5G backhaul in rural America.

2. Fiber Reliability

Fiber is the primary communication path for the vast majority of global communications.

- Wireline, wireless, enterprise and government entities today use mostly fiber as their primary and secondary communication paths;

- Satellite companies rely on fiber to get content from programmers' studios to their uplink earth stations, and some satellite operators provide fiber as a backup to their satellite services;

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[1] *Wireless Telecommunications Bureau, International Bureau, Office of Engineering and Technology, and Office of Economics and Analytics Seek Focused Additional Comment in 3.7-4.2 GHz Band Proceeding*, Public Notice, GN Docket No. 18-122, DA 19-678 (rel. July 19, 2019).

[2] *See* Letter from Ross Lieberman of ACA Connects, et al., to Marlene H. Dortch, Secretary, FCC, GN Docket No. 18-122 (filed July 18, 2019) ("5G Plus Plan Detailed Proposal").

[3] *See* Comments of Globecast, GN Docket No. 18-122 at 6 (filed Aug. 7, 2019).

- Programmers use fiber to transport content from their studios to uplink earth stations and, in many cases, as the primary/secondary way to deliver content overseas;

- MVPDs use fiber to move video content between their cable headends and, in some cases, receive content directly from programmers; and

- E911, wireless emergency alerts, and a long list of mission-critical services to consumers, enterprise, community anchor institutions (e.g. police departments, fire departments, hospitals, schools) and government today rely on fiber transmission.

Fiber cuts are a business-as-usual phenomenon in the telecommunications fiber industry. In fact, telecom service providers design their fiber networks with redundancy and optical budget margins that compensate for an anticipated number of fiber cuts per year. In other words, the prevalence of fiber cuts is not a barrier to obtaining service over fiber that meets a desired level of service availability.

Fiber transport reliability depends on the level of redundancy that the underlying fiber architecture provides. It can be engineered to provide 99.999 percent availability, i.e. "five-nines," or more, by adding redundancy to the network design. Redundancy can be built in at the connection, data center and equipment levels to ensure that there is no single point of failure at any point in the network. Each point-to-point connection, i.e., between data centers, can consist of multiple fiber connections which traverse completely different geographical paths and enter the data center at different locations. Furthermore, the network can be designed to ensure minimum separation distances between redundant fiber connections, which can be verified by review of fiber maps, and by using more than one fiber vendor, if desired. Every data center can be interconnected with multiple other data centers to ensure traffic can be rerouted in the event of failure in one data center. Reliability can also be ensured by using redundant equipment in data centers that can automatically recover from failure without manual intervention. Fiber solution contracts with strict network requirements on redundancy and corresponding Service Layer Agreement ("SLA") contractual commitments are common in today's telecommunications industry.

The 5G Plus Plan proposes to provide the MVPD industry with a fiber network architecture with a level of reliability that is the same or better than what is received from satellite providers via the C-Band. Specific details regarding the architecture of the network will be provided in the coming weeks.

Finally, it is important to remember that satellite communications are also susceptible to service disruption from a variety of sources, including the following:

- inclement weather conditions affecting signal propagation through the atmosphere;

- sender or receiver antennas' loss of pointing;

- transponder failure;

- satellites' loss of orbit, collisions or damages; and

- failed satellite launches.

Providing redundancy in the satellite industry is very expensive, as redundant transponders and in-orbit satellite spares have a very high associated cost. This is the primary reason why the vast majority of programmers today use just single-transponder satellite services without reserved spare transponder or in-orbit satellites.

3. Terrestrial Fiber Network Operational Costs for Programmers

The 5G Plus Plan accounts for programmers' ongoing operational expense for maintaining fiber-based distribution networks between their studios and the 42 data centers.[4] As explained in the plan, these costs would be reimbursed until such time that programmers no longer incur costs to transmit their programming via C-Band (i.e., at most a five-year transition period).

With respect to additional staffing, programmers would also be fully reimbursed for all fiber-related capital and operational expenses over the five-year transition period.

After five years, programmers would discontinue paying the satellite industry and shift their spending to:

- the maintenance of any incremental fiber infrastructure that the programmers will have built; and
- the steady-state fees for the managed video transport service provider or providers each programmer chooses.[5]

The steady-state cost for programmers to transport their content via fiber is expected to be lower than current satellite costs. More details regarding these ongoing costs will be provided in the coming weeks.

4. Plan Timing - First 18 Months for Urban Transition

The group of urban markets that would be cleared in 18 months under the plan include only those markets where no fiber deployment is necessary because it already exists. There would be no need for permits in these areas. Moreover, the 18-month transition period does not begin until the date monies are made available for reimbursement from the reallocation of spectrum; before then, parties would have time to begin planning for the transition, such as by negotiating contracts.

An 18-month transition timeline is possible in these urban areas for the following reasons:

1. MVPDs in urban areas already have fiber connecting their headends to their fiber networks and are already collocated in major data centers. Moreover, these MVPDs typically have contracted for significant fiber transport and have spare capacity available for video programming. Indeed, most urban MVPDs already receive some portion of their programming via fiber.

[4] *See* 5G Plus Plan Detailed Proposal at 26-27.
[5] *See infra* Section 5 ("Managed Video Transport Service Providers").

2. A large portion of the programmers have fiber today running into their studios or uplink earth stations and have made their content available to existing fiber-based video solution providers; and

3. Deployment of a managed video transport network among existing Tier 1 and Tier 2 data centers would likely require only a few months, and no more than a year.

Finally, we note that the 5G Plus Plan proposes to free up spectrum for 5G on a market-by-market basis. In some cases, MVPDs in an urban market may be able to transition to fiber in less than 18 months, in which case the spectrum could be made available for 5G ahead of schedule. By the same token, if a market encountered unexpected delays that pushed the transition in that market beyond 18 months, that would not delay the freeing up of spectrum for 5G in other urban markets.[6]

5. Managed Video Transport Service Providers

Under the 5G Plus Plan, programmers are not expected to have a physical presence at each of the 42 data centers. Rather, programmers would have multiple fiber-based solution providers available to them that would be responsible for end-to-end managed video transport services from their studios to the data centers. Indeed, there are multiple fiber-based video transport providers in the market today who could provide these services. Overall, programmers would have much greater optionality than they do today, when they must generally choose among no more than two satellite operators in delivering video programming to MVPD customers.

Programmers would be fully reimbursed for the full cost (initial capital expenses and five-year operational expenses) of using these fiber-based providers to obtain service with high requirements for service quality, availability, and coverage. Programmers would enter into agreements with one or more of the managed video transport service providers to deliver their content. The service provider(s) chosen by the programmer would have sole responsibility for providing end-to-end service management of the service provided to the programmer.

Programmers would not be responsible for any costs associated with transporting their video programming content from a data center to the earth station of an MVPD customer. Costs associated with this portion of network would be the responsibility of the MVPD.

6. C-Band Dual Illumination Period

The 5G Plus Plan takes into account the need for dual illumination during the switch of a customer from one transponder to another and then until all earth station antennas receiving that customer's service are repointed. The spectrum on the lower portion of the C-Band (3.70 – 4.07 GHz) would be available for this purpose in a market until all transition steps in the market are completed, and only then would the C-Band

[6] Under the CBA plan, which proposes to clear 200 megahertz on a nationwide basis within three years, no spectrum anywhere can be cleared until all five planned satellites are built and successfully launched, existing C-Band customers are fully repacked, and all earth station antennas needing filters have had them installed.

spectrum be made accessible to its new owner. For instance, to allow those MVPD earth stations not transitioning to fiber in Stage 1 to repoint their antennas to the new transponders of MVPD programmers being repacked into the lower portion of the band, the 5G Plus Plan proposes to dual illuminate these programmers for at least nine months.[7] Similarly, to allow non-MVPD earth stations that need to repoint their antennas from transponders in the lower portion of the C-Band to those in the upper portion, the plan provides for dual illumination for as long as five years.[8]

7. C-Band Current Utilization

The satellite industry has the most accurate information on the current utilization of the C-Band as well as usage trends. This information has been made available by satellite operators to the Commission. Should the Commission make such information available to us under a protective order, we would happily review the information and consider any necessary adjustments to the amount of spectrum that the 5G Plus Plan contemplates making available for 5G use.

In the meantime, Cartesian has used conservative estimates based on the best information that is publicly available in developing the 5G Plus Plan. We have used the higher demand number of the top-down (~100 transponder equivalents ("TPEs")) and bottom-up estimates (~94 TPEs), while projecting constant demand by non-MVPD customers over the next five years.

Our more conservative top-down estimate of ~100 TPEs is based on data published by Northern Sky Research (NSR), which include occasional use and other uses not related to cable distribution.[9]

8. Continued Satellite Operations in the Upper C-Band

Under the 5G Plus Plan, programmers would continue to pay the satellite industry for the first five years, and the plan would compensate satellite operators for lost revenues in the following two years. In other words, the satellite industry would continue to receive full revenues for at least seven years.[10] In exchange for these benefits, satellite operators would be required under the plan to continue serving non-MVPD earth station operators without raising prices for seven years. Under the C-Band Alliance ("CBA") Plan, by contrast, the satellite companies have made no such commitment. Nor have they provided plans around the launching of any new satellites beyond year seven, when one of their satellites will reach end of life and their customers' demand for satellite capacity will come to exceed supply. Moreover, an allocation of only 200 megahertz for 5G, as proposed by CBA, will not end the calls for more spectrum to be allocated within the next seven years. Given that the satellite industry's own customers are now generally entering into renewals lasting seven years or less, compared to previous agreements lasting as long as 15 years,[11] it is

[7] *See* 5G Plus Plan Detailed Proposal at 38.
[8] *See id.* at 38-40.
[9] *See id.* at 5.
[10] Satellite providers are further compensated under the plan for the costs of additional satellite launches and repacking costs.
[11] *See* Caleb Henry, Space News, "Eutelsat CEO optimistic on shorter broadcast contracts, OTT potential," Feb. 16, 2018, https://spacenews.com/eutelsat-ceo-optimistic-on-shorter-broadcast-contracts-ott-potential/.

clear that the industry understands that the continued evolution of the C-Band satellite industry beyond seven years is an unknown variable under any solution likely adopted by the Commission.

Cartesian is a specialist consulting firm in the telecoms, media and technology sector. For 30 years, we have advised clients worldwide in strategy development and assisted them in execution against their goals. Our unique portfolio of consulting services and managed solutions are tailored to the specific challenges faced by executives in these fast-moving industries. Combining strategic thinking, robust analytics, and practical experience, Cartesian delivers superior results.

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