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

In the Matter of	)	
	)	
Revision of the Commission's Rules Regarding	)	RM-11990
Sharing Spectrum Between NGSO and GSO	)	
Satellite Systems	)	

COMMENTS OF CTIA

CTIA[1] respectfully submits these comments in response to the petition for rulemaking ("Petition") filed by Space Exploration Technologies Corp. ("SpaceX") in the above-captioned proceeding[2] to urge the Federal Communications Commission ("Commission") to ensure that any action taken on the Petition does not impede current or future opportunities for terrestrial licensed 5G operations.

I. INTRODUCTION.

Longstanding sharing criteria between geostationary satellite orbit ("GSO") and non-geostationary satellite orbit ("NGSO") stations play an important role in mitigating harmful interference risks between satellite systems while also protecting terrestrial-based operations. In its Petition, SpaceX argues that operations by NGSO satellite systems are overly restricted as a

[1] CTIA – The Wireless Association® ("CTIA") (www.ctia.org) represents the U.S. wireless communications industry and the companies throughout the mobile ecosystem that enable Americans to lead a 21st century connected life. The association's members include wireless providers, device manufacturers, suppliers as well as apps and content companies. CTIA vigorously advocates at all levels of government for policies that foster continued wireless innovation and investment. CTIA represents a broad diversity of stakeholders, and the specific positions outlined in these comments may not reflect the views of all individual members. The association also coordinates the industry's voluntary best practices, hosts educational events that promote the wireless industry and co-produces the industry's leading wireless tradeshow. CTIA was founded in 1984 and is based in Washington, D.C.

[2] Space Exploration Holdings, LLC Petition for Rulemaking, INBOX-1.401, RM-11990 (filed Aug. 9, 2024) ("Petition"); *Office of the Secretary Reference Information Center Petition for Rule Making Filed*, Public Notice, Report No. 3210 (rel. Oct. 2, 2024).

result of international criteria for sharing with GSO fixed-satellite service ("FSS") and GSO broadcasting satellite service ("BSS") networks—specifically, the equivalent power flux-density ("EPFD") limits on aggregate and single-entry interference from the transmissions of an NGSO system into GSO networks.[3] SpaceX contends that these requirements have harmed satellite broadband competition.[4] CTIA submits these comments to highlight the need to consider terrestrial wireless implications in any review of SpaceX's request.

While the central focus of the EPFD limits is to enable GSO-NGSO coexistence, the criteria that SpaceX seeks to amend have long been used by operators in designing and deploying NGSO constellations and are intertwined with the complimentary levels set for the protection of terrestrial services operating in the same spectrum bands. The Petition, however, does not consider the potential impact of the proposed changes to terrestrial wireless operations in the same or adjacent frequencies.

As the Commission recently highlighted in establishing the world's first supplemental coverage from space framework, innovations leveraging space-based connectivity must be balanced "with the need to retain service quality of terrestrial networks, protect spectrum usage rights, and minimize the risk of harmful interference, both domestically and internationally."[5] Accordingly, CTIA urges the Commission to ensure that any proposed rule changes that result from any action initiated by the Commission on the Petition fully and carefully evaluate the downstream impact of such changes on terrestrial licensed wireless operations—including in

[3] *See* Petition at 2-3.

[4] *Id*.

[5] *See Single Network Future: Supplemental Coverage from Space; Space Innovation*, Report and Order and Further Notice of Proposed Rulemaking, FCC 24-28, ¶ 3 (rel. Mar. 15, 2024).

both existing licensed bands and in spectrum that is being explored domestically and globally for future licensed wireless use.

II. ANY PROPOSED CHANGES TO THE GSO-NGSO SHARING METHODOLOGY MUST ACCOUNT FOR THE POTENTIAL IMPACTS ON CURRENT AND FUTURE LICENSED TERRESTRIAL OPERATIONS.

A. Action on the Petition Should Be Confined to Spectrum Bands That Do Not Overlap with Terrestrial Licensed Operations, with Broader Consideration on a Band-by-Band Basis.

Under Sections 25.289 and 25.146 of the Commission's rules, NGSO FSS system licensees must not cause harmful interference to GSO operations, which the NGSO system may demonstrate through compliance with the EPFD limits contained in Article 22 of the International Telecommunication Union's ("ITU's") Radio Regulations.[6] These internationally developed criteria were adopted by the ITU nearly 25 years ago,[7] remain current today, and have been specifically incorporated into the Commission's rules in the Ku-band (e.g., 12-18 GHz) and the Ka-band (e.g., 26.5-40 GHz), as the Petition discusses.[8] Importantly, satellite operators remain obligated to also comply with Article 21 of the Radio Regulations as appropriate, which establishes requirements for both space- and terrestrial-based operators to maintain a coexistence environment.[9]

Although the existing EPFD limits were designed to enable GSO-NGSO coexistence, they are also baked into NGSO system design and thus have been critical input parameters to sharing and compatibility studies where coexistence has been considered with terrestrial operations over the last two-plus decades. Specifically, while power flux density ("PFD")

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[6] *See* 47 C.F.R. §§ 25.289, 25.146; ITU, Radio Regs., Article 22 (Ed. 2024) ("Article 22").

[7] *See* 47 C.F.R. §§ 25.289, 25.146.

[8] *See* Petition at 8.

[9] ITU, Radio Regs., Article 21 (Ed. 2024) ("Article 21").

criteria consider the impact of a satellite constellation on terrestrial operations based on satellite maximum power levels and the maximum number of satellites in view at any time, the EPFD requirement more broadly limits the power of NGSO satellites considering the combined interference contribution of the entire simulated constellation. Given that this limitation was adopted when there were smaller NGSO constellations,[10] it is even more meaningful today as NGSO systems, including SpaceX's own, can include many thousands of satellites.[11] For example, during the 2023 World Radiocommunication Conference ("WRC-23"), studies submitted to the ITU, including those from the United States,[12] evaluated the impact of the growing size of NGSO systems on terrestrial services in the 17 GHz band and took into account conservative assumptions, including the operational considerations of the Article 22 EPFD limits. Without these limits implemented, additional constraints would have then been necessary on NGSO FSS space stations to reduce their power to ensure the protection of fixed and mobile terrestrial systems. Thus, while the EPFD limits were designed to facilitate GSO-NGSO sharing, the EPFD criteria have also helped prevent potential interference with terrestrial services. Any resulting relaxation of these limits must not compromise the designated protection criteria for terrestrial networks, ensuring the quality of service for these networks is retained.

[10] *See* Petition at 4 (highlighting how EPFD limits adopted in 2000 considered the proposed SkyBridge constellation of 64-80 satellites).

[11] *See*, *e.g.*, *Application for Approval of Orbital Deployment and Operating Authority for the SpaceX Gen2 NGSO Satellite System*, ICFS File No. SAT-LOA-20200526-00055 (filed May 26, 2020); FCC Application for Space and Earth Station – Amendment, ICFS File No. SAT-AMD-20210818-00105 (filed Aug. 18, 2021); FCC Application for Space and Earth Station – Amendment, ICFS File No. SAT-AMD-20241017-00228 (filed Oct. 17, 2024) (seeking authority to launch and operate a 29,988-satellite constellation).

[12] *See* United States of America, *Working Document Towards a Preliminary Draft New Report ITU-R S.[Scaling Factor]*, Document 4A/789-E (Sept. 7, 2022), https://www.itu.int/md/R19-WP4A-C-0789/en.

Here, the Petition seeks a rulemaking to update the relevant Commission rules "to permit more efficient sharing between GSO and NGSO systems in *downlink* bands *between 10.7 GHz and 30 GHz* that are subject to EPFD limits."[13] Within these contours, the Petition encompasses a number of bands that are allocated for, or adjacent to, spectrum available on a primary or co-primary basis for terrestrial wireless operations today. For example, the 10.7-12.2 GHz band has a non-federal allocation for FSS downlink operations but also includes a co-primary Fixed Service allocation at 10.7-11.7 GHz as well as a Fixed Service and BSS allocation in the adjacent 12.2-12.7 GHz band segment. Similarly, the 17.8-18.3 GHz band includes a secondary non-federal FSS downlink allocation alongside a primary Fixed Service allocation and a primary federal FSS downlink allocation.[14]

Existing terrestrial service operations in these bands have been deployed in reliance on the protection criteria afforded by the existing rules, including Article 21 PFD limits and Article 22 EPFD limits. SpaceX acknowledges this reliance—noting that design decisions impact operations for years down the road.[15] The Commission should ensure that any new rulemaking stemming from the Petition does not undermine the terrestrial network service investments—specifically, any action should confine proposals to spectrum bands that do not overlap with terrestrial licensed operations, and should ensure that a thorough evaluation is undertaken with regard to the potential impacts to adjacent-band terrestrial operations. Should the Commission seek to revisit EPFD limits in bands that include both terrestrial licensed and FSS allocations, it should only do so on a case-by-case basis to ensure terrestrial operations are protected, including

[13] Petition at 11 (emphasis added).

[14] *See* 47 C.F.R. § 2.106.

[15] *See* Petition at 11 ("[D]esign decisions that satellite operators make today will impact consumers for years to come.").

by conducting a fulsome technical evaluation, with input from terrestrial wireless stakeholders, regarding the potential for any changes to the EPFD limits to impact terrestrial wireless operations.

Given the broad potential impact and ongoing studies at the ITU, CTIA recommends the Commission defer consideration of the Petition in order to better understand the impacts of the proposed technical changes on terrestrial services. Doing so would be consistent with the Commission's recent acknowledgement that its technical rules may be reevaluated in the event of future changes to the Article 22 criteria.[16] And while SpaceX suggests that the EPFD rules must change, the U.S. position leading into WRC-23, and now during the WRC-27 cycle, seeks to *study* whether they should change and that satellite systems *may* benefit from an updated review of the implementation of Article 22 EPFD limits.[17] Thus, much work remains to be done before SpaceX's proposal can be properly evaluated for impacts to other systems.[18]

B. The Commission Should Not Propose Changes That Would Impact Critical Terrestrial C-Band Deployments.

While the scope of the Petition appears to be focused on rule changes for FSS operations between 12.7 GHz and 30 GHz, Article 22 also applies to other spectrum bands, including the C-band frequencies at 3700-4200 MHz.[19] It is imperative that any potential changes proposed

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[16] *See Amendment of Parts 2 and 25 of the Commission's Rules to Enable NGSO Fixed-Satellite Service (Space-to-Earth) Operations in the 17.3-17.8 GHz Band*, Report and Order, FCC 24-97, ¶¶ 27-28, n.91 (rel. Sept. 27, 2024).

[17] *See* Petition at 12, n.28 (citing United States of America, *Proposals for the Work of the Conference Agenda Item 10—Article 22 EPFD Limits*, OEA/Ser.L/XVII.4.2.42, at 5-6 (Aug. 13, 2023) ("U.S. Agenda Item 10 Proposals")). Moreover, the ITU Working Part 4A has further acknowledged that the "cornerstone of the compatibility sought in RR Article 22 is that non-GSO FSS systems must protect GSO FSS and BSS networks from unacceptable interference." United States of America, *Working Document Towards a Preliminary Draft New Report [Article 22 EPFD Limit Studies]*, Document 4A/84-E, at 2 (Apr. 19, 2024).

[18] *See* Petition at 12; U.S. Agenda Item 10 Proposals.

[19] *See* Article 22 at Sec. 22.5C; *id*. at tbl. 22-1E.

by the Commission do not impede terrestrial wireless operations in this foundational 5G spectrum.

The 3700-4200 MHz band is a globally harmonized tuning range that includes the 3GPP frequency bands n77 and n78.[20] Today, the 3700-3980 MHz segment has become instrumental to U.S. 5G deployments, working alongside other mid-band spectrum and both low-band and millimeter wave band holdings to support 5G broadband connectivity across the country. Wireless providers spent record-setting sums to acquire access to this spectrum in the United States, and they deployed it roughly six months earlier than the accelerated Phase II transition deadline.[21] As a result, this spectrum has been put to work to the benefit of consumers and businesses nationwide, helping to provide high-speed 5G connectivity to some 330 million Americans across the country[22] and delivering measurable improvements in wireless performance.[23] The C-band spectrum above 3980 MHz, meanwhile, has become the target of 5G expansion across the globe. The 4.0-4.2 GHz band offers a substantial opportunity for the deployment of 5G services in a globally harmonized and contiguous frequency range, making it

[20] *See*, *e.g.*, Comments of CTIA, GN Docket No. 24-214, at 22 (filed Oct. 7, 2024).

[21] *See* Comments of CTIA, GN Docket No. 18-122, at 1 (filed Nov. 8, 2023).

[22] *See* Press Release, CTIA, U.S. Wireless Data Use Skyrockets, Passing 100T Megabyte Milestone, CTIA Annual Survey Finds (Sept. 10, 2024), https://www.ctia.org/news/u-s-wireless-data-use-skyrockets-passing-100t-megabyte-milestone-ctia-annual-survey-finds; *see also 2024 Annual Survey Highlights*, CTIA, (Sept. 10, 2024), https://api.ctia.org/wp-content/uploads/2024/09/2024-Annual-Survey-Highlights.pdf.

[23] *See* Doug Brake, *CBRS Spectrum Is Lightly Used, Whereas C-Band Is Deployed Extensively*, CTIA BLOG (Sept. 25, 2023), https://www.ctia.org/news/cbrs-spectrum-is-lightly-used-whereas-c-band-deployed-extensively (stating that the 100 megahertz of spectrum available for the first phase of C-band deployments saw mobile speeds increase nearly five times in some markets).

a potentially viable candidate for use by commercial wireless providers.[24] Indeed, other countries have explored or are exploring opening the band for additional terrestrial uses.[25]

Given the potential to impact current and future terrestrial wireless operations, the Commission should explicitly decline to consider any revision to EPFD requirements for current or future FSS operations in the 3700-4200 MHz band. Wireless providers have invested billions of dollars purchasing and transitioning this spectrum for 5G use and global leaders are evaluating options for expanding opportunities in this spectrum in the near term. The Commission should decline to take any steps that would undermine investment and innovation in this frequency environment.

III. CONCLUSION.

The GSO-NGSO sharing criteria have a direct impact on terrestrial-based operations. The Commission should exclude from any rulemaking stemming from the Petition any changes that would impact terrestrial licensed operations, deferring such action instead to band-specific proceedings that can explore potential impacts to terrestrial operations in a more nuanced way. The Commission should also ensure that future NGSO operations do not impede the potential for 5G and beyond, particularly in foundational terrestrial allocations across the mid-band range.

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[24] *See* Comments of CTIA, OIA Docket No. 24-30, Public Notice DA 24-774, at 17 (filed Aug. 20, 2024).

[25] *See id*.; *see also* European Commission Office, *Mandate to CEPT on technical conditions regarding the shared use of the 3.8-4.2 GHz frequency band for terrestrial wireless broadband systems providing local-area network connectivity in the union* (Dec. 16, 2021), https://eccwp.cept.org/WI_Detail.aspx?wiid=804; European Conference of Postal and Telecommunications Administrations, Working Group Frequency Management: Results of the WG FM@107 (Hybrid) Meeting, 03-7 June 2024 (June 18, 2024), https://www.cept.org/ecc/groups/ecc/wg-fm/news/results-of-the-wg-fm107-hybrid-meeting-03-07-june-2024.

Respectfully submitted,

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