Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

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

COMMENTS OF THE NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION

As the President's principal advisor on communications policies, the National Telecommunications and Information Administration (NTIA) respectfully submits these comments on behalf of the Executive Branch.[1] NTIA appreciates the Commission's issuance of the Notice of Inquiry (Notice) in the above-captioned docket.[2] The Notice comes at a crucial time for solidifying U.S. leadership in spectrum optimization and commercial innovation, as laid out by the Trump administration.

While the Upper C-band has no federal allocations, there are important federal uses both in the band and in the adjacent band. To make spectrum available in the band for new services, the Commission should consider the impacts on adjacent aviation safety systems, as well as federal users' reliance on the band for statutorily directed federal missions, including through contractual relationships with commercial satellite providers. With sufficient preparation and coordination between the Commission and key federal stakeholders – the Department of

[1] NTIA is the Executive Branch agency principally responsible for the development of communications policies pertaining to the Nation's economic and technological advancement and to the regulation of the regulation of the communications industry, for the coordination of the communications activities of the Executive Branch, and for the effective presentation of the views of the Executive Branch to the Commission. *See* 47 U.S.C. § 902(b)(2).

[2] Upper C-band (3.98 to 4.2 GHz), *Notice of Inquiry*, GN Docket No. 25-59, FCC 25-13 (Feb. 27, 2025) (Notice).

Transportation (DOT) and the Federal Aviation Administration (FAA); the Department of Defense (DoD) and the Departments of the Army, Navy, and Air Force; the National Science Foundation (NSF); and the National Oceanic and Atmospheric Administration (NOAA) – the U.S. can successfully and timely expand commercial services in the band to support the increasingly connected future that lies ahead.

I. OPPORTUNITIES FOR MORE INTENSIVE USE OF THE BAND

In 2020, the United States made 280 megahertz, the 3.7 to 3.98 GHz range, available for flexible use, including 5G applications.[3] Today's lower C-band deployments are benefitting consumers through advanced 5G network deployments and are setting the stage for continued U.S. leadership in advanced networking.[4] Importantly, though, consumer and enterprise demand for connectivity points to the pressing need to identify additional spectrum capable of keeping pace with this demand. Commenters in the proceeding have outlined a range of compelling applications for this spectrum, including high-powered terrestrial wireless services and expanded mobile satellite capabilities.[5] Given its potential to foster innovation across multiple industries, we urge the Commission to explore fully the diverse and transformative uses that can maximize the benefits of this spectrum for consumers.

As the Commission considers adding new services in the 3.98 to 4.2 GHz range, the comments below address current federal uses in and adjacent to the band.

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[3] *Expanding Flexible Use of the 3.7 to 4.2 GHz Band*, Report and Order and Order of Proposed Modification, 35 FCC Rcd 2343 (2020), at https://docs.fcc.gov/public/attachments/FCC-20-22A1.pdf.

[4] *See, e.g.*, AT&T Comments at 3; Verizon Comments at 3; CTIA Reply Comments at 3.

[5] *See, e.g.*, AT&T Comments at 5; Verizon Comments at 2; Qualcomm Comments at 4; Omnispace Comments at 1-2; Skylo Comments at 1; Open Technology Institute at New America/Public Knowledge (OTI/PK) at 3.

II. ADJACENT BAND OPERATIONS IN THE FREQUENCY BAND 4.2 TO 4.4 GHZ

A. Consideration of Adjacent Aviation Operations

Currently, the Upper C-band serves as part of a buffer between 5G operations in the 3.7 to 3.98 GHz range and critical aviation altimeters in the 4.2 to 4.4 GHz range, as well as a home for remaining C-band satellite downlinks operating in the 4.0 to 4.2 GHz range. The 20-megahertz guard band between 3.98 and 4.0 GHz prevents harmful interference to commercial satellite communications providers. Practically, though, those satellite services also act as an additional guard band totaling 220-megahertz protecting aviation operations. Wireless services in the Upper C-band can likely coexist with aviation operations as demonstrated by the rollout of the lower C-band. That current operating environment, governed by a voluntary commitment between the FAA and 21 wireless licensees – and set to expire on January 1, 2028 – was achieved due to extensive and collaborative work by the aviation and wireless industries.[6]

Similarly, efforts to further expand wireless services in the Upper C-band should include careful and proactive planning. A well-sequenced approach, beginning with the development and certification of next-generation radio altimeters (NextGen RAs), followed by comprehensive safety assessments and regulatory alignment, would enable the maximum repurposing of spectrum while maintaining the integrity of the National Airspace System.

B. Current Efforts Underway to Introduce Next-Generation Altimeters

NTIA believes that successful expansion of new wireless services into the maximum amount of the Upper C-band would depend on a well-sequenced process to enable the FAA and the aviation industry to design, adopt, certify and install NextGen RAs. NTIA has spent

[6] NTIA notes that depending on the progress of the ongoing studies of next generation altimeters, the elevation masks, spurious emissions limits, and geographic coordination requirements in the voluntary agreement could be necessary beyond the January 1, 2028, expiration date in order to maintain safe coexistence for currently deployed radio altimeters.

extensive time over the past year working with federal partners in preparation for a future Upper C-band reallocation process while preparing for new altimeter standards. NTIA has conducted significant discussions with RA manufacturers, federal agencies, and other stakeholders, leading to general confirmation that DOT/FAA could support the expansion of wireless services into the Upper C-band, with aviation safety and operational integrity maintained. As detailed below, this process is already underway.

RTCA Performance Standards for NextGen RAs. RTCA, the non-profit organization that develops aviation standards, is developing minimum operational performance standards (MOPS) for the NextGen RAs that could support repurposing of the Upper C-band.[7] This process may make up to 150 megahertz available for auction for high-powered commercial wireless deployment and potentially even more for other commercial uses. As part of developing robust new standards that will minimize the need for future altimeter updates, the RTCA workgroup assumes that part of the 3.98 to 4.2 GHz band can be made available for potential repurposing for high-power mobile wireless operations. RTCA has set a timeline for Final Review and Comment/Open Consultation no later than September 2026 and a final publication no later than March 2027. The Commission can run many of its processes in parallel to this but should consider the status of these updated standards as it crafts future service rules.

FAA Comprehensive Safety Assessment. The FAA must conduct a comprehensive safety assessment of the NextGen RAs. This assessment, however, cannot be conducted until the Commission adopts final technical service rules. The safety assessment is vital for verifying that

[7] *See* RTCA, Advancing Industry Standards: SC-239/WG-119 Aligns to Meet Evolving Radar Altimeter Needs (press release), February 21, 2025, at https://www.rtca.org/news/advancing-industry-standards-sc-239-wg-119-aligns-to-meet-evolving-radar-altimeter-needs/; RTCA Comments at 1.

the systems can perform their intended functions within the expected wireless environment. By evaluating the compatibility and resilience of these systems, the FAA ensures that they meet the rigorous safety requirements necessary for certification and deployment. The availability of verified aviation safety data should similarly be factored into the Commission's parallel rulemaking process for wireless services in the Upper C-band.

FAA and FCC Establish Rules. Once the FAA has completed its safety assessment, it would need to complete a rulemaking to require installation of NextGen RA systems on U.S. registered aircraft as well as other aircraft operating in the National Airspace System. Such mandate should provide a reasonable amount of time for aircraft operators to purchase and install these new systems. According to the FAA, there are approximately 7,400 U.S. registered aircraft that provide commercial airline service, all of which are equipped with at least two RAs. There are an additional 3,000 – 4,000 foreign registered transport aircraft that regularly fly in the U.S. that would likely require a retrofit to operate safely in the new environment. While domestic and foreign transport category airplanes would likely be the most critical aircraft to upgrade to NextGen RA systems, other commercial aircraft (8000 aircraft with 1-2 RAs per aircraft), general aviation and business aviation aircraft (11,000 aircraft with 1-2 RAs per aircraft), and rotorcraft (approximately 6,000 aircraft, with 1 RA per aircraft) would possibly need new NextGen RA systems as well based on FAA safety review of their operations and the expected environment dependent upon the amount of spectrum and radiated power levels of any new services. U.S. government-owned or operated aircraft may also be impacted, including Department of Defense and Department of Homeland Security (U.S. Coast Guard) aircraft. Not all of the current generation of RA is sufficiently resilient to high-power transmissions significantly expanding beyond 3.98 GHz or to the emissions into the RA band, even those RAs

that have been retrofitted recently. Therefore, before any decision by the FCC to permit commercial wireless operators to begin transmitting on the new frequencies, aviation stakeholders should be given sufficient time to assess any proposed FCC spectrum plan with high-powered transmissions beyond 3.98 GHz.

Achieving safe coexistence between the wireless and aviation industries relies heavily on effective collaboration and meticulous planning. Introducing new services in the band should involve a structured and predictable process, with coordination between the FAA, FCC, DoD, NTIA, and stakeholders from both industries to align timelines effectively. Close collaboration and proactive communication among stakeholders and federal agencies are essential for addressing technical challenges early and mitigating risks before they impact operations. By fostering partnerships and maintaining transparency, both industries can advance wireless technology while prioritizing aviation safety. As the FCC moves forward with this proceeding, NTIA is prepared to facilitate coordination among stakeholders to provide the Commission with technical data that will assist the agency as it develops regulatory timelines and service rules for the Upper C-band.

III. RADIO ASTRONOMY OPERATIONS

The National Science Foundation conducts critical radio astronomy operations in the Upper C-band and other spectrum bands for scientific research. This is done on an opportunistic basis. As a "passive" operation (meaning it only *receives* radio signals, it does not transmit them), radio astronomy operations are susceptible to interference. Conversely, it also means they do not cause interference to other spectrum users. Accordingly, radio astronomy operators take advantage of instances where this spectrum is unused or underutilized to perform observations. This frequency range supports observations of transition lines of Ammonia and Methanol, which

are essential for studying interstellar chemistry and molecular cloud dynamics. Additionally, maintaining celestial reference frames, a fundamental aspect of precision navigation and critical infrastructure, depends on access to these frequencies.

Relying on these frequencies are a limited number of radio astronomy sites, primarily located in remote areas where natural isolation aids in mitigating interference. As this proceeding moves forward, coordination between wireless operators, regulatory bodies, and the radio astronomy community can continue to promote these scientific missions. Targeted protection measures, such as geographic exclusion zones, dynamic spectrum access solutions, and interference mitigation protocols, may be appropriate to facilitate these observations in conjunction with expanded wireless services. Balancing spectrum efficiency with scientific integrity can help maintain the vital contributions of radio astronomy without impeding advancements in communications.

IV. INCUMBENT OPERATORS AND USERS

A. Multiple Federal Agencies Use the 4.0-4.2 GHz Band on a Contractual Basis

Federal spectrum policy has encouraged federal users to transition toward commercial service providers to fulfill essential missions.[8] Federal users have established contractual agreements with incumbent commercial satellite service providers, securing guaranteed access to the C-band spectrum through long-term leasing arrangements, service-level agreements, or other negotiated terms that align with mission-critical requirements. Multiple federal users rely on

[8] *See, e.g.*, NTIA, 18 GHz Band Report, Report 25-01, at 2 ("As NASA will not be building any more Tracking and Data Relay Satellites (TDRS), it needs a way to meet intersatellite data link requirements for future missions. New federal and non-federal ISS allocations in this band will provide regulatory certainty to support the development of commercial services to meet NASA's future needs. This aligns with Congress's direction to NASA to utilize commercial space services whenever possible and to encourage the growth of the commercial space industry."), at https://www.ntia.gov/sites/default/files/2025-05/18-ghz-band-study-report.pdf.

commercial satellite service providers for uninterrupted access to the C-band spectrum. These contractual agreements support essential missions, including national security, public safety, and critical information dissemination. For example, the Navy relies on Upper C-band for SATCOM, benefiting from its resilience to jamming, kinetic attacks, and superior intelligence dissemination capabilities. Similarly, the National Oceanic and Atmospheric Administration's National Environmental Satellite, Data, and Information Service (NESDIS), which manages the nation's environmental satellite programs and provides critical data and information about the atmosphere, oceans, and land, relies on commercial SATCOM providers to transmit data support to weather forecasting, climate monitoring, and disaster response efforts. The Commission should consider transition mechanisms affording federal users proper time to adapt to spectrum changes while maintaining operational integrity and reliability.

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As the agency responsible for coordinating and communicating the views of the Executive Branch before the FCC, NTIA looks forward to continuing to work with the Commission on its Upper C-band proceeding and ensuring that the needs and interests of federal users in and adjacent to the band are adequately and timely communicated. The repurposing of the Upper C-band presents an important opportunity to enhance spectrum optimization and drive innovation. Through careful coordination with federal stakeholders, the Commission can ensure a seamless transition that supports aviation safety and other critical operations, while solidifying U.S. leadership in next-generation connectivity.

Respectfully submitted,

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