

**Before the
Federal Communications Commission
Washington, DC 20554**

In the Matter of)	
)	
Expanding Flexible Use of the 3.7 to 4.2 GHz Band)	GN Docket No. 18-122
)	
Expanding Flexible Use in Mid-Band Spectrum Between 3.7 and 24 GHz)	GN Docket No. 17-183 (Inquiry Terminated as to 3.7-4.2 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)	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 AVIATION SPECTRUM RESOURCES, INC.**

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OF AVIATION SPECTRUM RESOURCES, INC.**

Aviation Spectrum Resources, Inc. (“ASRI”), by its attorneys, hereby files its reply comments in the above-referenced proceeding.

I. INTRODUCTION AND SUMMARY

Any actions that the Commission might take to change the framework under which access to the C-Band (3.7-4.2 GHz) is managed must take full stock of incumbent aviation operations and satellite communications (“SATCOM”) and ensure that they are protected. Of primary concern to the majority of aviation operators is protecting the continued performance of radio altimeters. Radio altimeters are ubiquitously deployed across commercial and private aircraft and provide critical operating altitude measurements for navigation safety, particularly at

night, during bad weather, and other conditions involving poor visibility.¹ It is absolutely essential for aviation safety that the Commission study the extent to which new services would pose threats of harmful interference to these critical existing adjacent band applications before adopting any new rules in the C-Band. The Commission should stand by its commitments in the NPRM to protect incumbent services should it introduce new services into the C-Band, and final rules should allow for growth and innovation in radio altimeters.²

Of further concern to aviation operators are adequate protections for Wireless Avionics Intra-Communications (“WAIC”) and C-Band SATCOM. The new WAIC aviation system will support aircraft communications and contribute materially to safe and reliable aircraft operations. WAIC will depend upon continued access to the only frequencies set aside for it, the Aeronautical Mobile (R) Service (“AM(R)S”) spectrum at 4.2-4.4 GHz. In addition, aviation is just one of several industries that relies on C-Band SATCOM, as explained in the comments of ASRI and others.³ C-Band SATCOM continues to play an important role for safe aviation,

¹ As Boeing notes, radio altimeters are “critical to many aircraft functions, including precision approach, landing, ground proximity, and collision avoidance” and “during automated approaches and landings.” Comments of the Boeing Company, GN Docket No. 18-122, *et al.*, at 3 (Oct. 29, 2018) (“Boeing Comments”). Radio altimeters also are often connected to the Traffic Collision-Avoidance System (“TCAS”) and Automatic Dependent Surveillance-Broadcast (“ADS-B”) System, which monitor airspace around an aircraft and provides warnings of potential mid-air collision threats. *Id.* In many aircraft, as well, as AIA and GAMA note, radio altimeters are directly connected to the Ground Proximity Warning System (“GPWS”), which provides warnings if the aircraft is too low or descending too quickly. Comments of Aerospace Industries Association and the General Aviation Manufacturers Association, GN Docket No. 18-122, at 2 (Oct. 29, 2018) (“AIA/GAMA Comments”). Because they operate by reflecting signals off of the ground, radio altimeters are potentially susceptible to ground-sourced interference from in-band and adjacent band transmissions. *See* Boeing Comments at 3-4.

² *Expanding Flexible Use of the 3.7 to 4.2 GHz Band*, GN Docket No 18-122, *et al.*, Order and Notice of Proposed Rulemaking, FCC 18-91, ¶¶ 27-29 (July 13, 2018) (“NPRM”).

³ *See* Comments of Aviation Spectrum Resources, Inc., GN Docket No. 18-122, *et al.*, at 2-3 (Oct. 29, 2018) (“ASRI Comments”). Comcast and ACA, for example, also note the importance of C-Band SATCOM for distribution of video content. *See* Comments of Comcast Corporation and NBCUniversal Media, LLC, GN Docket No. 18-122, *et al.*, at i, 3-4 (Oct. 29,

supporting the backhaul of aviation data from remote sites and serving as a back-up link for weather data (e.g., NOAAPort signals) supporting aircraft while in flight over and near the United States.⁴ The Commission must ensure that WAIC, SATCOM, and satellite telemetry operations in and near the C-Band are protected and are able to support growth and innovation as it considers new entrants into parts of the C-Band.

Further, the Commission should promptly lift the freeze on applications for new and modified C-Band earth stations and take steps to ensure that the full-band, full-arc policy remains in place as part of any final rules, so as to support efficient, responsive SATCOM services that meet the needs of aviation and other industry sectors.⁵

II. IT IS PARAMOUNT THAT ANY NEW SERVICES MUST PROTECT RADIO ALTIMETERS OPERATING IN 4.2-4.4 GHz

The record strongly supports the Commission refraining from action that would risk causing harmful interference to highly-critical aeronautical safety services in the adjacent 4.2-4.4 GHz aeronautical radionavigation service allocation. Radio altimeter operations, important for all aviation, are especially vital for helicopters which have a variety of missions that involve operations at low altitudes, often over uneven terrain, in a variety of environments.⁶ The radio

2018) (explaining that C-Band spectrum is particularly suited for transmitting video from studios to distribution centers, as well as for remote newsgathering operations) (“Comcast Comments”); Comments of the American Cable Association, GN Docket No. 18-122, *et al.*, at 2 (Oct. 29, 2018) (“The C-band is the heaviest used medium for backhaul delivery of video to the systems of MVPDs, as well as to broadcast stations and other users.”) (“ACA Comments”).

⁴ Ensuring redundancy and path diversity for critical aviation safety-related services is consistent with longstanding Commission policy.

⁵ See *Temporary Freeze on Applications for New or Modified Fixed Satellite Service Earth Stations and Fixed Microwave Stations in the 3.7-4.2 GHz Band*, GN Docket Nos. 17-183, 18-122, Public Notice, 33 FCC Rcd 3841 (IB/PSHSB/WTB 2018).

⁶ See Comments of Garmin International, Inc., GN Docket No. 18-122, *et al.*, at 6-7 (Oct. 29, 2018) (explaining that radio altimeters are now mandatory safety-of-life equipment for

altimeters are the only mechanism for providing accurate altitude measurements at all times during flight and have significantly improved aviation safety since their widespread implementation on aircraft beginning in the 1970s. Without a functioning radio altimeter to provide accurate vertical position and obstacle avoidance information, aircraft will not be able to fly in all-weather conditions, certain approaches, or even at night. It goes without saying that the impairment of these functions would seriously threaten commercial and private aviation safety across the United States for both domestic and international aviation operators.

In describing their function, Boeing notes that radio altimeters utilize relatively low power levels and must operate across the entire 4200-4400 MHz bandwidth to generate accurate results for the landing of aircraft.⁷ This need creates the risk that terrestrial radio transmitters operating near the upper edge of the C-Band could overpower relatively weak reflected radio altimeter signals leading to false readings of an aircraft's altitude above terrain.⁸ Garmin explained in its comments that harmful interference from a single ground station in the adjacent 3.7-4.2 GHz band may affect a radio altimeter – and thus aviation safety – even at a distance of several kilometers – despite the fact that radio altimeters are equipped with band pass filters to protect against overload interference from adjacent-band signals.⁹ The proponents of introducing

helicopter operations and support critical situational awareness during helicopter hover and landing) (“Garmin Comments”).

⁷ Boeing Comments at 3-4. The altitude data that radio altimeters produce are directly related to the total bandwidth of the radio altimeter signal. *See id.* at 4 (citing Operational and Technical Characteristics and Protection Criteria of Radio Altimeters Utilizing the Band 4 200-4 400, ITU-R Recommendation M.2059-0, at 11 (Feb. 2014)); *see also* Garmin Comments at 8 (explaining the need for radio altimeters to use the entire 200 megahertz of the 4.2-4.4 GHz band).

⁸ *See* Comments of Boeing at 3-4; *see also* ASRI Comments at 5-6.

⁹ Garmin Comments at 10. Garmin also notes the potential for aggregate interference into the 4.2-4.4 GHz band from prospective new services at the upper edge of the 3.7-4.2 GHz band. *Id.* at 10-11.

new services into the C-Band have not adequately addressed the potential for radio altimeter interference, to the extent they address it at all.¹⁰

Consequently, a proper assessment of harmful adjacent band interference to radio altimeters must be completed to protect aviation safety prior to the introduction of new services. The aviation industry has already begun this work with efforts by the Aviation Vehicle System Institute (“AVSI”) to test the RF performance of existing avionics, with results expected to be complete by the end of 2018. These results should be taken up by the Commission for assessment against 5G services providers seeking to deploy in the C-Band in close consultation with the Federal Aviation Administration.¹¹ ASRI and the involved aviation/aerospace organizations will ensure the relevant information is made available once AVSI testing has been completed and the results are reviewed and compiled.

¹⁰ See Comments of Lockheed Martin Corporation, GN Docket No. 18-122, *et al.*, at 3 (Oct. 29, 2018) (“Lockheed Martin Comments”) (raising concerns that there has been no meaningful consideration of protecting radio altimeter operations in the 4.2-4.4 GHz band by new operations in the 3.7-4.2 GHz band). Although T-Mobile contends that “[n]o additional protection is required for adjacent band operations,” it acknowledges “the Commission may wish to continue to study whether terrestrial wireless services would interfere with [WAIC] and radio altimeter operations in the 4.2-4.4 GHz band” to develop a framework to ensure their safe operation, albeit T-Mobile inexplicably would impose the burden on these aviation systems to “recogniz[e] the potential for adjacent channel operations.” See Comments of T-Mobile USA, Inc., GN Docket No. 18-122, *et al.*, at 33 (Oct. 29, 2018). The Commission should not, as T-Mobile appears to suggest, subjugate the safe and reliable operation of aviation systems in the adjacent 4.2-4.4 GHz band to the introduction of new broadband systems in the subjacent C-Band. Instead, the Commission should pursue a balanced approach that requires new entrants in adjacent bands to demonstrate protection of existing services preceding them in nearby spectrum.

¹¹ Accord AIA/GAMA Comments at 4. See Garmin Comments at 9-10 (describing the AVSI testing).

III. SIMILARLY, WAIC MUST BE PROTECTED FROM ADJACENT BAND INTERFERENCE

Although WAIC systems are relatively new, they operate in an established international AM(R)S allocation at 4.2-4.4 GHz which has been adopted by the United States following a WRC-15 decision designating the band for WAIC. Developers, manufacturers, and aviation operators are relying on the allocation for implementation of WAIC applications which will enhance safe flight operations. As Boeing explained in its comments, “WAIC systems require access to the entire 4.2-4.4 GHz band to accommodate the monitoring and data transfer requirements of modern aircraft.”¹²

The 4.2-4.4 GHz band was seen as advantageous for developing WAIC systems because, at the time the allocation was made, “this spectrum [was] already allocated for aeronautical safety services and the spectrum ha[d] no adjacency issues” from devices passengers typically take on aircraft or from satellite services in the 3.7-4.2 GHz band.¹³ The AM(R)S allocation at 4.2-4.4 GHz is the only spectrum allowed for WAIC and was deliberately engineered to ensure aviation makes efficient and safe use of existing aeronautical safety allocations, *i.e.*, the spectrum designated for radio altimeters.¹⁴ The prospective introduction of new, higher-powered fixed or mobile systems operating in the 3.7-4.2 GHz band, especially in the upper portions of the band, however, could cause substantial interference to WAIC systems operating just above 4200 MHz

¹² Boeing Comments at 5.

¹³ AIA/GAMA Comments at 3.

¹⁴ ITU-R Radio Regulation 5.436 (use of 4200-4400 MHz by AM(R)S stations is reserved for WAIC systems operating in accordance with recognized international aeronautical standards). Radio Regulation 5.436 was adopted at the 2015 World Radiocommunication Conference, WRC-15 (AI 1.17). Final Acts WRC-15, at 30 (2015). WAIC systems and radio altimeters, both low power systems, can naturally share the 4.2-4.4 GHz band, mutually taking advantage of their different operating environments – inside and outside the aircraft, respectively. *See* Boeing Comments at 5-6.

unless adequate out-of-band-emission protections are implemented. Thus, any rules permitting flexible mobile or other new services (point-to-multipoint, for example) in the subjacent C-Band must incorporate an appropriate framework that protects existing and planned expanded WAIC operations. This matter requires more attention from the proponents of the prospective new services than has occurred to date and before the Commission can be in a position to make an informed and sound decision regarding future use of the C-Band.¹⁵

IV. C-BAND SATCOM MUST BE PROTECTED AND ALLOWED TO GROW

As explained in ASRI's comments and confirmed by the comments of others, aviation is just one of several industries that relies on C-Band SATCOM.¹⁶ Other industry sectors heavily dependent on C-Band SATCOM include video content distribution,¹⁷ audio broadcasting,¹⁸ and journalism.¹⁹ Underscoring the ubiquitous importance of C-Band SATCOM is the fact that more

¹⁵ As noted above, in response to T-Mobile's cavalier assertion that operators of WAIC systems and radio altimeters in existing and utilized spectrum designations bear the burden of ensuring their own protection from new entrants in adjacent bands, the Commission should adopt a balanced spectrum management framework that recognizes that new entrants bear the primary burden to show compatibility among co-primary services. *See supra* note 10.

¹⁶ *See, e.g.*, Lockheed Martin Comments at 9-10; Boeing Comments at 6-8; AIA/GAMA Comments at 2-3.

¹⁷ *See, e.g.*, Comcast Comments at 5-11; Comments of NCTA – The Internet & Television Association, GN Docket No. 18-122, *et al.*, at 3-6 (Oct. 29, 2018) (“NCTA Comments”); Comments of the Local Broadcasters, GN Docket Nos. 18-122, 17-183, at 3-4 (Oct. 29, 2018); Comments of Digital Networks, LLC, GN Docket No. 18-122, *et al.*, at 2-3 (Oct. 29, 2018) (“Digital Networks Comments”).

¹⁸ *See, e.g.*, Comments of National Public Radio, Inc., GN Docket No. 18-122, at 3-9 (Oct. 29, 2018) (stating that public radio service is possible only because of C-Band spectrum) (“NPR Comments”); Comments of the National Association of Broadcasters, GN Docket No. 18-122, *et al.*, at 3-6 (Oct. 29, 2018) (stressing the importance of C-Band SATCOM for both audio and video broadcasting content distribution) (“NAB Comments”).

¹⁹ *See* Comcast Comments at i, 3-4 (explaining that C-Band spectrum is particularly suited for remote newsgathering operations). *Accord* Comments of the American Cable Association at 2.

than 15,000 earth stations in operation as of April 19, 2018, were registered during the recent filing window permitted by the Commission, which closed on October 31.²⁰

Numerous commenters confirm why C-Band SATCOM operations cannot effectively be replaced by SATCOM operations in other bands – such as the Ku- or Ka-bands – or through other means such as fiber.²¹ The record demonstrates that C-Band SATCOM provides a high-level of availability for critical aviation use that cannot be matched by Ku-band or other higher-band satellite networks.²² Boeing explains that C-Band SATCOM, unlike higher-band satellite applications, is more reliable in adverse weather conditions that can compromise aviation safety and provides dependable connectivity to airports in remote locations where terrestrial fiber technologies may not be available.²³ There is no assurance that fiber will be available where needed, despite the hopeful but unsupported assertions of some commenters.²⁴

²⁰ See Matt Daneman, “C-Band Earth Station Registration Done, Late Disclosure Sought by Stakeholders,” *Communications Daily* (Nov. 29, 2018).

²¹ See, e.g., Comcast Comments at 20-22 (C-Band spectrum possesses uniquely advantageous technical characteristics that cannot be replaced by satellites in other bands or by fiber); Digital Networks Comments at 2-3 (the availability of programming on the satellite Ku-band is limited due to the capacity and cost of Ku-band space segments, and the higher frequencies of the Ku-band can be impacted by weather, specifically rain fade and snowfall); Letter from Paul Jamieson, Vice President, Government Affairs & Policy, Altice USA, Inc., to Marlene H. Dortch, Secretary, Federal Communications Commission, GN Docket No. 18-122, *et al.*, at 2-3 (Oct. 29, 2018) (alternatives to use of C-Band spectrum may not be viable, especially in smaller, rural markets); Comments of World Teleport Association, GN Docket No. 18-122, at 2 (Oct. 29, 2018) (“C-band offers reliability, quality, and cost efficiency that cannot be matched by other technologies or in other satellite spectrum.”).

²² See, e.g., Lockheed Martin Comments at 10, n. 17 (“[T]here is no substitute for C-band in terms of critical services to aviation.”); AIA/GAMA Comments at 2-3 (noting “high availability and superior qualities during weather issues” of C-Band spectrum); Boeing Comments at 6-8 (stating C-Band spectrum provides “very high availability and reliability” compared to other solutions).

²³ See Boeing Comments at 6-7.

²⁴ See Comments of CTIA, GN Docket No. 18-122, *et al.*, at 17-18 (Oct. 29, 2018). Comcast notes that, for content delivery applications, “fiber cannot accommodate itinerant uses,

Indeed, as the foregoing shows, the very reasons that Qualcomm contends that the C-Band is suitable for new 5G operations are the reasons why SATCOM in the C-Band is vital for aviation and other purposes and cannot be replaced by Ku/Ka-band SATCOM or ground-based wireline infrastructure.²⁵ Qualcomm claims that 5G services need additional licensed mid-band spectrum because it supports very good availability, is well suited for rural area coverage, and provides a guaranteed quality of service.²⁶ C-Band SATCOM, an *existing* service, benefits from C-Band spectrum in virtually identical ways. But perhaps more importantly, use of the C-Band for SATCOM is unique whereas, as Comcast observes, the commercial mobile industry has other mid-band spectrum available to it – *e.g.*, in the 3.5 GHz band and the advanced wireless services bands as well as low and high-band spectrum that, depending on which band is being discussed, will soon be made available or has not, to date, been fully utilized by the mobile licensees.²⁷

Further, there are critical satellite telemetry operations in and around the 3.7-4.2 GHz band which must be protected by any new entrants the Commission allows into the band. Inmarsat uses frequencies in the upper portion of the spectrum under consideration, specifically the 4198-4200 MHz range, for emergency tracking, telemetry, and command (“TT&C”) operations on its Inmarsat-5 satellites on a global basis.²⁸ Similarly, as Lockheed Martin notes,

these feeds almost always must do without a secondary, redundant feed.” Comcast Comments at 22.

²⁵ See, *e.g.*, Comments of Qualcomm Incorporated, GN Docket No. 18-122, *et al.*, at 3-5 (Oct. 29, 2018).

²⁶ *Id.*

²⁷ See Comcast Comments at 29-30.

²⁸ See Comments of Inmarsat, GN Docket No. 18-122, *et al.*, at 4-5 (Oct. 29, 2018). The Inmarsat-5 satellites provide critical SATCOM services to aviation with links in Inmarsat’s L-Band spectrum. *Id.* Inmarsat also explained in its comments that it conducts TT&C operations in the space-to-Earth direction for the Inmarsat-3 and -4 satellites in the 3945-3955 MHz range at earth stations in Hawaii. *Id.* at 4.

many C-Band satellite networks around the world have telemetry links within approximately 30 megahertz below 3700 MHz for use during orbit-raising and launch and early orbit phase operations.²⁹ Notably, these links are already protected *in-band* as part of the 3.5 GHz band regulatory framework.

V. THE REQUIREMENTS OF THE PUTATIVE NEW ENTRANTS FOR ACCESS TO THE C-BAND AT THE EXPENSE OF INCUMBENTS HAVE NOT BEEN ESTABLISHED

ASRI does not question that deployment of 5G may require additional spectrum for the commercial mobile and fixed services industries, or that services taking advantage of newly-developed, next-generation standards may bring new applications and benefits. But the Commission should adopt a balanced and measured approach when considering the repurposing of spectrum, such as the C-Band, for mobile or other new uses when it will involve disrupting existing incumbent uses, such as SATCOM and supporting telemetry applications. This is particularly true when the demand for the new services is simply assumed and not demonstrated.

As Comcast pointedly observes in its comments, “whether there is a hyper demand for 5G spectrum justifying such a scheme [as reconfiguring the 3.7-4.2 GHz band] remains to be seen.”³⁰ Comcast goes on to note that “bidding by only one major mobile wireless carrier [in the recently concluded 600 MHz auction] bel[ies] any suggestion of ravenous demand” and “there remains a significant amount of AWS-4, 700 MHz E Block, and H Block spectrum currently going unused,” while “the Commission is well on its way to making available significant

²⁹ Lockheed Martin Comments at 8.

³⁰ Comcast Comments at 29.

amounts of high- and mid-band spectrum for 5G in the near future” in the 3.5 GHz and millimeter wave bands.³¹

A balanced spectrum management policy, as called for by the President’s October 25, 2018, Memorandum on developing a National Spectrum Strategy, counsels against a headlong rush into a wholesale reconfiguration of the C-Band.³² Consequently, the Commission should require a firmer demonstration of need from would-be new entrants before disrupting existing C-Band spectrum users that do not have a comparably suitable home.

VI. THE COMMISSION SHOULD LIFT THE FREEZE ON FIXED SATELLITE SERVICE APPLICATIONS AS SOON AS POSSIBLE AND AFFIRM ITS FULL-BAND, FULL-ARC POLICIES

ASRI agrees with the Satellite Industry Association (“SIA”) and those many other commenters that urge the Commission, as soon as practicable, to lift the freeze on new and modified earth station and space station applications that it imposed in April of this year.³³ Earth station operators require the flexibility to modify their stations and to deploy them in new locations as circumstances change. Any modified framework for the 3.7-4.2 GHz band that the Commission adopts which purports to protect incumbent earth stations operations should fully take into account these needs. Accordingly, not only is there scant reason to retain the freeze on a permanent basis, the public interest demands that it be lifted expeditiously. Otherwise, any

³¹ *Id.* at 30.

³² Presidential Memorandum on Developing a Sustainable Spectrum Strategy for America’s Future, Memorandum for the Heads of Executive Departments and Agencies, Section 1 (Oct. 25, 2018).

³³ *See* Comments of the Satellite Industry Association, GN Docket No. 18-122, *et al.*, at 30 (Oct. 29, 2018) (“SIA Comments”); *see also* Boeing Comments at 7; Comcast Comments at 32-35; NAB Comments at 13; NCTA Comments at 24-28; NPR Comments at 7-8.

other steps intended to protect fixed satellite service operations may, as a practical matter in many cases over time, amount to an empty gesture.

Consistent with a prompt lifting of the application freeze, users of SATCOM must be given an adequate transition period within the C-Band should the band be reconfigured. The transition in any final rules permitting new C-Band services and requiring SATCOM to use less of the C-Band must be fair and reasonable, taking into account the real needs of existing SATCOM users and the likelihood that it will be some time before any new entrants access any C-Band spectrum made available to them.

In addition, the Commission must permit SATCOM operators and users full use of the C-Band spectrum that remains available to them under any new framework. The Commission's long-standing policy of full-band, full-arc protection of C-Band earth stations should continue both now and within any modified 3.7-4.2 GHz band regulatory framework that is adopted to the same extent it permits continued SATCOM operations. The full-band, full-arc policy is an integral part of protecting existing SATCOM services in the band. As SIA notes, the policy "enables satellite operators to efficiently manage their networks to address interference and respond to customer demand" as well as serve "critical public interest objectives by allowing customers to immediately restore service following a space segment outage, benefit from competitive forces, and make opportunistic use of available capacity."³⁴ Accordingly, ASRI joins those parties that urge the Commission to retain this policy,³⁵ which will have increasing importance in the event the Commission reduces the amount of spectrum for C-Band SATCOM operations in this proceeding.

³⁴ See SIA Comments at iii.

³⁵ See *id.* at 21-24; see also Boeing Comments at 7; Comcast Comments at 32-35; NAB Comments at 13; NCTA Comments at 24-28; NPR Comments at 7-8.

VII. CONCLUSION

As the record developed thus far in this proceeding amply demonstrates, spectrum immediately adjacent to the 3.7-4.2 GHz band remains essential for critical aviation applications such as radio altimeters and WAIC. Moreover, the C-Band itself is singularly suited for effective SATCOM applications like those in use today serving the aviation industry. Properly protecting these important existing spectrum uses, as the Commission stated in the NPRM is its plan, imposes certain threshold requirements under a balanced spectrum management policy on the consideration of introducing flexible mobile use or new point-to-multipoint services in the 3.7-4.2 GHz range, *and where in the band such applications should be located*. The Commission should make a deliberate and careful assessment to ensure that whatever framework it adopts protects adjacent band radio altimeter operations, as well as WAIC applications, existing C-Band SATCOM, and associated satellite telemetry operations. Any final rules must be based on a strong foundation of interference analysis, and testing where appropriate, so as to ensure that the protection is adequate. Such analysis and testing are still to be completed or even, in some cases, commenced. Only in this way can the Commission take appropriate and

effective measures to protect against potential loss of life for both domestic and international users of aviation safety systems that rely on operations in and near the C-Band.

Respectfully submitted,

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