

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

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In the Matter of)	
)	
Expanding Flexible Use of the 3.7 to 4.2 GHz)	GN Docket No. 18-122
Band)	
)	
Expanding Flexible Use in Mid-Band Spectrum)	GN Docket No. 17-183
Between 3.7 and 24 GHz)	(Inquiry Terminated as to 3.7-4.2
)	GHz)
)	
Petition for Rulemaking to Amend and)	RM-11791
Modernize Parts 25 and 101 of the)	
Commission's Rules to Authorize and Facilitate)	
the Deployment of Licensed Point-to-)	
Multipoint Fixed Wireless Broadband Service)	
in the 3.7-4.2 GHz Band)	
)	
Fixed Wireless Communications Coalition, Inc.,)	RM-11778
Request for Modified Coordination Procedures)	
in Band Shared between the Fixed Service and)	
the Fixed Satellite Service)	

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COMMENTS OF GCI COMMUNICATION CORP.

GCI Communication Corp. ("GCI") submits the following comments in response to the Federal Communications Commission's ("FCC's" or "Commission's") Notice of Proposed Rulemaking ("NPRM") seeking comment on the future of incumbent usage of the 3.7-4.2 GHz band (the "C-Band" or "3.7 GHz Band").¹ Consistent with its comments previously filed in

¹ *In the Matter of Expanding Flexible Use of the 3.7 to 4.2 GHz Band, Expanding Flexible Use in Mid-Band Spectrum Between 3.7 and 24 GHz, Petition for Rulemaking to Amend and Modernize Parts 25 and 101 of the Commission's Rules to Authorize and Facilitate the Deployment of Licensed Point-to-Multipoint Fixed Wireless Broadband Service in the 3.7-4.2 GHz Band, Fixed Wireless Communications Coalition, Inc., Request for Modified Coordination Procedures in Band Shared between the Fixed Service and the Fixed Satellite Service*, GN Docket Nos. 18-122,

related proceedings,² GCI urges the Commission to ensure that any action taken with respect to reallocating the C-Band for terrestrial use protects and ensures a foreseeable future for the long-standing important incumbent fixed satellite service (“FSS”) operations in this band.

I. INTRODUCTION AND SUMMARY

As Chairman Pai has recognized, “satellites continue to deliver tremendous benefits for the American people.”³ This holds especially true for the residents of Alaska. Specifically, GCI relies on the 3.7 GHz Band in order to provide downlink FSS operations, and has a very long history of efficiently utilizing the C-Band to provide broadband and video communications services throughout Alaska. The C-Band is oftentimes GCI’s only option to provide critical and important services to rural and remote areas. Indeed, GCI’s creative and innovative uses of the C-Band are a direct result of the difficulty of serving Alaska’s remote and rural areas using alternative mechanisms. Accordingly, many of GCI’s C-Band sites serve customers residing in the most rural and remote areas of the country that must rely exclusively on satellite technology for the provision of basic telephone service, medical service, and distance-learning. Federal agencies, such as the Federal Aviation Administration (“FAA”), for example, also depend on GCI’s operations in this spectrum to assist pilots in determining local weather conditions

17-183, RM-11791, RM-11778, Order and Notice of Proposed Rulemaking (rel. July 13, 2018) (“NPRM”).

² See, e.g., Comments of GCI Communication Corp., GN Docket No. 18-122 (filed May 31, 2018) (“GCI C-Band Sharing Comments”); Reply Comments of General Communication, Inc., GN Docket No. 17-183 (filed Nov. 15, 2017) (“GCI Mid-Band NOI Reply Comments”); Comments of General Communication, Inc., GN Docket No. 17-183 (filed Oct. 2, 2017) (“GCI Mid-Band NOI Comments”); Comments of General Communication, Inc., RM-11791 (filed Aug. 7, 2017) (“GCI BAC Comments”); Reply of General Communication, Inc., RM-11778 (filed Jan. 24, 2017) (“GCI FWCC Reply”).

³ Ajit Pai, *Space Month at the FCC*, FCC BLOG (Oct. 24, 2018, 1:30 PM), <https://www.fcc.gov/news-events/blog/2018/10/24/space-month-fcc>.

throughout the state. Many of these critical services, if interrupted, could result in life-threatening situations.

GCI, through its subsidiaries, operates a telecommunications network that covers more of Alaska's population than any other provider in the State. GCI has developed and deployed that network through its longstanding familiarity with the unique demands of the Alaskan marketplace and environment, its deep resources in Alaska, and its understanding of the needs of Alaskans. As GCI has found, providing broadband service to Alaska is particularly challenging due to "its remoteness, lack of roads, challenges and costs associated with transporting fuel, lack of scalability per community, satellite and backhaul availability, extreme weather conditions, challenging topography, and short construction season."⁴ Therefore, GCI must utilize a variety of technologies in order to provide dependable services, and often must do so in innovative ways. This includes using FSS in conjunction with its terrestrial mobile and fixed wireless networks, largely in areas where fiber deployment is not feasible.

Regardless of the ultimate direction the FCC takes with respect to this proceeding, its main priority must be to ensure adequate protections, flexibility, and funding to allow critical incumbent C-Band services to continue. GCI and others have invested millions of dollars to provide operations in this band and these critical uses upon which rural communities and citizen rely should not be hindered by Commission action. The NPRM seeks comment on "transitioning all or part of the band to terrestrial wireless broadband services"⁵ "while protecting existing

⁴ *Connect America Fund; Universal Service Reform – Mobility Fund; Connect America Fund - Alaska Plan*, Report and Order and Further Notice of Proposed Rulemaking, 31 FCC Rcd 10139, 10162, ¶ 72 (2016) ("*Alaska Plan R&O*") (citing *Connect America Fund et al.*, Report and Order and Further Notice of Proposed Rulemaking, 26 FCC Rcd 17663, 17829, ¶ 507 (2011)). ("*USF/ICC Transformation Order*"), *aff'd sub nom. FCC 11-161*, 753 F.3d 1015 (10th Cir. 2014)).

⁵ NPRM ¶ 1.

operations in the band from harmful interference.”⁶ To accomplish this feat, the FCC seeks comment on, among other things, (1) clearing the C-Band of FSS operations and relying on alternative satellite bands or fiber as suitable replacements for current C-Band operations; (2) removing the operational flexibility currently afforded to C-Band operators through the full-band, full-arc coordination policy to better accommodate terrestrial operations in the C-Band; and (3) limiting future earth station and space station operations. The NPRM also seeks comment on potential market-based and auction-based mechanisms that may accomplish its goal to introduce terrestrial services onto the C-Band.

Unfortunately, the FCC’s proposals in the NPRM are either unsuitable in Alaska, or would strip the C-Band of its commercial viability – leaving significant critical services stranded. Therefore, the FCC must not lose sight in this proceeding of the need to protect incumbent C-Band operations, which should be the Commission’s first priority. Protection of existing operations in the C-Band does not mean to freeze uses as they exist today. Such an approach would paralyze a dynamic industry. Rather, C-Band incumbents need flexibility in order to continue to efficiently provide operations and ensure that their customers continue to receive reliable services. If the FCC does ignore the substantial use of the C-Band in the record and moves forward with a market-based or auction-based mechanism, it must make significant adjustments for any such proposals in order to ensure the continued use and protection of these C-Band services going forward. The FCC must also ensure that affected incumbent operators are made whole to account for any modifications to their service. In addition, a significant timeframe to allow for a transition must be implemented – with such timeframe dictated by the ability of C-Band services to be replaced; not an arbitrary deadline set by the FCC. Lastly, GCI

⁶ *Id.* ¶ 26.

urges the FCC to reject proposals to introduce fixed services onto the C-Band due to the high potential for catastrophic interference to FSS services, and opposes imposing additional, unjustifiable, administrative burdens on FSS operators.

II. GCI RELIES ON THE C-BAND FOR THE PROVISION OF CRITICAL BROADBAND OPERATIONS TO RURAL AND REMOTE AREAS

GCI uses the 3.7 GHz Band for middle-mile backhaul services,⁷ as well as for traditional video content distribution. This band is particularly important to GCI, and other FSS earth station operators in Alaska, that face significant and unique challenges in providing telecommunications services to the state, including limited satellite coverage, increasing capacity, and interference issues. This spectrum helps alleviate some of these concerns, as it enables GCI to provide critical and important services via 2G and LTE-over-Satellite wireless services, among other technologies that GCI uses to provide services to its customers via the C-Band. Below are a number of examples of services provided by GCI using the 3.7-4.2 GHz spectrum, which have also been detailed in GCI's related comments:⁸

Critical Long-Distance Services. GCI offers Measured Toll Service ("MTS") for consumers and businesses using the C-Band spectrum. For many remote villages in the northern, western, and interior regions of Alaska, this is oftentimes the only communications link to the "outside world," allowing these residents to contact state troopers and other emergency officials at all times, but especially in critical situations. Many of these communities have no terrestrial (or other) transmission alternative. GCI also provides long-distance private line (special access)

⁷ For backhaul purposes, when data is requested by a source ("SRC") host, it is delivered to the region's C-Band earth station and is uplinked via the 6 GHz Band to the satellite and then downlinked, translating the frequency from 6 GHz to 4 GHz for reception at the receiving earth station. Transponders assist by unlinking (at 6 GHz) and downlinking (at 4 GHz) the data response.

⁸ See, e.g., GCI C-Band Sharing Comments; GCI Mid-Band NOI Reply Comments; GCI Mid-Band NOI Comments; GCI BAC Comments; GCI FWCC Reply.

services to businesses, native corporations, and local, state and federal governments. These operations service Federal Aviation Administration (“FAA”) circuits and other government agency circuits, helping to ensure that the most critical and secured communications travel from and reach their intended destination.⁹ Any interference that affects these circuits could result in the potential for injury or loss of life.

FAA Assistance. Due to the enormous size of the state and lack of road infrastructure, the use of small aircraft for day-to-day travel is common in rural Alaska. Unfortunately, due to weather, mountainous terrain, and the lack of adequate mapping, travel by small aircraft comes with inherent risk. Pilots routinely find themselves in rough weather and must decide whether to turn around and try again later – at significant expense and inconvenience to their passengers – or face the increased risk of flying in potentially unsafe conditions. For over a decade, GCI has been working with the FAA on a program that provides real-time weather-camera information to pilots using the GCI satellite network for middle-mile backhaul. Based on data compiled by the FAA, this program has reduced weather-related aviation incidents in Alaska by 85 percent, and has reduced how often pilots must turn a plane around due to weather by 66 percent.¹⁰

⁹ In addition, the U.S. military also relies on satellite operations in the C-band to augment its own capacity. The Army utilizes both military and commercial satellites to provide “interoperable high-speed, high-capacity connectivity, so Soldiers can communicate across vast distances and in austere locations and terrains, virtually anytime, anywhere.” This commercial use “support[s] and complement[s] the Army’s Warfighter Information Network-Tactical (“WIN-T”) network and architecture and help[s] increase the operational reach and situational awareness of the entire force.” U.S. Army, Satellite Communications, <http://peoc3t.army.mil/tn/satcom.php> (last visited Oct. 29, 2018). Commercial satellites also provide important redundancy for security purposes: for example, the military adds commercial satellite receivers to vehicles and other equipment to back up their own operations in the event they are hacked or degraded. Andrea Shalal, *Commercial Satellite Industry Seeks Growing U.S. Military Demand*, REUTERS (Mar. 9, 2016) <https://www.reuters.com/article/us-usa-military-satellites/commercial-satellite-industry-sees-growing-u-s-military-demand-idUSKCN0WB20F>.

¹⁰ GCI, News Release, *Weather Camera Program Protects Pilots, Saves Lives in Alaska* (Apr. 19, 2017) <https://www.gci.com/about/news-releases-archive/weather-camera-program>.

Alaska Plan.¹¹ The C-Band also plays a critical role in GCI's contribution to the Alaska Plan: GCI uses this spectrum to deliver middle-mile capacity with the last-mile LTE service – a critical initiative to provide needed services to under and unserved areas.¹² GCI has already allocated dedicated spectrum in Dutch Harbor, Barrow and other served and to-be-served sites, and GCI currently has approximately 1.25 transponders (36 MHz each) dedicated to this cause. If GCI's access to the C-Band were to be modified or interrupted in any way, it could jeopardize GCI's ability to provide services consistent with the obligations it assumed under the Alaska Plan.

Telehealth. Through its “ConnectMD” network, GCI supports the delivery of telemedicine services such as teleradiology, remote patient monitoring, medical network solutions, and live video-conferencing to customers in Alaska.¹³ These C-Band sites provide backhaul to government health providers such as North Slope Borough Department of Health and Social Services,¹⁴ as well as Tribally-operated, non-profit health and social services organizations like the Arctic Slope Native Association.¹⁵ These services improve healthcare in areas that traditionally have few physicians and even fewer medical specialists in a variety of

¹¹ In 2016, the Commission adopted a plan to help extend and upgrade Alaska's broadband service to support a large number of underserved and unserved communities (the “Alaska Plan”). Objectives of the Alaska Plan include, but are not limited to, introducing broadband service to over 36,000 new residents at speeds of 10/1 Mbps and upgrading almost 70,000 residents to 25/3 Mbps, which requires GCI to deploy 4G LTE or better service to more than 100,000 remote Alaska residents. *Alaska Plan R&O*, ¶¶8, 73.

¹² See *Wireless Telecommunications Bureau Approves Performance Plans of The Eight Wireless Providers That Elected to Participate in the Alaska Plan*, Public Notice, WC Docket No. 16-271, DA 16-1419, Appendix A, page 6 (rel. Dec. 21, 2016).

¹³ See GCI ConnectMD, <http://www.connectmd.com/> (last visited Oct. 29, 2018).

¹⁴ The North Slope Borough, <http://www.north-slope.org/departments/health-social-services> (last visited Oct. 29, 2018).

¹⁵ Samuel Simmonds Memorial Hospital, <http://www.arcticslope.org/about> (last visited Oct. 29, 2018).

medical fields, including audiology, cardiology, dental, family medicine, neurosurgery, ophthalmology, pediatrics, psychiatry, and women's health. Importantly, ConnectMD also allows participating communities to accommodate patients with sudden symptoms, often developing treatment plans without the need for costly hospitalization. In most instances, the ConnectMD network is the only way that rural Alaskans may gain access to necessary medical care, and if GCI's access to the C-Band is interrupted in any way, these programs, and the residents who rely on them, will be impacted.

Long-Distance Learning. GCI's SchoolAccess network provides broadband access, video conferencing and state-of-the-art digital tools to schools and libraries in rural and underserved regions of the United States.¹⁶ This program focuses on K-12 school and library environments and currently serves more than 100,000 patrons.¹⁷ The SchoolAccess services have become an essential part of educating students in rural areas, with its video service logging more than 2.25 million minutes each year in Alaska, New Mexico, and Montana.¹⁸ The program allows students in rural and remote areas to virtually participate in online music performances, leadership groups, state-wide programs and competitions, including Battle of Books, a statewide reading motivational and comprehension program; spelling bees; and Alaska Robotics, the state-level science and engineering fair.¹⁹ The opportunities do not end there: distance-learning has not only increased academic, athletic and social collaboration between geographically isolated students, but has also led to improved test scores among its students, providing a greater

¹⁶ GCI SchoolAccess, <http://www.schoolaccess.net/public-general/services> (last visited Oct. 29, 2018).

¹⁷ GCI SchoolAccess, About, <http://www.schoolaccess.net/public-general/about> (last visited Oct. 29, 2018).

¹⁸ *Id.*

¹⁹ *Id.*

opportunity for these students to attend college.²⁰ The services provided by GCI's SchoolAccess have become an essential part of educating students in rural Alaska by allowing children in remote areas to gain an education that would otherwise not be available without leaving home, and such services rely, in part, on unfettered access to the C-Band.

III. CURRENT AND FUTURE C-BAND FSS OPERATIONS MUST BE PROTECTED

The extensive use of the C-Band by GCI and other FSS operators demonstrates just how highly valued this spectrum is to such services – especially in rural areas.²¹ The C-Band offers favorable propagation characteristics and flexible operating rules such as full-band, full-arc coordination that have allowed FSS services to flourish on this spectrum. Accordingly, as a result of the important interests at stake, flexible access to sufficient C-Band capacity must remain available for current and future C-Band operations. The proposals in the NPRM, however, are inapposite to this understanding. Specifically, the offered “alternative” transmissions, as well as, proposed modifications to the flexible operating and licensing rules associated with C-Band FSS operations would each paralyze the C-Band market and catastrophically disrupt incumbent FSS operations.

A. GCI'S C-Band Services Currently Cannot Be Replaced By Other Transmission Options

In an effort to replace C-Band FSS services, the NPRM asks whether alternative satellite bands, such as the Ku- or Ka-bands, or fiber, would be suitable replacements for current C-Band operations. GCI's experience confirms that such “substitutes, particularly fiber, are most

²⁰ *Id.*

²¹ As the Commission recognizes, in rural areas, “the value of the spectrum remaining in FSS is relatively high.” NPRM ¶ 64.

prevalent in urban areas while in rural areas there are fewer FSS substitutes.”²² Alaska – although the largest state in America, has some of the most rural and remote areas in the country,²³ and therefore, “the value of the spectrum remaining in FSS is relatively high while the opportunity cost of clearing less flexible-use spectrum is relatively low.”²⁴ Accordingly, GCI reiterates that there are no other currently viable alternative transmission path options that could effectively replace its C-Band operations with respect to its reliability and cost at this time.²⁵

First, GCI does not view the currently available Ku- and Ka-band options as suitable alternative options due to (a) the limited lower link availability resulting from more challenging propagation conditions and higher link margins required for Ku- or Ka-band fading;²⁶ (b) the prohibitively high cost associated with replacing or upgrading ground segment equipment; and (c) the lack of available Ku- or Ka-band satellites having satisfactory coverage over the state of Alaska - in other words, there is not enough capacity or coverage of Ku-band satellites to move all of the C-Band services and there is minimal, if any, Ka-Band coverage in Alaska. For these reasons, alternative satellite bands are not an option for migrating GCI’s C-Band operations.

²² *Id.*

²³ According to 2010 U.S. Census data, Alaska has the lowest population density, with only 1.2 people per square mile statewide. Alaska ranks 52 out of 52 states and territories in population density (this ranking includes Puerto Rico and Washington D.C.). In contrast, the second least dense state, Wyoming, is nearly 5 times as dense, with a statewide population density of 5.8 people per square mile. *See* Resident Population Data, U.S. CENSUS BUREAU, <http://www.census.gov/2010census/data/apportionment-dens-text.php>.

²⁴ NPRM ¶ 64.

²⁵ *Id.* ¶ 63.

²⁶ For instance, weather characteristics such as rain, snow, or fog may cause signal fade on these satellite bands.

Second, as GCI has explained to the Commission on several occasions, switching to fiber is also not a suitable alternative for its services.²⁷ Much of the land in rural Alaska is protected by numerous federal and state laws that limit human activity, including the Alaska National Interest Lands Conservation Act, the National Wildlife Refuge System Administration Act, the National Wildlife Refuge System Improvement Act of 1997, the Wilderness Act, the Wild and Scenic Rivers Act, the Marine Mammal Protection Act, and the Arctic Refuge Comprehensive Conservation Plan.²⁸ Even absent federal land regulations, long fiber runs in Alaska are not feasible solutions. In many areas, those would run over the Arctic tundra and would need to be safeguarded against damage caused by the complex and changing structure of permafrost, which can range in thickness from a single meter to many hundreds of meters. In other areas, fiber would be required to run in the sea and would need to be safeguarded against additional elements, including ice and rough sea floors.²⁹

Uneven freezing and thawing at or near the surface can result in dramatic changes to landforms, such as ice wedges (i.e., growing cracks in the ground) and pingos (i.e., small hills that arise quickly due to subsurface pressures), which can damage buried fiber optic cable.³⁰ In

²⁷ See, e.g., GCI Mid-Band NOI Reply Comments at 14-15; see also Amended Petition of GCI for Waiver of Certain Channelization and Other Restrictions on Common Carrier Fixed Point-to-Point Operations Between 6425 and 7125 MHz, WT Docket No. 16-209, at p. 6 (filed May 3, 2016) (“GCI Amended Petition”).

²⁸ GCI Amended Petition at 6.

²⁹ Submarine fiber, particularly in Alaska’s cold and icy waters carries inherent risk. The more ice that accumulates, the higher the probability of cuts to the fiber, resulting in decreased reliability.

³⁰ U.S. Fish & Wildlife Serv., *Ice Wedges, Polygons, and Pingos*, <https://www.fws.gov/refuge/arctic/permcycle.html> (last visited Oct. 29, 2018) (describing the process by which the permafrost cycles through these changes); Nat’l Snow & Ice Data Ctr., *All About Frozen Ground – How Does Frozen Ground Affect Land?* https://nsidc.org/cryosphere/frozenground/how_fg_affects_land.html (last visited Oct. 29, 2018) (describing how freezing and thawing in the Arctic can change the shape of the land).

short, if it was feasible to install fiber to serve these rural Alaskan communities, then GCI would have already done so. However, it is not feasible to span large geographic distance in remote areas of Alaska with fiber infrastructure. Moreover, a business case for fiber is challenging, if not impossible, due to the costs associated not just with deployment and repairs in difficult to access areas, but with the hardening required to make fiber a reliable telecommunications option in such areas.³¹ Indeed, that is a large reason why GCI utilizes geostationary satellites that do an extremely effective job covering large geographic areas. GCI has a long history of creative and innovative uses of the C-Band. This innovation is a direct result of the difficulty in serving such areas over the above mechanisms. Accordingly, suggestions that fiber can effectively replace all FSS operations, particularly in rural areas, should be rejected.

B. Modifying or Eliminating the Full-Band, Full-Arc Coordination Policy Would Be Catastrophic for C-Band Operations

Proposals to remove the operational flexibility provided to FSS operators by the full-band, full-arc coordination policy would also severely impact C-Band operations and should be rejected.³² Specifically, the NPRM proposes to effectively eliminate the full-band, full-arc coordination policy and to protect only those “frequencies, azimuths, and elevation angles and other parameters reported as in regular use (i.e., at least daily) in response to future information collections.”³³

GCI’s ability to effectively utilize the C-Band spectrum is due in large part to the well-established flexible operating rules under the full-band, full-arc policy that allow it to efficiently

³¹ Other unique challenges concerning fiber deployment in Alaska include consideration of bird and animal migration and birthing schedules, as well as shorter construction periods due to severe weather and lack of light during winter months.

³² See NPRM ¶ 40.

³³ *Id.* ¶ 39.

shift frequencies and satellites in the event of a transponder or satellite failure, changing customer requirements, or market competition (resulting in capacity cost reductions).³⁴ In addition to relying on primary, full-time satellites, GCI also requires the ability to operate on other western arc satellites with very little notice (*i.e.*, less than four hours) in order to provide restoration of terrestrial networks that service rural Alaska. GCI has contracted with satellite providers to obtain “in-orbit protection,” which allows GCI to access additional capacity at other orbital location (with priority assignment) in the event that the primary spacecraft experiences a catastrophic failure. In short, eliminating the full-band, full-arc coordination policy ignores the very-real fact that changes in frequency are an integral part of the day-to-day operations of FSS operators, including GCI. Removing this flexibility would make it extremely difficult, if not impossible, for GCI to minimize service interruptions to its customers, and such consequences should be avoided by maintaining this policy going forward.

There has been no proposal in the record or by the FCC that has offered an adequate alternative to full-band, full-arc coordination (and further protects against satellite outages and the accompanying loss of service). Without a legitimate, suitable alternative, such a policy must stay in effect.

C. Limiting New Earth Stations and Space Stations Will Result in Interrupted FSS Service

The NPRM seeks comment on revising the Part 25 rules to permanently limit the eligibility to file applications for earth station licenses or registrations to incumbent earth stations.³⁵ The NPRM similarly proposes to revise the rules to “bar new applications for space station licenses and new petitions for market access concerning space-to-Earth operations” in the

³⁴ Indeed, GCI routinely adjusts the frequencies and other parameters of satellite carriers in its network to facilitate “adds, moves, and changes” to GCI’s services.

³⁵ NPRM ¶ 30.

C-Band.³⁶ Both of these proposals should be rejected. Limiting future operations in any way will strip C-Band operators of their ability to offer uninterrupted service over this spectrum and could catastrophically impact FSS operations.

For instance, GCI files for new earth stations in order to ensure that it may continue to provide reliable communications services, including critical emergency 911 services to its customers, or offer new services to customers that are not served by existing earth stations. Such a need could be scheduled and planned (for instance, if a satellite has reached its end-of-life and GCI must seek new earth stations compatible with the replacement satellite, or if a customer with critical communications, such as the FAA, needs satellite circuits to be extended into new locations), or it could stem from emergency circumstances. Such emergency circumstances have occurred as a result of Alaska's long and harsh winters due to the impact that the weather elements have on GCI's operations. For example, GCI recently encountered a situation where one of its mountain towers located in a remote area of Alaska experienced severe icing issues that caused its microwave link, which serviced remote villages in western Alaska, to become unreliable. This link was the primary link to communications in these villages, and provided not only mobile wireless voice and broadband services, but also supported telehealth services, school access services, wireless 911 routing, and served as a backup to wireline 911 services. In an effort to remedy this situation, GCI initially intended to temporarily operate in this area using flyaway Ku-Band VSAT stations, however such emergency deployments proved unable to withstand the high wind and severe weather in this area of Alaska. Therefore, access to the C-Band was GCI's only option. As a result, GCI filed for an emergency STA along with a new earth station application. If the FCC strips GCI and other FSS operators of the ability to access

³⁶ *Id.* ¶ 46.

new C-Band earth stations, services will be impacted, and ultimately, it will be the end users that face the consequences – end users that are the least likely to obtain services via alternative means. In this instance, approximately 2300 western Alaskans would have lost access to vital communications services, including accessing 911 services without C-Band access.

FSS operators need the ability to make changes to and expand their operations to reflect the ever-evolving nature of the satellite industry, including in situations where space stations reach end of life, or move to different frequencies due to satellite carrier management decisions, etc. As detailed herein, FSS services are ever-evolving and require flexibility – both on an operational level and licensing level. The nature of these operations often require access to new earth stations and space stations in order to allow FSS operators to continue offering similar services in this dynamic industry, and thus, authority for new earth stations and/or space stations is necessary in order to accomplish this goal. If adopted, the FCC’s proposals to limit or bar such new applications would effectively prevent FSS operations from being provided to consumers that have come to rely on such services. Therefore, the FCC should reject its proposals to limit or eliminate the opportunity to apply for future C-Band earth and space stations.

IV. THE FCC’S PROPOSED TRANSITION MECHANISMS HAVE NOT DEMONSTRATED ADEQUATE PROTECTIONS FOR FSS OPERATIONS AND THEREFORE SHOULD NOT BE ADOPTED WITHOUT ADDITIONAL CONSIDERATIONS

The NPRM accurately concludes that “co-channel sharing is not feasible”³⁷ in the C-Band. GCI agrees: band sharing in the 3.7-4.2 GHz band is problematic due in large part to the

³⁷ *Id.* ¶ 55.

actual technology utilized by FSS-receive systems.³⁸ The NPRM therefore seeks comment on other approaches to repurpose a portion or all of the band for flexible use.³⁹ Specifically, the NPRM highlights market-based and auction-based proposals, as well as potential combinations of the two. At this time, none of the proposals, as offered, ensure adequate protection of FSS earth station operations.

GCI remains concerned about any proposal that would make some or all of the C-Band available for terrestrial use. The need for GCI's (and the rest of the FSS industry's) unfettered access to the C-Band is well documented in the record.⁴⁰ Any modifications made to the C-Band service, even if they only affect the Lower 48 states, would disrupt the entire marketplace for this spectrum to an irreparable level, and such consequences must be recognized by the FCC. As discussed herein, there is no proposal currently on the record that would adequately protect GCI's C-Band operations and ensure that GCI would be able to provide the same or similar services using an alternative method. However, if such a proposal were to be offered under either a market-based or auction-based approach, then the FCC must ensure that the interests of FSS earth station operators, in addition to satellite operators, are addressed in order to better protect such services. This may be accomplished by providing earth station operators the opportunity to effectively participate in the transition process, allowing for a reasonable and

³⁸ GCI relies on unfettered access to the entire 500 MHz C-Band spectrum allocation to serve its C-Band satellite network and, in the few locations where it uses just less than the full 500 MHz, relies on the flexibility afforded by the FCC's rules, as discussed above, to efficiently shift frequencies and satellites in the event of a transponder or satellite failure or market competition (resulting in capacity cost reductions). It will be difficult, if not impossible, to maintain a competitive market position in the event that the band permits shared use between FSS and commercial wireless services.

³⁹ NPRM ¶ 58.

⁴⁰ See, e.g., GCI C-Band Sharing Comments; GCI Mid-Band NOI Reply Comments; GCI Mid-Band NOI Comments; GCI BAC Comments; GCI FWCC Reply.

realistic timeframe for any transition and sufficiently compensating earth station operators for all costs associated with any transition.

A. Earth Station Operators Must Be Allowed to Effectively Participate in Any Transition Process to Better Ensure Protection or Relocation of Their Operations

Both the market-based and auction-based proposals set forth in the NPRM envision satellite operators as being the sole representation for FSS operations in negotiations with new mobile terrestrial entrants, with no input from earth station operators. For instance, with respect to the market-based approach, satellite operators “could choose to make some or all of their spectrum available to terrestrial operators” and would be responsible for “notifying earth stations of the need to modify their operations” among other things.⁴¹ Similarly, under an auction-based mechanism, satellite operators would be fully responsible for participating in an auction and making any decisions involving spectrum relinquishment.⁴² With respect to both mechanisms, decisions on the band will be left to the economic whim of satellite operators, with their customers being afforded little to no say on the future of their own operations. Such a mechanism ignores the huge economic investment of C-Band earth stations and the critical services provided by such operations.

Unfortunately, the interests of satellite operators often conflict with the interests of their customers. The lack of opportunity for earth station operators to have a voice in the transition or cost recovery process is especially concerning seeing as their services would be the most impacted by the proposed potential modifications to the C-Band. Therefore, if the Commission moves forward with either of its proposed transition mechanisms, earth station operators must be provided with the opportunity to effectively participate in the process and impact the outcome of

⁴¹ NPRM ¶ 66.

⁴² *Id.* ¶¶ 98-110.

any transition. With the market-based approach, this could include earth station operator representation in any consortium-based Transition Facilitator, which would ensure a say in negotiations with terrestrial wireless parties.⁴³ With respect to any of the auction approaches discussed in the NPRM, earth station operators could be afforded the opportunity to participate directly in the auction, rather than having to rely on satellite operators for decisions involving spectrum relinquishment.⁴⁴ Providing earth station operators with the opportunity to affect the outcome of either mechanism is an effective way to ensure that their interests are represented to better protect the future of incumbent FSS operations.

This band should not be turned into a financial transaction between the satellite carriers and the wireless industry without representation or remuneration for the earth station customers that lack other viable alternatives. If that is the case, all of the tens of thousands of earth stations in this band may quickly fade to black. Accordingly, the Commission must ensure that all parties are represented at the table for any negotiations regarding this band.

B. A Sufficient Timeframe Must Be Provided For the Relocation of Earth Station Operations, Particularly Those in Rural and Remote Areas

In the event that the FCC takes steps to remove or relocate incumbent FSS operations, such operations, particularly those in rural and remote areas, must be afforded a sufficient amount of time to relocate their services. As the NPRM explains, Intel, Intelsat and SES suggest clearing the band would take at least 12-20 months (in addition to several other benchmarks prior

⁴³ See *id.* ¶ 74. In addition, there are a number of aspects surrounding the proposed formation of the Transition Facilitator that should be modified to increase transparency and reflect diverse interests, including, but not limited to, seeking comment on a detailed transition plan prepared by the Transition Facilitator so that impacted parties are not only aware of next steps, but are afforded the opportunity to further shape the transition plan. GCI also agrees that license authorization should be conditioned on the licensee refraining from commencing operations until protections for incumbents have been put in place. See *id.* ¶ 90.

⁴⁴ See *id.* ¶¶ 98-110.

to arriving at that point).⁴⁵ GCI's experience shows that such an undertaking would take significantly longer in a rural and remote area such as Alaska. Specifically, GCI suggests that in the event some or all of the C-Band is to be cleared and incumbent FSS operators are to be relocated, at least five years should be afforded to rural FSS operators for the transition period. A longer timeframe is necessary for rural areas to plan for other spectrum capacity, develop and fund earth station migration strategies and to construct the infrastructure to clear or reduce the C-band presence. In some scenarios proposed in the NPRM, additional earth stations may be required to access new space segment capacity launched which is an expensive and logistically complex process in Alaska. Moreover, as the FCC recognizes, "the opportunity cost of clearing less flexible-use spectrum is relatively low" in rural areas,⁴⁶ and therefore the demand will likely not be as urgent as in the urban counterparts, further supporting an increased transition timeframe in these areas. As noted throughout this pleading, it is unclear at this time how GCI and others in extremely rural areas would be able to replicate C-Band services in another band or location. Indeed, GCI's use of the C-Band is a result of the inability to use other cost-effective options with comparable performance – many of which are suggested by the NPRM. Thus, GCI and other rural providers must be given the time necessary to come up with potential creative alternatives. The time needed for such a process is variable, and should be dictated by the ability of C-Band providers to replicate services in a manner transparent to their end customers; not an arbitrary deadline set in advance by the FCC.

⁴⁵ *Id.* ¶ 92.

⁴⁶ *Id.* ¶ 64.

C. Adequate Compensation of All Costs Associated with Relocation Must be Provided to Earth Station Operators

Moreover, if the FCC decides to move forward with its proposals, adequate compensation must be provided to earth station operators to cover all costs and related impacts associated with transitioning some or all of the band to terrestrial operations and ensure that these operators are “made whole” again.⁴⁷ Earth station operators, some of which have been operating on this band for decades (such as GCI), must be fully compensated for any relocation of their services – ensuring that these operators are not forced to pay out of pocket for any funds resulting from actions taken in this proceeding that are outside of their control.

GCI has been operating on the C-Band for over 35 years, and has invested significant resources (over \$100 million) in developing and deploying its FSS services over this band– with the investment of these resources premised on continued access to this spectrum. GCI’s decades of business plans and investments have resulted in over 130 C-Band antennas in Alaska, ranging from hub sites in large cities like Anchorage and Fairbanks to small, remote islands such as Atka and Nikolski.

Accordingly, operators like GCI deserve a guarantee that, in the event the FCC transitions some or all of the band to terrestrial operations, FSS operators would be able to continue provide their same services, or if required to relocate or transition, would be fully reimbursed for all incurred costs as well as reimbursed for the loss of their investment. GCI envisions that such compensation could include, but not be limited to, equipment and installation costs; research and development for potential alternatives; increased operating expenses as a

⁴⁷ See *id.* ¶ 65.

result of more remote C-Band equipment;⁴⁸ replacement earth station antennas; associated installation and structural support; and any other cost that is a direct result of action taken by the FCC in this proceeding. Moreover, additional costs may arise if the FCC elects to transition C-Band services entirely onto alternative transmission options, including actual technology transition costs and costs associated with deploying new technologies; increased costs due to limited available C-Band capacity; and costs associated with acquiring redundant services to act as a back-up to ensure comparable reliability to the C-Band.

In addition to the “business as usual” costs associated with clearing the band, there is also a significant business impact that should be addressed through compensation. Namely, removing resources from new revenue generating projects and consideration for compensation associated with disrupting customers and resources. Without adequate compensation reflecting the actual costs as well as decades-old investments, FSS earth station operators may not be able to continue to provide important and critical services to their customers and the community at large.

V. ALLOWING FIXED SERVICES ON THE C-BAND WILL RESULT IN CATASTROPHIC INTERFERENCE TO FSS OPERATIONS AND THEREFORE THE BAC PROPOSAL SHOULD BE REJECTED

The NPRM also seeks comment on authorizing and facilitating the deployment of licensed point-to-multipoint (“P2MP”) fixed broadband service in the 3.7 GHz Band. Regardless of the FCC’s decision concerning mobile operations, GCI urges the FCC to refrain from adopting rule changes to allow *any* P2MP fixed service (“FS”) use of the C-Band.⁴⁹ The basis of the FCC’s proposal stems from a 2017 Petition filed by the Broadband Access Coalition’s

⁴⁸ Indeed, if the FCC adopts its proposal to move C-Band operations to more rural and remote areas, rather than urban areas, the FCC would also need to account for – and reimburse – the increased operating costs associated with keeping satellites in operation for those limited areas.

⁴⁹ See NPRM ¶ 116.

(“BAC” or the “Coalition”) (the “BAC Proposal” or the “BAC Petition”).⁵⁰ As GCI previously explained to the Commission, it has serious concerns about the BAC Proposal and the impact on FSS operations and reiterates that it should be rejected.⁵¹ GCI agrees with the FCC’s assessment that co-channel sharing between FSS and mobile operations would result in significant harmful interference risks to FSS and would likely exclude a majority of the population from receiving wireless backhaul services as well.⁵²

As an initial matter, it will be extremely difficult, if not impossible, to protect incumbent FSS operations in the C-Band from P2MP FS.⁵³ Coexistence between the two services is problematic due in large part to the fact that the received signal level (“RSL”) at the satellite antenna is extremely small. It is so small that very sensitive low-noise amplifiers (“LNAs”) are required to recover the signal and discriminate it from the thermal noise floor. However, the presence of even small amounts of external, intentional radiator energy can easily overwhelm the input signal limits of an LNA and saturate it.⁵⁴ In short: even the smallest levels of interference could be harmful to the provision of services over the C-Band. GCI requires clear, unobstructed access to/from the target satellite in order to achieve reliable operation of circuits delivered via satellite. Alternatively, if saturation of the input does not occur, the presence of interference

⁵⁰ Petition for Rulemaking, Broadband Access Coalition, RM-11791 (filed June 21, 2017) (“BAC Petition”); *see also* NPRM ¶ 116.

⁵¹ *See generally* GCI BAC Comments.

⁵² *See* NPRM ¶ 52.

⁵³ *See id.* ¶ 121.

⁵⁴ Received signals from geostationary satellites are dramatically lower than those observed in terrestrial microwave solutions. This requires the use of ultra-sensitive low noise amplifier components in order to overcome thermal noise. The presence of intentional, in-band interferers can easily swamp the input power threshold of an LNA.

increases the noise density and causes a degradation of the signal quality, rendering the signal unrecoverable.

Once interference occurs, the mitigation of that interference can become very difficult to realize because multiple transmitters could operate in the same region, with spectrum re-use. Service affecting interference events occur in existing satellite networks as new antennas come into networks or fall out of performance specifications. Under those conditions, identifying the source of the interference, particularly if the operation is intermittent or time-of-day specific, can take days or weeks, and requires expensive, complex triangulation systems. Such an occurrence can cripple the critical services already being provided in the band.

In addition, the power levels that were proposed in the BAC Petition, and are currently being examined under the NPRM, are not to be considered “low power” despite the Coalition’s categorization of them as such. For instance, the BAC Petition proposes a maximum EIRP of 50 dBm for licensed P2MP operations, and a maximum conducted power of 1 Watt.⁵⁵ The proposed increase from 36 dBm is a 25x power increase and is a 100W power output; this is not “low power.” Furthermore, the Coalition’s proposal to conduct in-band operations (along C-Band receive carriers) with no offered modifications to the existing Part 101 out of band emission (“OOBE”) limits may not be adequate to protect the receive signals for adjacent channels, particularly at the higher output levels of 50 dBm.⁵⁶

Moreover, while GCI recognizes the Commission’s mission to take action in order to secure the United States as a leader of 5G technology, introducing fixed services into the C-Band is not the way to meet this goal. In fact, the need for new P2MP spectrum was vastly inflated in the BAC Petition. For instance, the Coalition argued that making additional spectrum available

⁵⁵ BAC Petition at 30; *see also* NPRM ¶ 125.

⁵⁶ *See* NPRM ¶ 125.

is “essential” to provide a cost-effective solution “in areas where the costs to deploy fiber-to-the-home (“FTTH”) technology are prohibitive.”⁵⁷ The BAC Petition, however, failed to consider that Viasat-1 (Ka-band) has proven this statement to be incorrect. Viasat delivers high-speed Internet directly to consumers at high usage allowance and information rates at competitive prices.⁵⁸ Further, the BAC Petition also minimized the spectrum available in other bands that is, or will be, available for the provision of the exact same type of services that the Petition suggested providing, such as the 3.5 GHz band. Therefore, the FCC should take a closer look at the FS community’s proclaimed need for access to the C-Band, and other available options before acting on the BAC Proposal.

VI. THE FCC SHOULD REJECT PROPOSALS THAT WILL INCREASE UNNECESSARY ADMINISTRATIVE BURDENS ON FSS EARTH STATION OPERATORS

Finally, the FCC should refrain from adopting additional information collections that would increase burdens on FSS operators, as doing so diverts resources from providing critical and important services to consumers. For instance, the NPRM seeks comment on whether to require periodic certifications to the FCC regarding the continued accuracy of FCC C-Band information on file, or whether it should delete from licenses or registrations frequencies that are unused for more than 180 days.⁵⁹ The NPRM also proposes to require FSS earth station operators to submit additional information on their existing facilities, notably more granular azimuth and elevation information (rather than providing eastern and western limits associated

⁵⁷ BAC Petition at 3.

⁵⁸ See *Announcing Exede(sm) by ViaSat 12 Mbps High-Speed Broadband Service for \$50*, VIASAT.COM, <https://www.viasat.com/news/announcing-exedesm-viasat-12-mbps-high-speed-broadband-service-for-50> (last visited Oct. 29, 2018); see also *High-Capacity Satellite System: Transforming Satellite Broadband*, VIASAT.COM, <https://www.viasat.com/products/high-capacity-satellites> (last visited Oct. 29, 2018).

⁵⁹ NPRM ¶¶ 35-36.

with the geostationary arc).⁶⁰ As an initial matter, FSS operators should not be required to report or monitor activity beyond what is asked of other licensees. There is no justification in the record for imposing this unique, burdensome treatment.⁶¹ Furthermore, requiring additional granular information (such as the specific azimuth and elevation data) would be an entirely new requirement for earth station operators. Under the current rules, earth station operators may select an all-encompassing “permitted list” on the FCC registration form (Form 312), rather than provide information focused on one specific satellite that it intends to use. This system was designed to authorize the earth station to receive transmissions from all U.S.-licensed and foreign-licensed C-band satellites authorized to serve the U.S. that are within the satellite coordination arc. Therefore, the proposed requirement to identify the specific satellite with which the earth station intends to communicate would constitute a new burden. The heavy burden placed on earth station operators to gather, prepare, file, monitor and update its relevant information as proposed in the NPRM outweighs any potential benefits of providing this information to the FCC. Further requiring additional filings from FSS earth stations only will increase the burdens on these operators, diverting resources from the provision of service, and ultimately impacting the future of such services.

VII. CONCLUSION

FSS operators such as GCI have relied upon unencumbered access to the entire 500 MHz offered in the 3.7-4.2 GHz band for many years in order to provide critical, reliable services to customers in remote or rural areas. Modifying the current 3.7 GHz landscape by introducing commercial wireless services without additional protections and an unclear compensation and

⁶⁰ *Id.* ¶ 41.

⁶¹ Indeed, the satellite industry has successfully operated under the Part 25 rules without certifications for many years. Moreover, requiring a certification of license accuracy is redundant, as the license is already required to be accurate as dictated by the FCC’s rules.

remuneration model would severely impact GCI's FSS operations, and the rural end user consumers, schools and health clinics that rely on them the most. Accordingly, in the event that a market-based or auction solution is adopted for the 3.7 GHz Band, the significant critical incumbent uses in these bands must be recognized and suitable protections for these services must be incorporated in any future framework. Moreover, the FCC should reject proposals to introduce P2MP FS to the C-Band due to catastrophic interference concerns, and should also reject proposals that would increase administrative burdens on C-Band operators, without any justifiable benefit.

Respectfully submitted,

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