

**BEFORE THE
FEDERAL COMMUNICATIONS COMMISSION
WASHINGTON, D.C. 20554**

Application of

SPACE EXPLORATION HOLDINGS, LLC

For Authority to Launch and Operate the
SpaceX Gen3 NGSO Satellite System

Call Signs: _____

ICFS File No. SAT-LOA-_____

**APPLICATION TO LAUNCH AND OPERATE
THE SPACEX GEN3 NGSO SATELLITE SYSTEM**

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July 6, 2026

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SpaceX seeks authority to deploy Gen3: 100,000 satellites powering human connectivity and AI-fueled progress. The artificial intelligence revolution promises a supersonic tsunami of progress with the capability to deliver transformative prosperity to billions and carry the light of human consciousness far into the future. SpaceX's Gen1 and Gen2 satellite systems already deliver high-speed, low-latency broadband to all American consumers and the planet's most remote regions, from polar research stations and schools deep in the rainforest to first responders serving isolated islands in the wake of natural disasters. A robust, resilient, and ubiquitous communications infrastructure with the capacity to handle the majority of the world's internet traffic will allow all people to enjoy the benefits of our shared abundant future and continue the legacy of American leadership in connecting the unconnected.

The Gen3 system will include 100,000 satellites operating in very-low-Earth-orbit to deliver extremely low-latency and multi-gigabit symmetrical throughput for consumers, enterprises, and government users and billions of AI-powered devices around the world. To achieve this ambitious goal, the Gen3 system will put new spectrum and sharing frameworks to work for American consumers. AI requires massive uplink capacity to support high-definition

spatial and auditory data necessary for real-time decision-making and industrial automation. Without it, the United States cannot compete in the AI revolution. The Gen3 system will meet this need by augmenting workhorse Ku-, Ka-, V-, and E-band spectrum that the Commission granted for SpaceX's Gen2 system with new spectrum opportunities in adjacent bands. Providing capacity for billions of people and AI-powered devices around the world will also require enormous expansion of backhaul capabilities. To that end, the Gen3 system will pioneer greenfield W- and D-band frequencies between 92 and 275 GHz.

The Gen3 system will deliver unparalleled service quality and capacity to people around the world while efficiently sharing spectrum with all other users. The Gen3 system will comply with the Commission's applicable technical and sharing rules, including recently updated spectrum sharing frameworks for next-generation satellite systems. SpaceX will operate the Gen3 system consistent with the Commission's spectrum management policies based on physics first principles, shared responsibilities, and modern tools and techniques.

SpaceX will maintain and build upon its industry-leading space sustainability practices and cutting-edge collision avoidance technologies when designing and operating its Gen3 system. The Gen3 system will meet or exceed all Commission orbital debris mitigation rules. SpaceX will also continue to collaborate closely with the astronomy community to preserve and promote their essential work towards our shared goal to understand and explore our universe.

The Gen3 System. The Gen3 system will consist of 100,000 satellites, configured in two bands of thin, closely stacked operational shells with nominal altitudes between 323 and 327.5 kilometers and 473 and 477.5 kilometers. SpaceX seeks flexibility to operate its Gen3 system with inclinations ranging from 26 degrees to 96.9 degrees (sun-synchronous orbit) to optimize coverage consistent with evolving demand. Satellites in the Gen3 system will operate within

tolerances compliant with ITU Resolution 8. This flexibility will allow the Gen3 system to coordinate with other satellite systems operating near and transiting through these shells, and to leave ample room for crewed spacecraft.¹ The Technical Attachment provides detailed orbital parameters.

By deploying these satellites at very low altitudes, the Gen3 system will achieve unprecedented satellite diversity—ensuring multiple satellites are always visible from any point on Earth. Together, the orbital characteristics of the Gen3 system enable agile and ultra-precise spectrum sharing, lower latency and substantially higher aggregate capacity necessary to meet the demands of consumers, enterprises, and government users. With dozens of satellites visible from any location, the Gen3 system can dynamically route traffic, avoid interference, and maintain continuous high-quality service even as spectrum use intensifies globally.

To deliver the benefits of this new system to consumers as soon as possible, the Gen3 system will leverage ground infrastructure authorized for SpaceX's Gen1 and Gen2 systems. SpaceX requests authority herein to include the Gen3 system as a point of communication for its authorized earth stations. SpaceX will submit additional earth station applications as needed to expand its ground network to meet the capacity needs of the Gen3 system and to request access to new frequencies.

Gen3 Spectrum Plan. SpaceX is designing the Gen3 satellite constellation to deliver ultra-low-latency, multi-gigabit broadband service to orders of magnitude more users around the world, all while efficiently sharing spectrum with other in-band and adjacent-band users. The Gen3 system will build upon the existing Ku- to W-band frequencies requested for its Gen2 system with additional contiguous and nearby spectrum. SpaceX requests to operate user links across wide,

¹ See ITU Radio Regs., Res. 8 (WRC-23).

contiguous uplink channels in Ku-band and Ka-band, which will be essential to keep pace with demand for high-definition, real-time communications and audiovisual data processing for AI-powered applications and devices. The Gen3 system will also leverage expanded backhaul using frontier D-band spectrum between 122.5 and 275 GHz to deliver a step-change in system capacity and quality. SpaceX requests to use all these frequencies for either gateway earth station or non-gateway earth station links. A more precise description of the frequency and channelization plan for the Gen3 system is included in the Schedule S and the Technical Attachment.

SpaceX requests authority to operate the Gen3 system in all frequencies on a global basis. To the extent a frequency band contains an allocation for the fixed-satellite service or mobile-satellite service in the International or U.S. Table of Frequency Allocations, SpaceX requests to operate consistent with that allocation and its associated protections. But the Gen3 system will also pioneer several new and underused satellite spectrum bands that have not yet received a formal satellite frequency allocation. SpaceX requests to operate in these frequency bands subject to any necessary waivers to operate on a non-conforming basis where conforming frequency allocations do not yet exist. SpaceX will operate under any waivers on a non-interference, non-protection basis to protect in-band and adjacent-band users.

Spectrum Sharing. The Gen3 system will leverage and build on the same proven beamforming, electronic beam steering, dynamic power control, and intelligent network orchestration software that enabled SpaceX's Gen1 and Gen2 systems to operate seamlessly alongside every other spectrum user. These capabilities have allowed over 10,000 collective satellites to efficiently coexist with an extremely wide range of satellite, terrestrial, and passive users. The Gen3 system will comply with the Commission's applicable technical rules, including downlink limits to protect terrestrial operations, out-of-band emissions limits, NGSO-NGSO

sharing rules, and modernized rules for satellite sharing between NGSO and GSO systems. For any new spectrum bands for which SpaceX requests a waiver to operate on a non-conforming basis, SpaceX will operate consistent with the Commission's spectrum management principles designed to promote efficient spectrum sharing and opportunities for new, beneficial services for consumers.² SpaceX will also coordinate with federal users as necessary to protect federal assets from harmful interference.

SpaceX requests that the Commission include the Gen3 system application in the Commission's recently announced third processing round for those Ku-, Ka-, and V-band frequencies. For several of the frequencies the Commission included in this third processing round, the Commission also included newly authorized frequencies in SpaceX's Gen2 system that SpaceX did not include in its original Gen2 System Application. SpaceX can operate its Gen2 and Gen3 systems such that they will not preclude or leave insufficient spectrum for other competing satellite systems to efficiently share the spectrum. Nevertheless, SpaceX requests a waiver of the Commission's rules to include both the Gen2 and Gen3 systems in the third processing round subject to appropriate conditions.

The Commission unanimously decided to replace the obsolete EPFD limits with a modern, performance-based framework, which will go into effect soon. In the meantime, the Commission granted waivers to permit next-generation satellite systems—including SpaceX's Gen1 and Gen2 systems—to exceed these EPFD limits in the United States and other administrations similarly upgrading their framework. To the extent necessary, SpaceX submits a waiver request for the overly conservative EPFD limits of the ITU to enable the Gen3 system to provide the best possible

² See *Principles for Promoting Efficient Use of Spectrum and Opportunities for New Services; Promoting Efficient Use of Spectrum through Improved Receiver Interference Immunity Performance*, ET Docket Nos. 23-122 and 22-137, Policy Statement, 38 FCC Rcd 3682 (2023).

service for American consumers and people around the world.

Space Sustainability. The Gen3 system will build upon the leading-edge space sustainability practices and technologies of SpaceX’s current generations of satellites. SpaceX is designing its Gen3 system to meet or exceed the Commission’s orbital debris mitigation rules and follow conservative industry best practices. SpaceX provides more detail on its plans in the Technical Attachment.

As with all its satellites, SpaceX will deploy its Gen3 satellites at very low altitudes for initial testing and checkout prior to orbit raise. This approach capitalizes on the natural advantages of atmospheric drag at these altitudes, which guarantees that any satellite encountering early operational failure—such as initial defects or malfunctions—will rapidly deorbit, fully demise, and pose no calculable risk to humans upon re-entry. SpaceX will dispose of its Gen3 satellites primarily by atmospheric re-entry. SpaceX will attempt targeted re-entry when disposing its satellites through atmospheric reentry and will design its satellites to pose no calculable risk to humans upon reentry and to minimize atmospheric impact.

In all phases of operation, the Gen3 satellites will use SpaceX’s industry-leading deconfliction procedures, maneuver thresholds, and advanced propulsion systems to minimize the probability of any high-risk conjunctions with Resident Space Objects (“RSO”). While the specific operational strategies and altitude ranges of the Gen3 system will improve over time to facilitate coordination with crewed space stations, SpaceX will ensure that its operations in these lower-altitude shells mitigate any effect on crewed space stations within its orbital tolerances.

SpaceX will also continue working closely with the astronomy and scientific community to preserve and advance scientific research, human spaceflight, and space exploration. Just as it has with its Gen1 and Gen2 systems, SpaceX will incorporate the latest generation of brightness

mitigation and boresight avoidance technologies to minimize the impact of the Gen3 system on optical reflections and intentional and unintentional radio frequency emissions. Furthermore, SpaceX will explore with the scientific community ways to use its constellations, along with its powerful AI tools, to accelerate their research and enhance space exploration.

Serving the Public Interest. Granting SpaceX’s application for the Gen3 system will serve the public interest, convenience, and necessity by delivering a step-change in coverage and capacity improvement on the Gen2 system, bringing multi-gigabit, ultra-low-latency broadband to billions of people around the world. The Gen3 system will also ensure that all people—no matter how rural and remote—can benefit AI-enabled services proliferate. Moreover, the Gen3 system will maintain United States’ leadership in space, spectrum, robotics, and artificial intelligence for years to come by providing the capacity, coverage, and service quality necessary to connect billions of devices to real-time, AI-powered tools, including constellations of advanced AI satellites.

The Gen3 system will also serve the public interest by swiftly putting the Commission’s world-leading satellite spectrum policy to work for American consumers. The Gen3 system will leverage the Commission’s new efficient satellite sharing rules to dramatically improve end-user service while pioneering new uses of unused and lightly used spectrum bands that lie adjacent to them to improve uplink and downlink capacity alike. The Gen3 system will build upon the Commission’s Spectrum Horizons and Spectrum Abundance proceedings by using leading-edge D-band spectrum to deliver extremely wide bandwidth through ultra-thin beams that present minimal interference risk.³ And the Gen3 system will pave a path for future regulatory innovation

³ See *Satellite Spectrum Abundance*, SB Docket No. 25-180, Further Notice of Proposed Rulemaking and Notice of Proposed Rulemaking, 40 FCC Rcd 3794 (2025).

that will open the benefits of new spectrum and more efficient sharing to all.

Finally, granting SpaceX's application for the Gen3 system will serve the public interest by continuing to promote responsible satellite operations that deliver massive consumer benefits while promoting the long-term sustainability of low-Earth orbit. The Gen3 system will build upon the years of continuous and iterative innovation while finding and sharing new ways to efficiently share orbital resources. And SpaceX will do so, as it always has, in collaboration with the astronomy and scientific communities.

ITU Cost Recovery. As a result of the actions taken at the 1998 Plenipotentiary Conference, as modified by the ITU Council in 2005, the ITU now charges processing fees for satellite network filings. Therefore, Commission applicants are responsible for all fees charged by the ITU. SpaceX confirms that it is aware of this requirement and accepts responsibility to pay any ITU cost recovery fees associated with this application. Invoices for such fees may be sent to the contact representative listed in the accompanying FCC Form 312.

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For the foregoing reasons, and for the reasons set forth in the accompanying materials, SpaceX requests that the Commission find that granting approval for launch and operating authority for SpaceX's Gen3 system would serve the public interest, and issue such grant expeditiously.

Respectfully submitted,

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