Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	ICFS File Nos.:
	)	
Space Exploration Holdings, LLC	)	SAT-LOA-20200526-00055
	)	SAT-AMD-20210818-00105
Request for Deployment and Operating Authority	)	SAT-AMD-20221216-00175
for the SpaceX Gen2 NGSO Satellite System	)	SAT-AMD-20241017-00228
	)	Call Sign: S2992/3069
	)	
Application for Authority for Modification of the	)	SAT-MOD-20241011-00224
SpaceX NGSO Satellite System	)	Call Sign: S2992/3069

AUTHORIZATION AND ORDER

Adopted: January 9, 2026 **Released: January 9, 2026**

By the Chief, Space Bureau:

GRANT

Space Exploration Holdings, LLC

ICFS File Nos. SAT-LOA-20200526-00055, SAT-AMD-20210818-00105, SAT-AMD-20221216-00175, SAT-AMD-20241017-00228, SAT-MOD-20241011-00224

ICFS File No(s):	SAT-LOA-20200526-00055, SAT-AMD-20210818-00105, SAT-AMD-20221216-00175, SAT-AMD-20241017-00228, SAT-MOD-20241011-00224[1]	**GRANTED-IN-PART / DEFERRED-IN-PART – With Conditions** **Space Bureau**
Licensee/Grantee:	Space Exploration Holdings, LLC (SpaceX)	
Call Sign:	S2992/3069	
Satellite Name:	SpaceX second-generation Starlink Constellation (Gen2 Starlink)	
Orbital Location:	Non-Geostationary Satellite Orbit (NGSO) 15,000 satellites operating in the following orbital shells:[2] 340 km, 53 degree inclination 345 km, 48 degree inclination 350 km, 38 degree inclination 355 km, 43 degree inclination 360 km, 96.9 degree inclination 365 km, 28 or 32 degree inclination[3] 475 km, 28 or 32 degree inclination[4] 480 km, 53 degree inclination 485 km, 43 degree inclination Continued operations in the following shells:[5] 525 km, 53 degree inclination	

[1] *See* Space Exploration Holdings, LLC, Application for Modification of Authorization for the SpaceX Gen2 NGSO Satellite System, ICFS File No. SAT-MOD-20241011-00224 (SpaceX Gen2 Upgrade Modification); Space Exploration Holdings, LLC, Application for Amendment of Application for the SpaceX Gen2 NGSO Satellite System, ICFS File No. SAT-AMD-20241017-00228 (SpaceX Gen2 Upgrade Amendment). SpaceX's modification and amendment applications, ICFS File Nos. SAT-MOD-20240111-00224 and SAT-AMD-20241017-00228, were placed on Public Notice on February 7, 2025. *See Satellite Licensing Division and Satellite Programs and Policy Division Information, Space Station Applications Accepted for Filing*, Public Notice, Report No. SAT-01892 (Feb. 7, 2025). A number of satellite companies, industry groups, and members of the public filed petitions, comments, and letters regarding SpaceX's modification and amendment applications. See the attached order for a discussion of comments raised on the record and our basis for grant of these operations.

[2] In the 340 km, 345 km, 350 km, 355 km, and 365 km orbital shells, SpaceX is authorized to operate in up to 72 planes per shell with up to 144 satellites per plane. In the 480 km and 485 km orbital shells, SpaceX is authorized to operate in up to 56 planes per shell with up to 120 satellites per plane.

[3] SpaceX requests authority to operate satellites in the 365 km shell at 32 degrees inclination to accommodate launches of Starship from its Starbase facilities in Boca Chica, TX, or in the alternative, to operate at 28 degrees inclination if the Federal Aviation Administration (FAA) does not allow for Starship launches at 32 degrees. *See* SpaceX Gen2 Upgrade Amendment, Legal Narrative at 3.

[4] SpaceX requests authority to operate satellites in the 475 km shell at 32 degrees inclination to accommodate launches of Starship from its Starbase facilities in Boca Chica, TX, or in the alternative, to operate at 28 degrees inclination if the FAA does not allow for Starship launches at 32 degrees. *See* SpaceX Gen2 Upgrade Modification, Legal Narrative at 8.

[5] SpaceX may continue to operate satellites currently deployed in these shells while it conducts maneuvers to lower these satellites into the new orbital shells authorized in this grant, as conditioned below. *See infra*, para. 13c.

	530 km, 43 degree inclination 535 km, 33 degree inclination	
Administration:	United States of America	
Nature of Service:	Fixed Satellite-Service (FSS); Mobile Satellite-Service (MSS), Supplemental Coverage from Space (SCS)	
Scope of Grant:	Modification of authorization to permit SpaceX to modify the previously-authorized 7,500 satellites to: (1) upgrade the form factor of the Gen2 Starlink satellites; (2) operate the Gen2 Starlink satellites using additional Ku-, Ka-, V-, and W-band frequencies and to operate in the MSS as well as FSS in certain frequencies; (3) add orbital shells centered at 355 km with a 43 degree inclination, 365 km with a 28 or 32 degree inclination, 475 km with a 28 or 32 degree inclination, 480 km with a 53 degree inclination, and 485 km with a 43 degree inclination and lower the satellites currently operating at 525 km, 530 km, and 535 km to the shells at 480 km, 485 km, and 475 km, respectively; (4) deploy satellites flexibly across authorized orbital shells to meet customer demands, including orbital tolerances and inclinations consistent with the ITU Radio Regulations, Resolution 8 and Resolution 35 (WRC 23); and (5) communicate with duly authorized gateway earth stations and user terminals in all authorized frequencies. Authorization for SpaceX to construct, deploy, and operate a second tranche of 7,500 Starlink Gen2 satellites to operate with the same frequencies and orbital parameters authorized for the first tranche. Authorization for SpaceX to communicate using the 1980-2000 (Earth-to-space), 2000-2020 MHz (Earth-to-space), and 2180-2200 MHz (space-to-Earth) frequencies outside the U.S. with up to 7,500 satellites. Grant of SpaceX's request to remove the condition requiring SpaceX to operate only one co-frequency, co-polarization beam simultaneously at any given location and grant of SpaceX's request for waiver of the Commission's equivalent power flux density (EPFD) limits for operations inside the United States.[6]	
Previous Grant(s):	Authority to construct, deploy, and operate up to 7,500 satellites operating in the Ku- and Ka-bands at altitudes of 525 km, 530 km, and 535 km (*SpaceX Gen2 First Partial Grant*).[7] Modification of SpaceX's license to authorize SpaceX to deploy and operate V-band capabilities on SpaceX's previously authorized 7,500 Gen2 Starlink satellites, including modification to reflect that SpaceX will no longer deploy and operate a separate V-band constellation (*SpaceX First V-band Modification Grant*).[8]	

[6] We defer action on SpaceX's request for MSS operations outside the U.S. in additional frequencies in the 1429-2690 MHz band and SpaceX's request to operate in the 20.2-21.2 GHz and 30.0-31.0 GHz bands, as well as authorization of additional Gen2 Starlink satellites beyond the total 15,000 authorized satellites (7,500 previously authorized satellites and 7,500 authorized in this grant).

[7] *Space Exploration Holdings, LLC, Request for Orbital Deployment and Operating Authority for the SpaceX Gen2 NGSO Satellite System*, Order and Authorization, 37 FCC Rcd 14882 (2022) (*SpaceX Gen2 First Partial Grant*), petitions for reconsideration pending.

[8] *Space Exploration Holdings, LLC, Application for Modification of Authorization of the SpaceX V-band NGSO Satellite system*, Grant Stamp, ICFS File No. SAT-MOD-20230322-00062 (SB, SPPD, granted-in-part/dismissed-in-part Oct. 13, 2023) (*SpaceX First V-band Modification Grant*).

	Modification of SpaceX's license for its Gen2 Starlink satellites to: (1) authorize SpaceX to deploy a modified version of the previously authorized Gen2 Starlink satellites with the capability to operate in certain frequencies in the 1429-2690 MHz range; and (2) to operate these satellites on frequencies within the 1910-1915 MHz and 1990-1995 MHz bands for limited on-orbit check out of the antennas immediately following deployment of each satellite for a period of 10 days or less, to ensure initial functionality of the satellite antenna (*SpaceX SCS Modification Partial Grant*).[9] Authority to communicate using E-band frequencies on the previously authorized 7,500 Gen2 satellites (*SpaceX Gen2 E-band Partial Grant*).[10] Authority to communicate using Very High Frequency (VHF) beacons on up to 450 Gen2 Starlink satellites for backup telemetry, tracking, and command (TT&C) during orbit-raising and in the event of an anomaly at operational altitude (*SpaceX Gen2 Beacon Order*).[11] Authority to deploy the previously authorized 7,500 satellites in orbital shells at 340 km, 345 km, 350 km, and 360 km, in addition to the previously authorized orbital shells at 525 km, 530 km, and 535 km, and modification of authorization to permit full SCS operations in the United States and MSS for the purposes of direct-to-cell operations on certain frequencies in the 1429-2690 MHz bands outside the United States (*SpaceX Gen2 SCS and 300 km Order*).[12] Waiver of section 25.202(k)(1) of the Commission's rules permitting SpaceX to operate with aggregate out-of-band emissions (OOBE) in the United States at a power flux density (PFD) level up to -110.6 dBW/m^2/MHz. (*SpaceX SCS OOBE Waiver Order*).[13]
Service Area(s):	Global
Frequencies:	Service and Gateway Links: Ku-Bands:[14] 10.7-12.7 GHz (space-to-Earth) 12.7-12.75 GHz (Earth-to-space) 12.75-13.25 GHz (Earth-to-space)

[9] *Space Exploration Holdings, LLC, Application for Modification of the Authorization for the SpaceX Gen2 NGSO Satellite System*, Grant Stamp, ICFS File No. SAT-MOD-20230207-00021 (SB, SPPD, granted-in-part/deferred-in-part rel. Dec. 1, 2023) (*SpaceX SCS Modification Partial Grant*).

[10] *Space Exploration Holdings, LLC, Request for Orbital Deployment and Operating Authority for the SpaceX Gen2 NGSO Satellite System*, Order and Authorization, 39 FCC Rcd 2159 (SB rel. Mar. 8, 2024) (*SpaceX Gen2 E-Band Partial Grant*).

[11] *Space Exploration Holdings, LLC, Request for Orbital Deployment and Operating Authority for the SpaceX Gen2 NGSO Satellite System*, Order and Authorization, 39 FCC Rcd 12410 (SB rel. Nov. 20, 2024) (*SpaceX Gen2 Beacon Order*).

[12] *Space Exploration Holdings, LLC, Request for Deployment and Operating Authority for the SpaceX Gen2 NGSO Satellite System*, Order and Authorization, 39 FCC Rcd 12550 (SB rel. Nov. 26, 2024) (*SpaceX Gen2 SCS and 300 km Order*).

[13] *Space Exploration Holdings, LLC, Application for Authority for Modification of the SpaceX NGSO Satellite System to Add a Direct to Cellular System*, Order, 40 FCC Rcd 1521 (SB rel. Mar. 7, 2025) (*SpaceX SCS OOBE Waiver Order*).

[14] We authorize SpaceX to provide both FSS and MSS in the 14.0-14.5 GHz (Earth-to-space) band.

	13.75-14.0 GHz (Earth-to-space) 14.0-14.5 GHz (Earth-to-space) 14.5-14.75 GHz (Earth-to-space) 14.75-14.8 GHz (Earth-to-space) 15.43-15.63 GHz (Earth-to-space) Ka-Bands:[15] 17.3-17.8 GHz (space-to-Earth) and (Earth-to-space) 17.8-18.6 GHz (space-to-Earth) 18.6-18.8 GHz (space-to-Earth) 18.8-19.3 GHz (space-to-Earth) 19.3-19.7 GHz (space-to-Earth) 19.7-20.2 GHz (space-to-Earth) 24.75-25.25 GHz (Earth-to-space) 27.5-29.1 GHz (Earth-to-space) 29.1-29.5 GHz (Earth-to-space) 29.5-30.0 GHz (Earth-to-space) V-Bands:[16] 37.5-42.0 GHz (space-to-Earth) 42.0-42.5 GHz (space-to-Earth) (outside the U.S. only)[17] 47.2-50.2 GHz (Earth-to-space) 50.4-51.4 GHz (Earth-to-space) 51.4-52.4 GHz (Earth-to-space) E-Bands:[18] 71.0-76.0 GHz (space-to-Earth) 81.0-86.0 GHz (Earth-to-space) W-Bands: 92.0-94.0 GHz (Earth-to-space) 94.1-95.0 GHz (Earth-to-space) 95.0-100.0 GHz (Earth-to-space) 102.0-109.5 GHz (Earth-to-space) 111.8-114.25 GHz (Earth-to-space) Supplemental Coverage from Space (SCS) Frequencies (within the U.S.):[19] 1910-1915 MHz (Earth-to-space) 1990-1995 MHz (space-to-Earth)

[15] We authorize SpaceX to provide both FSS and MSS globally in the 19.7-20.2 GHz (space-to-Earth) and the 29.5-30.0 GHz (Earth-to-space) bands.

[16] We authorize SpaceX to provide both FSS and MSS globally in the 39.5-40.5 GHz (space-to-Earth) and 50.4-51.4 GHz (Earth-to-space) bands, and in ITU Region 2 in the 40.5-41.0 GHz (space-to-Earth) band.

[17] *See* SpaceX Gen2 Upgrade Amendment, Technical Attachment at 4, n. 7.

[18] We authorize SpaceX to provide both FSS and MSS globally in the 71.0-74.0 GHz (space-to-Earth) and the 81.0-84.0 GHz (Earth-to-space) bands.

[19] SpaceX is authorized to operate in these frequencies on up to 7,500 Gen2 satellites.

	MSS for Direct-to-Cell Operations (outside the U.S. only):[20] 1475-1518 MHz (space-to-Earth) 1805-1880 MHz (space-to-Earth) 1930-2000 MHz (space-to-Earth) 2110-2180 MHz (space-to-Earth) 2180-2200 MHz (space-to-Earth) 2345-2360 MHz (space-to-Earth) 2620-2690 MHz (space-to-Earth) 1429-1470 MHz (Earth-to-space) 1710-1785 MHz (Earth-to-space) 1850-1920 MHz (Earth-to-space) 1920-1980 MHz (Earth-to-space) 2000-2020 MHz (Earth-to-space) 2305-2320 MHz (Earth-to-space) 2500-2570 MHz (Earth-to-space) MSS (outside of the U.S.):[21] 1980-2010 MHz (Earth-to-space) 2010-2025 MHz (Earth-to-space) (Region 2 only) 2160-2170 MHz (space-to-Earth) (Region 2 only) 2170-2200 MHz (space-to-Earth) VHF beacons:[22] 137.0250-137.1750 MHz (space-to-Earth) 137.3275-137.3750 MHz (space-to-Earth) 137.4725-137.5350 MHz (space-to-Earth) 137.5850-137.6500 MHz (space-to-Earth) 137.8125-138.0000 MHz (space-to-Earth) 148.2500-148.5850 MHz (Earth-to-space) 148.6350-148.7500 MHz (Earth-to-space) 149.9000-149.9500 MHz (Earth-to-space)

Unless otherwise specified herein, operations under this grant must comport with the legal and technical specifications and commitments set forth by the applicant or petitioner and with the Federal Communications Commission's rules not waived herein. This grant is also subject to the conditions below.

1. SpaceX must operate on a non-harmful interference basis during orbit-raising, including launch and early orbit phase operations, and deorbiting of its satellites, including lowering operational satellites in the 500 km shells to the new shells in the 400 km range.
2. SpaceX's operations in Ku-band frequencies are subject to the following condition:
    a. SpaceX's request for waiver of the U.S. Table of Frequency Allocations (U.S. Table), section 2.106(a) of the Commission's rules, to receive uplinks in the 14.5-14.8 GHz band is GRANTED

[20] SpaceX is authorized to operate in these frequencies on up to 7,500 Gen2 satellites.

[21] SpaceX is authorized to operate in these frequencies on up to 7,500 Gen2 satellites.

[22] SpaceX is authorized to operate VHF beacons on up to 450 Gen2 satellites.

on an unprotected and non-interference basis.[23]

3. SpaceX's operations in Ka-band frequencies are subject to the following conditions:

   a. SpaceX's requests for waiver of the U.S. Table, section 2.106(a) of the Commission's rules, and the Commission's Ka-band plan, to permit NGSO FSS uplink operations in the 17.3-17.8 GHz[24] band and NGSO FSS downlink operations in the 18.6-18.8 GHz[25] band are GRANTED. SpaceX's operations in these bands under these waivers must be on an unprotected and non-interference basis.

   b. Prior to commencing uplink operations in the 17.3-17.8 GHz band, SpaceX must protect: (i) all operators in the band by completing coordination and providing the Commission a demonstration that its uplink operations will not cause harmful interference to receiving earth stations in the band; and (ii) all affected terrestrial operators in the 17.7-17.8 GHz band.

   c. In the 17.3-17.8 GHz band, SpaceX must comply with the same ITU EPFD uplink limits in Region 2 as required for NGSO FSS uplink earth stations in Regions 1 and 3. *See* ITU Radio Regulations, Article 22.

   d. SpaceX's request for waiver of the U.S. Table, section 2.106(a) of the Commission's rules, and the Ka-band plan to permit the use of the 19.4-19.6 GHz (space-to-Earth) and the 29.1-29.5 GHz (Earth-to-space) bands for FSS operations that are not limited to MSS feeder links is GRANTED.[26] SpaceX's operations in this band under this waiver must be on an unprotected and non-interference basis.

   e. Operations in the 19.4-19.6 GHz and 29.1-29.5 GHz bands for FSS user links must be on an unprotected and non-interference basis to MSS feeder link operations.[27] SpaceX may not commence FSS user link operations in these bands until it completes coordination with authorized MSS users.

   f. SpaceX's request for authority to operate in the 20.2-21.2 GHz and 30.0-31.0 GHz bands is

[23] SpaceX Gen2 Upgrade Amendment, Waiver Requests at 4-5; *see also* 47 CFR § 2.106(a). In the U.S. Table, the 14.5-14.8 GHz band is not allocated to the Fixed-satellite Service (FSS) (Earth-to-space) or to the Mobile-satellite Service (MSS) (Earth-to-space) for non-Federal use. *Id.*

[24] SpaceX Gen2 Upgrade Amendment, Waiver Requests at 5-6; *see also* 47 CFR § 2.106(a). In the U.S. Table, the 17.3-17.8 GHz band is allocated, *inter alia*, to the FSS (Earth-to-space) (space-to-Earth) on a primary basis for non-Federal use, for GSO uplink use and GSO and NGSO downlink use. 47 CFR § 2.106(a), (d)(58), (527). SpaceX's request for waiver of the U.S. Table, section 2.106(a) of the Commission's rules, to allow NGSO FSS downlink in the 17.3-17.8 GHz bands is DISMISSED as MOOT after the Commission's adoption of the *17 GHz Report and Order* and the effectiveness of those new rules to permit (space-to-Earth) downlink use of the 17.3-17.8 GHz band by NGSO FSS space stations. *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*, IB Docket No. 22-273, Report and Order, 39 FCC Rcd 11156 (2024) (*17 GHz Report and Order*). The rules became effective on January 6, 2025.

[25] SpaceX Gen2 Upgrade Amendment, Waiver Requests at 6-8; *see also* 47 CFR § 2.106(a). In the U.S. Table, the 18.6-18.8 GHz band is allocated, *inter alia*, to the FSS (space-to-Earth) on a primary basis for non-Federal use, limited to GSO networks. 47 CFR § 2.106(a), (d)(164).

[26] SpaceX Gen2 Upgrade Amendment, Waiver Requests at 8-11; *see also* 47 CFR § 2.106(a). In the U.S. Table, the 29.1-29.5 GHz band is allocated, *inter alia*, to the FSS (Earth-to-space) on a primary basis for non-Federal use, limited in the 29.1-29.25 GHz and 29.25-29.5 GHz bands to feeder links for NGSO systems in the MSS, and in the 29.25-29.5 GHz band for GSO networks. 47 CFR §§ 2.106(a), (d)(166), (535). The 19.3-19.7 GHz band is allocated, *inter alia*, to the FSS (space-to-Earth) on a primary basis for non-Federal use, with the 19.4-19.6 GHz band limited to feeder links for NGSO systems in the MSS. 47 CFR § 2.106(a), (d)(166).

[27] SpaceX is required to protect any future operators of MSS feeder links in these bands operating in accordance with the U.S. Table.

DEFERRED.

4. SpaceX's request for waiver of sections 25.146(a)(2) and (c) of the Commission's rules to exceed any applicable equivalent power flux density (EPFD) limits within the territories of the United States is GRANTED, as discussed in the accompanying Order. SpaceX's request to remove the condition requiring operation with only one co-frequency, co-polarization beam in any given location in the 12.2-12.7 GHz and 19.7-20.2 GHz bands is GRANTED, to the extent set forth below and as discussed in the accompanying Order. SpaceX's operations are subject to the following conditions:
    a. In the Ku-band, SpaceX may not use more than eight (8) satellite beams from any of its authorized Gen2 Starlink satellites in the same frequency in the same or overlapping areas at a time.
    b. SpaceX must maintain a minimum GSO arc exclusion zone of at least four (4) degrees with respect to operational GSO satellites.
    c. Operations outside of the United States must comply with the EPFD limits in the Commission's rules, except to the extent another country has authorized different operational limits for communications from satellites to earth stations within that country.
    d. SpaceX's operations pursuant to this waiver must be conducted on an unprotected and non-interference basis. In the event the Space Bureau notifies SpaceX of a determination that it has caused harmful interference, SpaceX must immediately return to operating in accordance with the Commission's EPFD limits in the affected frequency bands. SpaceX will also be required to communicate to its affected customers how it is rectifying the situation if mediation will affect their service. The Space Bureau will revoke the waiver in the event of unresolved harmful interference.
    e. We previously granted SpaceX a partial waiver of section 25.146(c) to allow it to begin operations prior to receiving a favorable or qualified favorable finding from the ITU.[28] Until SpaceX receives a favorable or qualified favorable finding from the ITU pursuant to 47 CFR § 25.146 for all authorized Gen2 satellites, SpaceX must make available to any requesting party the data used as input to the ITU-approved validation software to demonstrate compliance with applicable EPFD limits for its operations outside the U.S., including the data that combine the Gen2 Starlink satellites into one consolidated file.
5. SpaceX's operations in V-band frequencies are subject to the following conditions:
    a. SpaceX's request for waiver of the U.S. Table, section 2.106(a) of the Commission's rules, to permit NGSO FSS uplink operations in the 51.4-52.4 GHz band is GRANTED.[29] SpaceX's operations under this waiver in this band must be on an unprotected and non-interference basis.
    b. On our own motion, we grant SpaceX a waiver of the U.S. Table, section 2.106(a) of the Commission's rules, to allow SpaceX to provide MSS in addition to FSS in the 39.5-40.0 GHz band. SpaceX's MSS operations in this band must be on an unprotected, non-interference basis.
6. SpaceX's operations in E-band frequencies are subject to the following conditions:
    a. SpaceX must coordinate its proposed frequency use for operations in the 71.0-76.0 GHz (space-to-Earth) and 81.0-86.0 GHz (Earth-to-space) frequency bands with any existing terrestrial or satellite U.S. licensees or U.S. market access grantees in the FSS whose facilities could be affected by SpaceX's E-band operations, in terms of frequency interference or restricted capacity,

[28] *See SpaceX Gen2 First Partial Grant*, 37 FCC Rcd at 14907-910, paras. 37-40.

[29] *See* SpaceX Gen2 Upgrade Amendment, Waiver Request at 12-13. In the U.S. Table, the 51.4-52.6 GHz band is allocated to the Fixed service and the Mobile service on a primary basis for Federal and non-Federal use. 47 CFR § 2.106(a).

and SpaceX must cooperate fully with other future co-frequency FSS satellites or satellite systems in these bands.

b. SpaceX must comply with any sharing requirements adopted as part of a future E-band processing round that includes the 71.0-76.0 GHz and 81.0-86.0 GHz bands.

7. SpaceX's request for waiver of the U.S. Table, section 2.106(a) of the Commission's rules, for NGSO uplink operations in the 92.0-94.0 GHz (Earth-to-space), 94.1-95.0 GHz (Earth-to-space), 95.0-100.0 GHz (Earth-to-space), 102.0-109.5 GHz (Earth-to-space), and 111.8-114.25 GHz (Earth-to-space) bands (W-band frequencies), is GRANTED.[30] SpaceX must operate on an unprotected and non-interference basis in these bands.[31]

8. SpaceX's Supplemental Coverage from Space (SCS) operations in the United States and direct-to-cell operations outside the United States are subject to the following conditions:

a. When conducting direct-to-cell operations in the licensed frequencies (space-to-Earth) and (Earth-to-space) outside the United States, SpaceX shall not cause harmful interference to, and shall not claim protection from harmful interference caused by, a station operating in accordance with the provisions of the Constitution, the Convention, and the ITU Radio Regulations.[32]

b. SpaceX's SCS operations in the 1910-1915 MHz and 1990-1995 MHz bands shall not cause harmful interference to other countries' operations and SpaceX must address and eliminate any harmful interference cases immediately.

c. For SCS operations in the United States and direct-to-cell operations outside the United States, SpaceX may only operate on a non-harmful interference basis with respect to cross-border operations. Accordingly, SpaceX may only exceed PFD limits where it has been authorized pursuant to an approval from the regulatory authority of the appropriate border country and after providing documentation of such approval to the Commission. Cross-border coordination and any negotiated technical parameters must be mutually acceptable to all involved, including U.S. counterpart agencies who oversee or regulate spectrum use in other countries.

d. As directed by the Commission in paragraph 235 in the *SCS Report and Order* (FCC 24-28), prior to conducting any direct-to-cell operations with earth stations outside the United States, SpaceX must submit a certification to the Space Bureau and Office of International Affairs (OIA).[33]

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[30] *See* SpaceX Gen2 Upgrade Amendment, Waiver Requests at 13-16. In the U.S. Table, the 92.0-94.0 GHz and 94.1-95.0 GHz bands are allocated to the Fixed, Mobile, Radio Astronomy, and Radiolocation services on a primary basis for Federal and non-Federal use; the 95.0-100.0 GHz band is allocated to the Fixed, Mobile, Radio Astronomy, Radiolocation, Radionavigation, and Radionavigation-Satellite services on a primary basis for Federal and non-Federal use; the 102.0-105.0 GHz band is allocated to the Fixed, Mobile, and Radio Astronomy services on a primary basis for Federal and non-Federal use; and the 105.0-109.5 GHz and 111.8-114.25 GHz bands are allocated to the Fixed, Mobile, Radio Astronomy, and Space Research (passive) services on a primary basis for Federal and non-Federal use. 47 CFR § 2.106(a).

[31] *See* ITU Radio Regulations, Article 4.4.

[32] *See id.* (stating that "[a]dministrations of the Member States shall not assign to a station any frequency in derogation of either the Table of Frequency Allocations in this Chapter or the other provisions of these Regulations, except on the express condition that such a station, when using such a frequency assignment, shall not cause harmful interference to, and shall not claim protection from harmful interference caused by, a station operating in accordance with the provisions of the Constitution, the Convention and these Regulations"); *see also Single Network Future: Supplemental Coverage from Space, Space Innovation*, GN Docket No. 23-65, IB Docket 22-271, Report and Order and Further Notice of Proposed Rulemaking, 39 FCC Rcd 2622, at 2723-2724, paras. 224-36 (2024) (*SCS R&O*).

[33] *SCS R&O* at paras. 235, 39.

e. We previously granted SpaceX's request for waiver of section 25.202(k)(1) of the Commission's rules,[34] permitting SpaceX to conduct SCS operations in the United States with an aggregate out-of-band emission PFD level up to -110.6 dBW/m^2/MHz.[35] SpaceX must operate pursuant to this waiver.

9. SpaceX's operations in the licensed 137.0-138.0 MHz (space-to-Earth), 148.0-150.05 MHz (Earth-to-space), 2345-2360 MHz (space-to-Earth) (outside of the U.S.), 12.7-12.75 GHz (Earth-to-space), 27.5-29.1 GHz (Earth-to-space), 29.1-30.0 GHz (Earth-to-space), 42.0-42.5 GHz (space-to-Earth), and 102.0-109.5 GHz (Earth-to-space) bands shall not cause harmful interference to current and future operational U.S. Federal systems operating pursuant to primary Federal allocations. SpaceX shall coordinate through mutual exchange of system information, to the extent possible consistent with national security requirements, in good faith, and on an ongoing basis, with potentially affected U.S. Federal systems to ensure protection of operational U.S. Federal systems. In all cases, SpaceX must provide all necessary system information and technical parameters to the affected Federal entities to allow those entities to conduct their required interference analysis. SpaceX shall maintain sufficient information to timely investigate and resolve documented instances of harmful interference and make available such information to affected Federal entities upon request. SpaceX shall adjust its operations to accommodate future operational U.S. Federal systems and aggregate effects into U.S. Federal systems. Upon receiving a documented report of harmful interference from an affected U.S. Federal system, SpaceX shall immediately cease the operation causing the harmful interference until the issue is resolved and coordination with the affected Federal entity is complete.

10. SpaceX must complete coordination with potentially affected Federal Agencies and Services engaged in national security or safety-of-life services, through mutual exchange of system information to the extent possible consistent with national security requirements, prior to operating in the 13.75-14.0 GHz (Earth-to-space), 14.5-14.75 GHz (Earth-to-space), 14.75-14.80 GHz (Earth-to-space), 15.43-15.63 GHz (Earth-to-space), 17.3-17.8 GHz (space-to-Earth), 17.8-18.6 GHz (space-to-Earth), 18.6-18.8 GHz (space-to-Earth), 18.8-19.3 GHz (space-to-Earth), 19.3-19.7 GHz (space-to-Earth), 19.7-20.2 GHz (space-to-Earth), 24.75-25.25 GHz (Earth-to-space), 37.5-41.0 GHz (space-to-Earth), 47.2-50.2 GHz (Earth-to-space), 50.4-52.4 GHz (Earth-to-space), 71.0-76.0 GHz (space-to-Earth), 81.0-86.0 GHz (Earth-to-space), 92.0-94.0 GHz (Earth-to-space), 94.1-95.0 GHz (Earth-to-space), 95.0-100.0 GHz (Earth-to-space), and 111.8-114.25 GHz (Earth-to-space) bands, which are allocated on a primary basis to Federal services or are adjacent to primary Federal allocations. SpaceX shall notify the Commission within 30 days after completion of coordination, with a copy to NTIA and the relevant Federal entity. Notification shall be submitted to the FCC's ICFS. Two weeks prior to the start of any operations in such bands, SpaceX must provide contact information for a 24/7 point of contact for the resolution of any harmful interference to contacts provided by the NTIA.

11. SpaceX's MSS operations in the Ku-, Ka-, V-, and E-bands must comply with the same technical parameters as its FSS operations.

12. SpaceX's request for waiver of sections 25.156 and 25.157 of the Commission's processing round rules for additional frequencies in the Ku-, Ka-, V-, and W-bands is GRANTED.[36] SpaceX must coordinate with any and all existing and future FSS operators in these bands and comply with any sharing requirements that may be adopted as part of a future processing round in these bands. Finally, SpaceX's authorization is subject to any rules adopted as part of the *Satellite Spectrum Abundance* proceeding.[37]

[34] 47 CFR § 25.202(k)(1).

[35] *See generally SpaceX SCS OOBE Waiver Order.*

[36] *See* SpaceX Gen2 Upgrade Amendment, Waiver Requests at 19-22; SpaceX January 31, 2025 Letter, at 3-7; 47 CFR §§ 25.156, 25.157.

[37] *See Spectrum Abundance NPRM.*

13. SpaceX must comply with the following conditions:

    a. SpaceX must comply with ITU Resolution 8. For Gen2 satellites that have been used to count towards an ITU Resolution 35 milestone, SpaceX must maintain orbital tolerances of +/-30 km altitude and +/-2 degrees inclination per *resolves* 11 of Resolution 8. For submission to ITU by the Commission per *resolves* 14 of Resolution 8, for any satellite that has been used to count towards an ITU milestone and that exceeds the allowed orbital tolerance of +/- 30 km for more than 60 consecutive days between the observed apogee or perigee of a satellite and the apogee and perigee previously declared to the ITU, SpaceX shall provide to the Commission within 15 days after the end of that 60-day period, the information in Annex 1 to Resolution 8 for these satellites for submission to the ITU.

    b. SpaceX must deploy and operate its Gen2 constellation in a manner consistent with its ITU filings. SpaceX must submit modified ITU filings prior to modifying its deployment or operational configuration of its Gen2 constellation.

    c. SpaceX is authorized to lower the satellites currently operating in shells at 525 km, 530 km, and 535 km to the new orbital shells at 480 km, 485 km, and 475 km, respectively. SpaceX may continue to operate satellites in its previously authorized 525 km, 530 km, and 535 km shells during this process. SpaceX must also notify the Commission within 30 days after orbit lowering has been completed for all satellites in the 500 km shells.

    d. SpaceX must provide a semi-annual report, by January 1 and July 1 each year, covering the preceding six-month period, respectively, from June 1 to November 30 and December 1 to May 31. The report should include the following information:

        i. The number of conjunction events identified for Starlink satellites during the reporting period, and the number of events that resulted in an action (maneuver or coordination with another operator), as well as any difficulties encountered in connection with the collision avoidance process and any measures taken to address those difficulties;

        ii. Satellites that, for purposes of disposal, were removed from operation or screened from further deployment at any time following initial deployment, and identifying whether this occurred less than five years after the satellite began regular operations or were available for use as an on-orbit replacement satellite;

        iii. Satellites that re-entered the atmosphere;

        iv. Satellites for which there was a disposal failure, *i.e.*, a satellite that loses the capability to maneuver effectively after being raised from its injection, including a discussion of any assessed cause of the failure and remedial actions. For each such satellite, SpaceX shall report an estimated orbital lifetime for the satellite following the failure, and for the Gen2 Starlink constellation the cumulative number of failed satellite object years; and

        v. Identification of any collision avoidance system outages or unavailability, either on a system-wide basis or for individual satellites. An "outage" would include any individual satellite anomaly that results in a satellite not achieving targeted risk mitigation via maneuver.

    e. In the event of satellite failures resulting in more than 100 post-failure object years, SpaceX may not deploy any additional satellites until the Commission has approved a license modification that includes an updated orbital debris mitigation plan addressing reduction in the failure rate or mitigation of the risk of satellite failures.

14. This authorization is also subject to the following requirements:

a. Applicable to SpaceX Gen2 satellites:[38]

i. SpaceX must launch 50 percent of the maximum number of authorized space stations, place them in the assigned orbits, and operate them in accordance with the station authorization no later than December 1, 2028, and SpaceX must launch the remaining space stations necessary to complete its authorized service constellation, place them in their assigned orbits, and operate each of them in accordance with the authorization no later than December 1, 2031.[39]

b. Applicable to SpaceX operations in the V-band on its first tranche of 7,500 satellites:[40]

i. SpaceX must launch 50 percent of the maximum number of previously-authorized space stations with V-band capabilities, place them in the assigned orbits, and operate them in accordance with this grant no later than November 19, 2024,[41] and must launch the remaining space stations necessary to complete its authorized V-band system, place them in their assigned orbits, and operate them in accordance with the authorization no later than November 19, 2027.[42]

15. SpaceX's requests pertaining to waiving part of section 25.114(a)(1) of the Commission's rules due to various limitations in the Schedule S software are GRANTED.[43]

16. This grant is without prejudice to any future action taken in connection with the SpaceX Gen2 Starlink constellation, call signs S2992 and S3069.

Licensee/grantee is afforded thirty (30) days from the date of release of this action to decline the grant as conditioned. Failure to respond within this period will constitute formal acceptance of the grant as conditioned.

This action is taken pursuant to Section 0.261 of the Commission's rules on delegated authority, 47 CFR § 0.261, and is effective upon release.

Station licenses are subject to the conditions specified in Section 309(h) of the Communications Act of 1934, as amended, 47 U.S.C. § 309(h).

Action Date:	January 9, 2026

[38] We note that although we authorize SpaceX to operate in additional frequencies on its Gen2 satellites and with an additional 7,500 satellites, we retain the current milestones for the Gen2 system, including for V-band space stations on the second tranche of 7,500 satellites. *See* 47 CFR § 25.164(h).

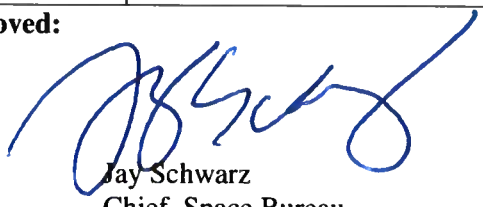
[39] 47 CFR § 25.164(b). SpaceX posted the surety bond for its Gen2 satellites operating in the Ku-, Ka-, and E-band frequencies. *See* Bond of Space Exploration Holdings LLC, ICFS File Nos. SAT-LOA-20200526-00055 and SAT-AMD-20210818-00105 (filed Dec. 30, 2022).

[40] *See SpaceX First V-band Modification Grant*. The separate milestones applicable to SpaceX's V-band operations are consistent with SpaceX's original V-band authorization. SpaceX filed its surety bond in accordance with the condition on its original V-band authorization on December 3, 2018. *See* Bond of Space Exploration Holdings, LLC, ICFS File No. SAT-LOA-20170301-00027 (filed Dec. 3, 2018).

[41] SpaceX has requested modification of its milestone related to its first tranche of V-band satellites. This authorization is without prejudice to any action taken in that proceeding. *See* ICFS File No. SAT-MOD-20240813-00183.

[42] 47 CFR § 25.164(b).

[43] SpaceX Gen2 Upgrade Modification, Waiver Requests at 4-7; SpaceX Gen2 Upgrade Amendment, Waiver Requests at 22-25.

Term Dates:	From: January 9, 2026	To: February 10, 2038[44]
Approved:  Jay Schwarz Chief, Space Bureau		

[44] SpaceX informed the Commission that the first Gen2 Starlink satellite was placed into its authorized orbit and began operating on February 10, 2023. *See* Letter from David Goldman, Senior Director, Satellite Policy, Space Exploration Technologies Corp., to Marlene H. Dortch, Secretary, FCC, ICFS File No. SAT-LOA-20200526-00055 (filed Jun. 20, 2023).

ORDER

Space Exploration Holdings, LLC

ICFS File Nos. SAT-LOA-20200526-00055, SAT-AMD-20210818-00105, SAT-AMD-20221216-00175, SAT-AMD-20241017-00228, SAT-MOD-20241011-00224

I. INTRODUCTION

1. Today, we partially grant the application, as amended, of Space Exploration Holdings, LLC (SpaceX) to deploy and operate a constellation of non-geostationary orbit (NGSO) second-generation Starlink satellites (Gen2 Starlink), as well as partially grant SpaceX's application to modify the frequency use, orbital parameters, and physical form factors of the previously-authorized Gen2 Starlink satellites (collectively, the Gen2 Upgrade Applications).[1] This Order provides the basis for our partial grant of SpaceX's Gen2 Upgrade Applications.[2]

2. Today's action will allow SpaceX to dramatically improve services to customers in America and worldwide, while still protecting incumbent services and the orbital environment. SpaceX's Starlink service has already had a transformative impact on American communities and businesses that are unserved or underserved by terrestrial broadband, allowing for advanced educational and healthcare services and greater participation in civic life.[3] The Gen2 Starlink Upgrade satellites, including an increased number of satellites, will allow for higher capacity to serve additional customers and gigabit

[1] *See* Space Exploration Holdings, LLC, Application for Modification of Authorization for the SpaceX Gen2 NGSO Satellite System, ICFS File No. SAT-MOD-20241011-00224 (SpaceX Gen2 Upgrade Modification); Space Exploration Holdings, LLC, Application for Amendment of Application for the SpaceX Gen2 NGSO Satellite System, ICFS File No. SAT-AMD-20241017-00228 (SpaceX Gen2 Upgrade Amendment); *see also* Space Exploration Holdings, LLC, Application for Orbital Deployment and Operating Authority for the SpaceX Gen2 NGSO Satellite System, ICFS File No. SAT-LOA-20200526-00055 (filed May 26, 2020) (SpaceX Gen2 Application); Space Exploration Holdings, LLC, Amendment to Pending Application for the SpaceX Gen2 NGSO Satellite System, ICFS File No. SAT-AMD-20210818-00105 (filed Aug. 18, 2021) (SpaceX Gen2 Amendment); Space Exploration Holdings, LLC, Amendment to Pending Application for the SpaceX Gen2 NGSO Satellite System, ICFS File No. SAT-AMD-20221216-00175 (filed Dec. 16, 2022) (SpaceX Gen2 Beacon Amendment). The original application, as amended, requested up to 29,988 Gen2 Starlink satellites operating in specific orbital shells between 340 km and 614 km and communicating using frequencies in the Ku-, Ka-, and E-bands.

[2] *See* the partial grant, above, for a complete description of the satellites, orbital parameters, frequencies, and relevant license conditions.

[3] *See e.g.* Letter from Dr. Teresa Tyson, Executive Director, The Health Wagon, to Marlene H. Dortch, Secretary, FCC, ICFS File Nos. SAT-MOD-20241011-00224 and SAT-AMD-20241017-00228 (dated Mar. 4, 2025) (Health Wagon March 4, 2025 Letter); Letter from Deza J. Hall, Clerk, Wise County Circuit Court Office, to Marlene H. Dortch, Secretary, FCC, ICFS File Nos. SAT-MOD-20241011-00224 and SAT-AMD-20241017-00228 (dated Mar. 4, 2025) (Wise County March 4, 2025 Circuit Court Clerk Letter); Letter from Donald Purdie, President and CEO, Appalachian Broadband Innovators, to Marlene H. Dortch, Secretary, FCC, ICFS File Nos. SAT-MOD-20241011-00224 and SAT-AMD-20241017-00228 (dated March 3, 2025) (Appalachian Broadband Innovators March 7, 2025 Letter); Letter from Don M. Green, Executive Director, Napoleon Hill Foundation, to Marlene H. Dortch, Secretary, FCC, ICFS File Nos. SAT-MOD-20241011-00224 and SAT-AMD-20241017-00228 (dated Mar. 10, 2025) (NHF March 10, 2025 Letter); Letter from Richard J. Peterson, President, Central Counsel of the Tlingit and Haida Indian Tribes of Alaska, to Marlene H. Dortch, Secretary, FCC, ICFS File Nos. SAT-MOD-20241011-00224 and SAT-AMD-20241017-00228 (dated Mar. 10, 2025) (Tlingit and Haida Tribes March 10, 2025 Letter); Letter from Colby Hall, Executive Director, Shaping Our Appalachian Region, to Marlene H. Dortch, Secretary, FCC, ICFS File Nos. SAT-MOD-20241011-00224 and SAT-AMD-20241017-00228 (dated Mar. 10, 2025) (SOAR March 10, 2025 Letter); Letter from Peter Lord, Senior Vice President, Oracle, to Marlene H. Dortch, Secretary, FCC, ICFS File Nos. SAT-MOD-20241011-00224 and SAT-AMD-20241017-00228 (dated Mar. 10, 2025) (Oracle March 10, 2025 Letter); Letter from Jon McKeown, Chief Procurement Officer, Carnival Corporation, to Marlene H. Dortch, Secretary, FCC, ICFS File Nos. SAT-MOD-20241011-00224 and SAT-AMD-20241017-00228 (dated Mar. 10, 2025) (Carnival March 10, 2025 Letter).

speed service, including symmetrical download and upload speeds.[4] Authorizing SpaceX to increase the size of its Gen2 constellation and to communicate using additional spectrum will also support American technological innovation and promote American competitiveness and dominance in space.

II. BACKGROUND

3. This grant builds on previous partial grants of SpaceX's Gen2 Starlink system, as SpaceX iteratively develops, deploys, and operates new satellites.[5] In October 2024, SpaceX filed the Gen2 Upgrade Applications, collectively requesting to modify the orbital parameters and frequency operations of the previously-authorized and pending Gen2 Starlink satellites.[6] SpaceX requests waivers of the U.S. Table of Frequency Allocations (U.S. Table) to operate in additional proposed frequency bands and requests waivers of the Commission's processing round rules and equivalent power flux density (EPFD) limits. The Gen2 Upgrade Applications were placed on public notice on February 7, 2025.[7]

III. DISCUSSION

4. After review of the record, we find partial grant of SpaceX's Gen2 Upgrade Applications, with conditions, serves the public interest. Below, we address the various outstanding issues raised by SpaceX's applications and comments in the record.

A. New Satellites and Orbital Flexibility

5. We grant SpaceX authority to deploy a second tranche of 7,500 Gen2 Starlink satellites, bringing the total size of the authorized Gen2 Starlink constellation to 15,000 satellites. While SpaceX requests action on its entire proposed 29,988-satellite constellation,[8] we proceed incrementally here.[9]

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[4] Gen2 Upgrade Amendment, Narrative at 8-13; Gen2 Upgrade Modification, Narrative at 11-16.

[5] For a complete description of the history of SpaceX's authorizations, see the Previous Grants section of the above grant.

[6] *See generally* SpaceX Gen2 Upgrade Modification; SpaceX Gen2 Upgrade Amendment. The Gen2 Upgrade Modification focused on changes to the orbital configuration of the previously-authorized 7,500 Gen2 Starlink satellites, while the amendment requested changes to the orbital configuration of the pending portion of the Gen2 application, as amended, and also requested additional frequency bands and associated waiver requests. We note the amendment included the changes to the orbital configuration for the orbital shells below 400 km, which the Space Bureau had not authorized at the time of filing. SpaceX later clarified that the additional frequencies and waiver requests included in its amendment were meant to apply to all 29,988 satellites, including the previously-authorized 7,500 satellites, and that the upgrade modification and amendment applications were meant to be read in tandem. SpaceX therefore incorporated the frequency requests and associated waivers included in the Gen2 Upgrade Amendment into the Gen2 Upgrade Modification. *See* Letter from Jameson Dempsey, Director of Satellite Policy, Space Exploration Technologies Corp., to Marlene H. Dortch, Secretary, FCC, ICFS File Nos. SAT-LOA-20200526-00055, SAT-AMD-20210818-00105, SAT-AMD-20221216-00175, SAT-AMD-20241017-00228, SAT-MOD-20241011-00224 at 1-2 (filed Jan. 31, 2025) (SpaceX January 31, 2025 Letter).

[7] *See Satellite Licensing Division and Satellite Programs and Policy Division Information, Space Station Applications Accepted for Filing*, Public Notice, Report No. SAT-01892 (Feb. 7, 2025). A number of satellite companies, industry groups, and members of the public filed petitions, comments, and letters regarding SpaceX's modification and amendment. *See e.g.*, ICFS File Nos. SAT-MOD-20241011-00224 and SAT-AMD-20241017-00228. A number of parties also filed petitions and/or comments in response to the initial Gen2 application. We address these comments as they pertain to the second tranche of 7,500 satellites we authorize in this grant. *See Space Exploration Holdings, LLC, Request for Orbital Deployment and Operating Authority for the SpaceX Gen2 NGSO Satellite System*, Order and Authorization, 37 FCC Rcd 14882, 14887-88, 14889-93, paras. 6, 9, n.35, n.51, n.52, n.54, n.55, n.56, n.57, n.58, n.59, n.60, n.61 (2022) (*SpaceX Gen2 First Partial Grant*) (describing the record before the Commission adopted the *SpaceX Gen2 First Partial Grant*).

[8] See Gen2 Upgrade Amendment, Narrative at 2, N.7; Gen2 Upgrade Modification, Narrative at II, N.2.

[9] *See e.g.* Petition of Viasat, Inc. to Deny, ICFS File Nos. SAT-LOA-20200526-00055, SAT-AMD-20210818-

(continued....)

SpaceX has been launching Gen2 Starlink satellites at a rapid cadence.[10] As discussed in more detail below, the Space Bureau has evaluated the real-world performance of the Gen2 Starlink satellites launched to date,[11] and we find that authorization for additional satellites is in the public interest, even as the Gen2 Starlink Upgrade satellites remain untested on orbit. We defer authorization of the remaining 14,988 proposed Gen2 Starlink satellites, including satellites proposed for operations above 600 km.[12]

6. We also authorize SpaceX to more flexibly distribute its satellites by deploying up to 144 satellites in up to 72 planes in each of the 340 km, 345 km, 350 km, 355 km, and 365 km orbital shells and by deploying up to 120 satellites in up to 56 planes in the 480 km and 485 km orbital shells. SpaceX is also authorized to deploy satellites with orbital tolerances for altitude and inclination consistent with the updates to the ITU Radio Regulations following the 2023 World Radiocommunication Conference.[13] We find the conditions we place on SpaceX's authorization should resolve commenters' concerns that granting SpaceX the additional flexibility it requested could foreclose access to space or will make it more difficult for other operators to evaluate potential interference.[14] Additionally, SpaceX is only granted flexibility in the deployment and operation of its Gen2 Starlink system consistent with the ITU Radio Regulations, and SpaceX must operate consistent with its ITU filings, which are publicly available. Other operators can stay informed of SpaceX's deployment and coordinate with SpaceX via the ITU process. If SpaceX plans to change the orbital parameters of its Gen2 Starlink system within the envelope of its authorized parameters, it may do so, without applying for a modification with the Commission, but with the appropriate modification of its ITU filing or filings.

B. Radiofrequency Operations and Associated Waivers

7. Below we discuss the waivers associated with grant of SpaceX's request to operate in

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00105, SAT-AMD-20221216-00175, SAT-MOD-20241011-00224, and SAT-AMD-20241017-00228 at 26-28 (filed Mar. 10, 2025) (Viasat 2025 Petition); Reply Comments of Eutelsat S.A. and WorldVu Satellites Limited, ICFS File Nos. SAT-MOD-20241011-00224, SAT-AMD-20241017-00228 at 6 (filed Apr. 4, 2025) (Eutelsat Reply).

[10] *See SpaceX launches 10,000th Starlink internet satellite*, https://www.theverge.com/news/802509/starlink-launches-10000th-internet-satellite (last accessed Dec. 18, 2025).

[11] Report of Space Exploration Holdings LLC, ICFS File Nos. SAT-LOA-20200526-00055 and SAT-AMD-20210818-00105 (filed Dec. 30, 2022) (SpaceX Gen2 December 30, 2022 Report); Report of Space Exploration Holdings LLC, ICFS File Nos. SAT-LOA-20200526-00055 and SAT-AMD-20210818-00105 (filed Jun. 30, 2023) (SpaceX Gen2 June 30, 2023 Report); Report of Space Exploration Holdings LLC, ICFS File Nos. SAT-LOA-20200526-00055 and SAT-AMD-20210818-00105 (filed Dec. 29, 2023) (SpaceX Gen2 December 29, 2023 Report); Report of Space Exploration Holdings LLC, ICFS File Nos. SAT-LOA-20200526-00055 and SAT-AMD-20210818-00105 (filed Jul. 1, 2024) (SpaceX Gen2 July 1, 2024 Report); Report of Space Exploration Holdings LLC, ICFS File Nos. SAT-LOA-20200526-00055 (filed Dec. 31, 2024) (SpaceX Gen2 December 31, 2024 Report); Report of Space Exploration Holdings, LLC, ICFS File Nos. SAT-MOD-20200417-00037, SAT-20200526-00055, and SAT-AMD-20210818-00105 (filed Jul. 1, 2025) (SpaceX Gen1 and Gen2 July 1, 2025 Report).

[12] See above grant for a full description of authorized orbital parameters.

[13] *See* International Telecommunication Union, Radio Regulations, Resolution 8.

[14] *See* Viasat 2025 Petition at 23-26; Comments of SES Americom, Inc. and O3b Limited, ICFS File Nos. SAT-MOD-20241011-00224 and SAT-AMD-20241017-00228 at 10 (filed Mar. 10, 2025) (SES/O3b Comments); *but see* Opposition and Response of Space Exploration Holdings, LLC, ICFS File Nos. SAT-MOD-20241011-00224 and SAT-AMD-20241017-00228 at 34, 36, 37 (filed Mar. 25, 2025) (SpaceX Opposition) (arguing the upgraded Gen2Starlink constellation will share orbital resources efficiently and responsibly, including by making its satellites' orbits available to the public and operating to promote space sustainability); Reply Comments of Telesat Canada, ICFS File Nos. SAT-AMD-20241017-00228 and SAT-MOD-20241011-00224 at 2-3 (filed Apr. 4, 2025) (Telesat Reply) (supporting SpaceX's request for flexibility and arguing the multiple possible configurations do not have a meaningful impact on the interference environment).

additional frequency bands,[15] waiver of the processing round rules, and waiver of the EPFD limits, and address comments filed in response to SpaceX's request.

8. *Waiver standard.* As an initial matter, generally, the Commission may waive any rule for good cause shown.[16] Waiver is appropriate only if both (1) special circumstances warrant a deviation from the general rule, and (2) such deviation better serves the public interest.[17] In making this determination, we may take into account considerations of hardship, equity, or more effective implementation of overall policy on an individual basis.[18]

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[15] For a full list of all authorized frequencies, including previously-authorized bands and bands we authorize today, as well as specifics on the number of satellites operating in each band and locations where those operations are authorized, see the frequencies section of the grant above. Some of the requested frequencies are included in a recent Commission notice of proposed rulemaking to make more spectrum available for satellite communications, and these frequencies are subject to the outcome of that rulemaking. *Satellite Spectrum Abundance*, Further Notice of Proposed Rulemaking and Notice of Proposed Rulemaking, FCC 25-29 (2025) (*Spectrum Abundance NPRM*). We note Echostar originally objected to SpaceX's proposed use of the 2000-2020 MHz, 2020-2025 MHz, 2160-2170 MHz, and 2180-2200 MHz bands. Reply Comments of EchoStar Corporation, ICFS File Nos. SAT-MOD-20241011-00224 and SAT-AMD-20241017-00228 at 17-18 (filed Apr. 4, 2025) (EchoStar Reply). Given Echostar's pending sale of this spectrum to SpaceX and SpaceX's parallel application for a separate satellite constellation using this spectrum, we find that Echostar's objection does not warrant denying SpaceX's request to operate in these bands. *See* Applications of Spectrum Business Trust 2025-1, Space Exploration Technologies Corp., and EchoStar Corporation for Consent to Assign Spectrum and Earth Station Licenses (GN Docket No. 25-302); *see also,* ICFS file no. SAT-LOA-20250916-00282, GN Docket No. 25-340. Except as authorized in this grant, we defer consideration of SpaceX's broader request to operate mobile satellite service (MSS) in the full 1429-2690 MHz range, and thus we do not discuss the merits of petitions, comments, and letters received on the record on that matter. *See e.g.,* Petition of Globalstar, Inc. to Deny, ICFS File Nos. SAT-MOD-20241011-00224 and SAT-AMD-20241017-00228 (filed Mar. 10, 2025) (Globalstar Petition); Petition of Iridium Constellation LLC to Dismiss or Deny in Part, ICFS File Nos. SAT-MOD-20241011-00224 and SAT-AMD-20241017-00228 at 1-2, 3-6 (filed Mar. 10, 2025) (Iridium Petition); Letter from Kara Leibin Azocar, Vice President Regulatory, Iridium Constellation LLC, to Marlene H. Dortch, Secretary, FCC, ICFS File Nos. SAT-MOD-20241011-00224 and SAT-AMD-20241017-00228 (dated Mar. 10, 2025) (Iridium/IMSO March 10, 2025 Letter); Letter from Michele Lawrie-Munro, Executive Director, Mobile Satellite Services Association, to Marlene H. Dortch, Secretary, FCC, ICFS File Nos. SAT-MOD-20241011-00224 and SAT-AMD-20241017-00228 (dated Mar. 10, 2025) (MSSA March 10, 2025 Letter); Letter from Steven Doiron, Vice President of Spectrum and Regulatory Affairs, Thuraya Telecommunications Company, to Marlene H. Dortch, Secretary, FCC, ICFS File Nos. SAT-MOD-20241011-00224 and SAT-AMD-20241017-00228 (dated Mar. 10, 2025) (Thuraya March 10, 2025 Letter); Comments of the Aerospace and Flight Test Radio Coordinating Council, Inc., ICFS File Nos. SAT-MOD-20241011-00224 and SAT-AMD-20241017-00228 (filed Mar. 10, 2025) (AFTRCC Comments); Letter from Veronique Blanc, Director of Partner Management, SITA, to Marlene H. Dortch, Secretary, FCC, ICFS File Nos. SAT-MOD-20241011-00224 and SAT-AMD-20241017-00228 (dated Mar. 10, 2025) (SITA March 10, 2025 Letter); Comments of GPS Innovation Alliance, ICFS File Nos. SAT-MOD-20241011-00224 and SAT-AMD-20241017-00228 (filed Mar. 10, 2025) (GPSIA Comments); Comments of Aviation Spectrum Resources, Inc. and International Air Transport Association, ICFS File Nos. SAT-MOD-20241011-00224 and SAT-AMD-20241017-00228 (filed Mar. 10, 2025) (ASRI/IATA Comments). In light of the extensive federal use of 20.2-21.2 GHz and 30.0-31.0 GHz bands, we also defer any action on these bands. In the event circumstances change and we re-open consideration of these bands, we will coordinate any applications with NTIA.

[16] 47 CFR § 1.3.

[17] *NetworkIP, LLC v. FCC*, 548 F.3d 116, 125-128 (D.C. Cir. 2008) (citing *Northeast Cellular Telephone Co. v. FCC*, 897 F.2d 1164, 1166 (D.C. Cir. 1990)).

[18] *Northeast Cellular*, 897 F.2d at 1166 ("[A] waiver is appropriate only if special circumstances warrant a deviation from the general rule and such deviation will serve the public interest. The agency must explain why deviation better serves the public interest and articulate the nature of the special circumstances to prevent discriminatory application and to put future parties on notice as to its operation"); *WAIT Radio v. FCC*, 418 F.2d 1153, 1159 (D.C. Cir. 1969)

(continued....)

1. Waivers of the U.S. Table of Allocations for Additional Frequency Bands

9. As part of this authorization, we grant SpaceX's request for waiver of the U.S. Table of Frequency Allocations[19] to conduct global uplink communications in the 14.5-14.8 GHz, 17.3-17.8 GHz,[20] 51.4-52.4 GHz, 92.0-94.0 GHz, 94.1-95.0 GHz, 95.0-100.0 GHz, 102.0-109.5 GHz, and 111.8-114.25 GHz (Earth-to-space) bands and global FSS downlink communications in the 18.6-18.8 GHz (space-to-Earth) band on an unprotected and non-interference basis.[21] For the Ku-, Ka-, and V-band frequencies included in this waiver, SpaceX seeks to operate in additional, contiguous spectrum in order to achieve symmetrical download and upload speeds, thus enabling fiber-like service for American consumers and bandwidth-intensive applications for American businesses in rural areas.[22] SpaceX commits to operating on an unprotected and non-interference basis and has designed its satellite system to permit sharing with other present and future operators of these bands.[23] We note that Kuiper[24] supports SpaceX's request for waiver of the Table of Frequency Allocations to permit operations outside the U.S. which will allow SpaceX to compete with Europe and China.[25]

10. To address concerns that SpaceX has not provided sufficient technical information to demonstrate that its uplink operations in the 17.3-17.8 GHz band will not cause interference to either geostationary orbit (GSO) FSS or Broadcast Satellite-Service (BSS) operators or NGSO downlink operators in this band,[26] SpaceX has committed to complying with the ITU EPFD uplink limits to protect

("The agency's discretion to proceed in difficult areas through general rules is intimately linked to the existence of a safety valve procedure for consideration of an application for exemption based on special circumstances.").

[19] 47 CFR § 2.106(a).

[20] SpaceX Gen2 Upgrade Amendment, Waiver Requests at 5-6; *see also* 47 CFR § 2.106(a). SpaceX's request for waiver of the U.S. Table, section 2.106(a) of the Commission's rules, to allow NGSO FSS downlink in the 17.3-17.8 GHz bands is DISMISSED as MOOT after the Commission's adoption of the 17 GHz Report and Order and the effectiveness of those new rules to permit space-to-Earth (downlink) use of the 17.3-17.8 GHz band by NGSO FSS space stations. *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*, IB Docket No. 22-273, Report and Order, 39 FCC Rcd 11156 (2024) (*17 GHz Report and Order*). The rules became effective on January 6, 2025.

[21] SpaceX's operations in the W-band (92.0-94.0 GHz, 94.1-95.0 GHz, 95.0-100.0 GHz, 102.0-109.5 GHz, and 111.8-114.25 GHz bands) are non-conforming with the International Table of Frequency Allocations. SpaceX's operations in these bands are on an unprotected, non-interference basis. *See* ITU Radio Regulations, Article 4.4.

[22] Gen2 Upgrade Amendment, Waiver Requests at 3.

[23] *Id.*

[24] We note that Kuiper has recently changed its name to Amazon Leo. *See Project Kuiper is now Amazon Leo*, https://www.aboutamazon.com/news/amazon-leo/project-kuiper-becomes-amazon-leo, last visited Nov. 25, 2025. This Order will continue to refer to Kuiper.

[25] Comments of Kuiper Systems LLC, ICFS File Nos. SAT-MOD-20241011-00224 and SAT-AMD-20241017-00228 at 2 (filed Mar. 10, 2025) (Kuiper Comments) (stating that some bands that are allocated for FSS use outside of the United States are not allocated in the United States and that denying a waiver to American licensees could put them at a disadvantage with respect to satellite constellations licensed outside the United States).

[26] SES/O3b Comments at 2, 8-9. Uplinks in the 17.3-17.8 GHz band are limited to BSS feeder links by the U.S. Table of Frequency Allocations, and SES/O3b argues that without a technical demonstration of non-interference, the waiver would place the burden on primary users of the band to seek protection from a nonconforming user. We reject this argument because we find that, as stated above, the conditions we have adopted will ensure that SpaceX protects incumbents by first coordinating with them prior to commencing uplink operations and abiding by the ITU uplink EPFD limits to protect GSO satellites operating in the band.

these GSO satellites from its transmitting earth stations in the Earth-to-space direction.[27] Further, we condition this authorization such that prior to commencing uplink operations in the 17.3-17.8 GHz band, SpaceX must protect existing operators in the band by completing coordination with existing earth station and terrestrial operators and providing the Commission with a demonstration that its uplink operations will not cause harmful interference to receiving earth stations and terrestrial operations in the band. Furthermore, SpaceX's operations in these bands must be on an unprotected and non-interference basis, and SpaceX must cease any operations immediately in the event of any harmful interference.

11. SpaceX requests authority for NGSO uplink operations in the W-band to enhance its parabolic earth station operations, particularly for backhaul use cases.[28] The 92.0-94.0 GHz and 94.1-95.0 GHz bands are allocated domestically for Fixed, Mobile, Radio Astronomy, and Radiolocation services.[29] The 95.0-100.0 GHz band is allocated domestically for Fixed, Mobile, Radio Astronomy, Radiolocation, Radionavigation, and Radionavigation-Satellite services.[30] The 102.0-105.0 GHz band is allocated domestically for Fixed, Mobile, and Radio Astronomy services.[31] The 105.0-109.5 GHz and 111.8-114.25 GHz bands are allocated domestically for Fixed, Mobile, Radio Astronomy, and Space Research (passive) services.[32] SpaceX states that using high-gain, narrow beam antennas will allow it to coexist with terrestrial fixed and mobile deployments, similar to its operations in the E-band.[33] SpaceX seeks to use the W-band frequencies on a receive-only basis and its W-band earth stations will have a minimum elevation angle of 10 degrees for satellites operating below 400 km, 20 degrees for those operating between 400 km and 500 km, and 25 degrees for those operating above 500 km. We find that granting this waiver and allowing SpaceX to operate on a non-conforming basis in the W-band is in the public interest because it will allow SpaceX to make use of higher frequency bands that are lightly used to deliver additional capacity and faster broadband speeds to customers in unserved and underserved areas of the United States and around the world. As with all communications operating under waiver of the Commission's rules, SpaceX's operations in these bands must be on an unprotected, non-interference basis.

12. Finally, we grant SpaceX's request to conduct MSS as well as FSS operations in the 14.0-14.5 GHz (Earth-to-space), 19.7-20.2 GHz (space-to-Earth), 29.5-30.0 GHz (Earth-to-space), 39.5-40.5 GHz (space-to-Earth),[34] 50.4-51.4 GHz (Earth-to-space), 71.0-74.0 GHz (space-to-Earth), and 81.0-84.0 GHz (Earth-to-space) bands. We also grant SpaceX's request for waiver of the U.S. Table and the Commission's Ka-band Plan to permit SpaceX to use the 19.4-19.6 GHz (space-to-Earth) and 29.1-29.5 GHz (Earth-to-space) bands for FSS operations not limited to MSS feeder links. Consistent with SpaceX's commitments in its application, we find good cause to grant the requested waiver and require SpaceX to operate its MSS communications with the same technical characteristics as its FSS operations

[27] Gen2 Upgrade Amendment, Waiver Requests at 6. *See also* ITU Radio Regulations, Article 22. Although the ITU limits only apply to NGSO FSS transmitting earth stations in Regions 1 and 3, we also require SpaceX to comply with these limits for its transmitting earth stations in Region 2.

[28] *See* SpaceX Gen2 Upgrade Amendment, Waiver Requests at 14.

[29] 47 CFR § 2.106(a). The 94.0-94.1 GHz band is also allocated for Federal Earth Exploration Satellite (passive) and Space Research (active). *Id.*

[30] 47 CFR § 2.106(a); (c)(161), (342).

[31] 47 CFR § 2.106(a).

[32] *Id.*

[33] *See* SpaceX Gen2 Upgrade Amendment, Waiver Requests at 14-15.

[34] The 39.5-40.0 GHz band is allocated on a primary basis for Federal MSS and non-Federal FSS, and there is no non-federal MSS allocation. 47 CFR § 2.106(a). For SpaceX's MSS operations in the 39.5-40.5 MHz band, we grant SpaceX, on our own motion, a waiver of the U.S. Table. 47 CFR § 2.106(a).

to minimize risk of interference to other systems.[35] Given SpaceX's commitments and the Commission's waiver of the EPFD limits discussed below, we find it is unnecessary to condition SpaceX's MSS operations, as some commenters suggest, on compliance with the EPFD limits and the separate power flux density (PFD) limits.[36] We also decline to dismiss or deny SpaceX's waiver based on Iridium's concern that grant of SpaceX's request to operate "general FSS traffic"[37] in the 19.4-19.6 GHz and 29.1-29.5 GHz bands would effectively rewrite the Commission's Ka-band plan without a rulemaking and that granting SpaceX's waiver would require the Commission to grant comparable waiver requests from other FSS operators.[38] We disagree. SpaceX's operations in these bands under this waiver must be on an unprotected and non-interference basis. Further, as noted in the grant, we condition SpaceX's operations to require coordination of its FSS operations not limited to MSS feeder links with MSS operators prior to commencement of operations, including Iridium, to protect MSS feeder link operations in these bands, which we believe will sufficiently allay Iridium's concerns.

2. Processing Round Considerations

13. We grant SpaceX's request for waiver of the Commission's processing round rules for the additional frequency bands authorized in this Order.[39] This waiver also includes the previously-authorized V-band frequencies, which we authorize SpaceX to use on all 15,000 Gen2 Starlink satellites.[40] The Commission's rules set forth procedures for consideration of applications for NGSO

[35] *See e.g.*, SpaceX January 31, 2025 Letter at 7. For these reasons, we disagree with Iridium's argument that SpaceX has not demonstrated sufficient grounds for waiver to justify FSS operations in the 19.4-19.6 GHz and 29.1-29.3 GHz bands.

[36] Petition of EchoStar Corporation to Dismiss or Deny, ICFS File Nos. SAT-MOD-20241011-00224 and SAT-AMD-20241017-00228 at 21-22 (filed Mar. 10, 2025) (Echostar Petition); Comments of Eutelsat S.A. and WorldVu Satellites Limited, ICFS File Nos. SAT-MOD-20241011-00224 and SAT-AMD-20241017-00228 at 5-6 (filed Mar. 10, 2025) (Eutelsat Comments).

[37] *See* Iridium Petition at 7, n. 12; *see* SpaceX January 31, 2025 Letter at 5 ("SpaceX seeks authority to use these bands both as feeder links to support its MSS operations and excess capacity for general FSS traffic."); SpaceX June 5, 2025 Letter at 12 (defining "general FSS traffic" as "non-MSS-feeder-link traffic").

[38] Iridium Petition at 2, 6-8. Iridium argues that grant of SpaceX's waiver request will allow FSS to proliferate in the 19.4-19.6 GHz and 29.1-29.3 GHz MSS feeder link bands where Iridium operates.

[39] *See* 47 CFR §§ 25.156 and 25.157. Specifically, we waive the processing round rules for the 12.7-13.25 GHz (Earth-to-space), 13.75-14.0 GHz (Earth-to-space), 14.5-14.75 GHz (Earth-to-space), 14.75-14.80 GHz (Earth-to-space), 15.43-15.63 GHz (Earth-to-space), 17.3-17.8 GHz (space-to-Earth and Earth-to-space), 18.6-18.8 GHz (space-to-Earth), 19.3-19.7 GHz (space-to-Earth), 24.75-25.25 GHz (Earth-to-space), 29.1-29.5 GHz (Earth-to-space), 42.0-42.5 GHz (space-to-Earth), 51.4-52.4 GHz (Earth-to-space), 92.0-94.0 GHz (Earth-to-space), 94.1-95.0 GHz (Earth-to-space), 95.0-100.0 GHz (Earth-to-space), 102.0-109.5 GHz (Earth-to-space), and 111.8-114.25 GHz (Earth-to-space) bands. The licensee is required to complete coordination with federal users pursuant to US 334 prior to operation in the bands between 17.8 GHz and 20.2 GHz.

[40] SpaceX's initial V-band authorization, as modified to include the V-band communications on the Gen2 Starlink satellites, was originally only for 7,500 satellites. *See generally Space Exploration Holdings, LLC, Application for Modification of Authorization of the SpaceX V-band NGSO Satellite System*, Grant Stamp, ICFS File No. SAT-MOD-20230322-00062 (SB, SPPD, granted-in-part/dismissed-in-part Oct. 13, 2023) (*SpaceX First V-band Modification Grant)*; *See also SpaceX Gen2 First Partial Grant*, 37 FCC Rcd at 14883, 14896, paras. 2, 19. These frequencies include 37.5-40.0 GHz (space-to-Earth), 40.0-42.0 GHz (space-to-Earth), 47.2-50.2 GHz (Earth-to-space), and 50.4-51.4 GHz (Earth-to-space) bands. We note that SpaceX has submitted a further modification application related to its V-band capabilities, requesting modification of the bond and milestone conditions applicable to its V-band operations with the first tranche of 7,500 satellites. *See* ICFS File No. SAT-MOD-20240813-00183. This modification request remains pending, and partial grant of SpaceX's Gen2 Upgrade Applications is without prejudice to any action in that proceeding.

satellite authorizations.[41] In most cases,[42] applications not filed in response to a public notice initiating a processing round will be considered lead applications, and the Commission will initiate a new processing round and establish a cut-off date for the filing of competing applications.[43] The Space Bureau has previously waived the processing round rules for SpaceX's E-band frequencies, finding that SpaceX's operations could coexist with existing users of the band and would not preclude other operators' use of the band in the future, and conditioning waiver on SpaceX's participation in any future processing round that includes the E-band frequencies.[44] We find the same factors underlying that decision apply to these additional frequency bands.

14. SpaceX explains that its operations will not preclude future market entry in these bands.[45] Particularly in bands where it proposes to operate on a non-interference basis, only outside the United States, or in bands that are allocated only for Federal use, SpaceX argues that these operations would not preclude future market entry because the operations are not mutually exclusive.[46] SpaceX also states that including these additional frequencies in processing rounds would delay SpaceX's operations for years with no public interest benefit, when SpaceX is ready to put the spectrum to use for the benefit of American consumers and to promote American competition abroad.[47] We find that it is more efficient and in the public interest to authorize SpaceX's requested operations in the Ku-, Ka-, V-, and W-band frequencies, which will benefit consumers by expanding the capacity of SpaceX's Gen2 Starlink system, than it would be to initiate additional processing rounds at this time. To commenters' objections that SpaceX's operations should not be authorized outside of a processing round, particularly regarding additional satellites authorized to communicate in the V-band,[48] we note that SpaceX must participate in any future processing round the Commission may open in any of these bands. We emphasize that granting this portion of SpaceX's application outside of a processing round does not confer on SpaceX higher priority with respect to later-authorized systems, either in a processing round or not. SpaceX must coordinate with any existing or future users of these bands, and the second tranche of SpaceX's 7,500 satellites must protect participants in the 2016 and 2021 V-band processing rounds.

15. Regarding frequencies previously authorized as part of the 2020 Ku/Ka-band Processing

[41] *See* 47 CFR §§ 25.156(d)(1), 25.157.

[42] *See, e.g.*, 47 CFR § 25.157(b), (i) (applications for replacement satellites and applications filed under the streamlined process for small satellites or small spacecraft under sections 25.122 and 25.123 of the Commission's rules are not subject to the Commission's processing round framework).

[43] *See* 47 CFR § 25.157(c)(2).

[44] *Space Exploration Holdings, LLC, Request for Orbital Deployment and Operating Authority for the SpaceX Gen2 NGSO Satellite System*, Order and Authorization, 39 FCC Rcd 2159, 2164-66, paras. 10-13 (SB rel. Mar. 8, 2024) (*SpaceX Gen2 E-Band Partial Grant*).

[45] *See* SpaceX January 31, 2025 Letter at 3.

[46] *Id.*

[47] *Id.* at 3-4, 6-7; SpaceX Opposition at 10-11.

[48] *See e.g.*, Opposition of Anuvu Licensing Holdings, LLC, ICFS File Nos. SAT-MOD-20241011-00224 and SAT-AMD-20241017-00228 (filed Mar. 10, 2025) (Anuvu Opposition); Viasat 2025 Petition at 20-23; Echostar Petition at 22-24.

Round[49] and 2016 V-band Processing Round,[50] we find that SpaceX has demonstrated that the reconfiguration of the orbital parameters of its previously-authorized 7,500 Gen2 satellites will not result in a significant increase to the interference environment from the original constellation as proposed,[51] and therefore under Commission precedent,[52] we need not alter the processing round status for SpaceX's previously-authorized Ku- and Ka-band operations as SES/O3b requests.[53] As we have found in prior SpaceX authorizations,[54] SpaceX's modified orbital parameters will allow it to better serve customers without significantly increasing interference into other systems authorized as part of earlier processing rounds. While SES/O3b argues that SpaceX's NGSO/NGSO interference demonstration is deficient,[55] after review of the technical showings, we find that SpaceX has provided sufficient information to demonstrate that its modification will not significantly impact the overall interference environment of the

[49] SpaceX filed its original application as part of the processing round initiated in 2020 for the 10.7-12.7 GHz, 12.75-13.25 GHz, 13.85-14.5 GHz, 17.7-18.6 GHz, 18.8-20.2 GHz, and 27.5-30.0 GHz bands (2020 Ku/Ka-Band Processing Round). *See Cut-Off Established for Additional NGSO FSS Applications or Petitions for Operations in the 10.7-12.7 GHz, 12.75-13.25 GHz, 13.8-14.5 GHz, 17.7-18.6 GHz, 18.8-20.2 GHz, and 27.5-30 GHz Bands, Satellite Policy Branch Information*, Report No. SPB-279, DA 20-325 (rel. Mar. 24, 2020) (2020 Ku/Ka-band Processing Round Public Notice).

[50] *Cut-off Established for Additional NGSO-Like Satellite Applications or Petitions for Operations in the 37.5-40.0 GHz, 40.0-42.0 GHz, 47.2-50.2 GHz, and 50.4-51.4 GHz Bands*, Public Notice, 31 FCC Rcd 11957 (IB 2016) (*2016 V-band Processing Round Public Notice*). We note that SpaceX is the only operator remaining in the 2016 V-band Processing Round.

[51] Regarding the impact of modifications to systems licensed as part of a processing round, the Commission has stated that for applications to modify authorized NGSO systems that were originally subject to modified processing round procedures, "'[i]f the proposed modification does not present any significant interference problems and is otherwise consistent with Commission policies, it is generally granted[,]' but if the modification 'presents significant interference problems, [the Bureau] would treat the modification as a newly filed application and would consider the modification application in a subsequent satellite processing round.'" *See* 47 CFR § 25.117(d)(2)(ii); *Space Exploration Holdings, LLC, Request for Modification of the Authorization for the SpaceX NGSO Satellite System*, Order and Authorization and Order on Reconsideration, 36 FCC Rcd 7995, 8006-07, para. 16 (2021) (*SpaceX Gen1 Third Modification Order*) (quoting *Teledesic LLC*, Order and Authorization, 14 FCC Rcd 2261, 2264, para. 5 (IB 1999)).

[52] *Id.*

[53] *See* SES/O3b Comments at 13.

[54] *See Space Exploration Holdings, LLC, Request for Deployment and Operating Authority for the SpaceX Gen2 NGSO Satellite System*, Order and Authorization, 39 FCC Rcd 12550, 12584-85, paras. 58-59 (SB rel. Nov. 26, 2024) (*SpaceX Gen2 SCS and 300 km Order*).

[55] SES/O3b specifically argues that SpaceX used a degraded throughput analysis to measure interference into participants in the 2020 Ku/Ka-band Processing Round, when it should have analyzed interference to noise ratios before and after the proposed modifications to the system. The degraded throughput analysis, SES/O3b argues, should be used only for analyzing interference into participants in earlier processing rounds, not participants in the same processing round. SES/O3b conducted its own analysis and argues that SpaceX's system, as upgraded, will cause increased interference into other NGSO systems in the 2020 Ku/Ka-band Processing Round, thus requiring the Commission to move SpaceX's system to a new Ku/Ka-band processing round. SES/O3b Comments at 2-3, 10-16, Annex 2 and 3; *see also* Viasat 2025 Petition at 18-19. On the contrary, SpaceX argues that there is no single required method to analyze interference into participants in the same processing round, but since the Commission recently codified the degraded throughput analysis for demonstrating protection of participants in earlier processing rounds, it is the most appropriate approach and demonstrates no interference into the systems in the 2020 Ku/Ka-band Processing Round. SpaceX Opposition at 4-6, 8-9. We find that SpaceX's technical showings are sufficient to demonstrate that its modification will not significantly impact the overall interference environment of the 2020 Ku/Ka-band Processing Round.

prior Ku/Ka-band processing round.[56] SpaceX's changes to its system's parameters will not result in increased long term interference, but will likely increase the short-term interference into other NGSO systems.[57] However, after reviewing the competing analyses, we find that SES/O3b overestimates the short-term interference SpaceX's modified operations will cause[58] and the actual increase in short-term interference into other NGSO systems in the 2020 Ku/Ka-band Processing Round is not significant. We expect SpaceX to take additional interference mitigation measures with respect to other NGSO systems in the 2020 Ku/Ka-band Processing Round and to remedy any actual interference. Consequently, we see no reason to move SpaceX's Ku- and Ka-band operations to a later processing round.

3. Waiver of EPFD limits

16. Under the Commission's rules, an applicant proposing operations in the 10.7-30 GHz range must certify that it will comply with applicable EPFD limits in Article 22, Section 2, and Resolution 76 of the ITU Radio Regulations, which have been incorporated by reference into the Commission's rules.[59] Additionally, prior to beginning service, an NGSO operator licensed to operate in the 10.7-30 GHz range must obtain a favorable or qualified favorable finding from the ITU regarding its compliance with applicable EPFD limits, in accordance with Resolution 85 of the ITU Radio Regulations.[60] The operator must then communicate the ITU finding to the Commission and submit the input data files used for the ITU validation software for public disclosure.[61] The Commission previously partially waived the EPFD rules, allowing SpaceX to begin operations prior to receiving a favorable or qualified-favorable finding

[56] We also agree with SpaceX that the concerns raised by Eutelsat, namely that 29,988 Gen2 satellites will create in-line events with co-frequency systems 100% of the time, are moot. *See* Eutelsat Comments at 2-3, 4-5 (requesting we resolve prior concerns raised on the record on this matter). SpaceX and Eutelsat have previously agreed to a coordination agreement, and Eutelsat's subsidiary, WorldVu Satellites LTD (OneWeb), withdrew the comments in question that Eutelsat is now citing. Eutelsat does not explain any changed circumstances that would justify reviving its subsidiary's withdrawn comments or why the coordination agreement between SpaceX and Eutelsat does not address these concerns as WorldVu previously stated. *See* SpaceX Opposition at 7; Letter from David Goldman, Director, Satellite Policy, Space Exploration Technologies Corp., and Kimberly M. Baum, VP, Spectrum Engineering and Policy, WorldVu Satellites Limited, to Marlene H. Dortch, Secretary, FCC, ICFS File Nos. SAT-LOA-20200526-00055 and SAT-AMD-20210818-00105, SAT-MPL-20200526-00062, SAT-APL-20210112-00007 (dated Jul. 21, 2022). Eutelsat also cites Viasat's comments from its 2022 petition: "SpaceX's system would block smaller NGSO constellations almost 100% of the time, causing harmful interference and significantly reducing capacity, while SpaceX suffers no ill-effects because of the size of its system. Because NGSO systems need to split spectrum in the event of an in-line interference event, SpaceX and other operators would need to split spectrum 100% of the time, greatly reducing capacity on the smaller system while SpaceX can use other satellites." *See* Petition of Viasat, Inc., ICFS File Nos. SAT-LOA-20200526-00055 and SAT-AMD-20210818-00105 at I-II, 4-9 (filed Feb. 8, 2022) (Viasat 2022 Petition). But as discussed above, we have reviewed SpaceX's updated technical showings and found that the upgraded Gen2 Starlink constellation will not increase interference into other NGSO systems, and certainly not to the degree these operators predict.

[57] *See* SES/O3b Comments, Annex 2 and 3. We observe that SpaceX underestimated the interference its system would cause by using a low receiver noise temperature in its analysis, as well as by applying adjusted antenna gain modelling for the antenna radiation pattern. Gen2 Upgrade Modification, Technical Attachment, Annex A; Gen2 Upgrade Amendment, Technical Attachment, Annex A. We note that adjusted antenna gain modelling is still being studied at the ITU and has not been adopted.

[58] SES/O3b conducted its analysis using a much higher number of co-frequency beams transmitting to the same location simultaneously (NCo) than SpaceX used in its analysis. SES/O3b Comments, Annex 2 and 3; Gen2 Upgrade Modification, Technical Attachment, Annex A; Gen2 Upgrade Amendment, Technical Attachment, Annex A.

[59] *See* 47 CFR § 25.146(a)(2).

[60] *See* 47 CFR § 25.146(c).

[61] *Id.*

from the ITU, conditioned on the requirements that it modify its operations should it receive an unfavorable finding and also that it provide the data files used as input to the ITU's validation software to any interested party so as to confirm compliance with the limits.[62]

17. We grant SpaceX a time-limited waiver of the Commission's single-entry EPFD downlink rules, with conditions. SpaceX argues that by exceeding the EPFD limits, it can provide better service to American consumers and businesses while not impacting GSO operators.[63] SpaceX has also tested operations with higher power levels and a greater number of overlapping, co-frequency beams (higher NCo) in certain countries and reported the results to the Commission.[64] The Commission is currently engaged in a rulemaking proceeding to review the current EPFD rules.[65] We believe that while this rulemaking is ongoing, it is in the public interest to grant SpaceX's request for waiver to allow it to exceed the EPFD limits, given the benefits to SpaceX's service and thus American consumers and the continued protection of GSO operators.[66] We grant this waiver subject to the completion of and rules adopted in the pending rulemaking.[67] SpaceX must bring its operations into compliance with any new rules upon the effective date of those rules. To address claims that SpaceX's operations in exceedance of the EPFD limits could cause interference to GSO networks,[68] we condition SpaceX's operations to ensure GSO operators are protected. Specifically, this waiver is limited in application to SpaceX's operations inside the United States. Outside the United States, SpaceX must continue to comply with the Commission's and ITU's EPFD rules and limits.[69] In addition, we condition SpaceX's operations under the waiver to address concerns about potential interference. Specifically, for operations in the Ku-band, SpaceX may not exceed an NCo of 8. SpaceX must also maintain a minimum GSO arc exclusion zone of 4 degrees with respect to operational GSO satellites. These operational limits are within the envelope of

[62] *See SpaceX Gen2 First Partial Grant*, 37 FCC Rcd at 14907-910, paras. 37-40.

[63] Gen2 Upgrade Amendment, Waiver Requests at 18-19; Gen2 Upgrade Amendment, Technical Attachment, Annex B; Gen2 Upgrade Modification, Technical Attachment, Annex B; SpaceX January 31, 2025 Letter at 10.

[64] *See* Letter from Cecilia Tenge-Rietberg, Sr. Satellite Policy Manager, SpaceX, to Marlene H. Dortch, Secretary, FCC, ICFS File Nos. SAT-MOD-20241011-00224 and SAT-AMD-20241017-00228 (filed Sept. 22, 2025) (SpaceX September 22, 2025 Letter).

[65] *See Modernizing Spectrum Sharing for Satellite Broadband*, Notice of Proposed Rulemaking, FCC 25-23 (Apr. 28, 2025) (*Modernizing Spectrum Sharing NPRM*).

[66] Commenters argue that SpaceX's waiver request falls short of the Commission's waiver standard, arguing SpaceX has not demonstrated good cause and waiver would undermine the purpose of the rule. *See e.g.*, Viasat 2025 Petition at 6-8, 11-12; Echostar Petition at 13-20. On the contrary, we find the benefits to American consumers and American leadership and innovation in space demonstrate good cause for granting the waiver, and SpaceX's demonstrations that its operations will not cause harmful interference to GSO operators, including the results of its real-world testing in other countries, coupled with the conditions we place on this waiver, indicate that waiver will not undermine the purpose of the rule.

[67] *See Modernizing Spectrum Sharing NPRM*.

[68] *See e.g.* SES/O3b Comments at 2, 4-7; Viasat 2025 Petition at 12, 16-17, 19; Echostar Petition at 6-13. *But see* Kuiper Comments at 2-3; Telesat Reply at 4-5.

[69] SpaceX may exceed the EPFD limits outside the United States to the extent that it receives authorization from the relevant administration. *See SpaceX Gen2 First Partial Grant*, 37 FCC Rcd at 14907-910, paras. 37-40. For its operations outside the United States, and consistent with conditions on the prior partial waiver of section 25.146(c), SpaceX must submit modified ITU filings reflecting its upgraded system, obtain a favorable or qualified-favorable finding from the ITU that includes evaluation of the joint effect of SpaceX's multiple ITU filings that comprise its Gen2 Starlink constellation, and provide its input data files to the ITU validation software to interested parties. These conditions are subject to the outcome of the *Modernizing Spectrum Sharing NPRM*.

the testing that SpaceX has conducted in other countries.[70] We believe that these operational limits will allow SpaceX to provide better service to consumers and operate at higher power levels while also alleviating concerns of harmful interference into GSO systems while the rulemaking proceeding is ongoing.[71] Finally, SpaceX's operations under this waiver must be conducted on an unprotected, non-interference basis. Specifically, in the event the Space Bureau notifies SpaceX of a determination that it has caused harmful interference, SpaceX must immediately return to operating in accordance with the Commission's EPFD limits in the affected frequency bands. SpaceX will also be required to communicate to the Commission and to its affected customers how it is rectifying the situation if mediation will affect their services. The Space Bureau may revoke the waiver in the event of unresolved harmful interference.

18. Some commenters express concerns that waiving the single-entry EPFD limits would allow SpaceX to consume the entire budget for, or exceed, the aggregate EPFD limits on its own.[72] At this time we do not prescribe how SpaceX, or any operator, must operate so as to meet the aggregate EPFD limits, beyond the conditions discussed above, but we note that SpaceX is still required to comply with the aggregate EPFD limits. SpaceX is also required to cooperate and coordinate in good faith with other NGSO operators to allow multiple users to operate in the band while meeting the aggregate EPFD limits under our rules.[73] We find that the requirement to cooperate and coordinate in good faith with other users, coupled with the conditions imposed on SpaceX's operations pursuant to the waiver, should address concerns that the aggregate limits will be exceeded.

19. As part of this waiver, we also grant SpaceX's request to remove the condition requiring operations using only one co-frequency, co-polarization beam in any given location (NCo of 1) in the 12.2-12.7 GHz and 19.7-20.2 GHz bands. Since SpaceX's operations exceeding the EPFD limits in the United States are limited to the technical parameters outlined above and must be conducted on a non-interference basis, and SpaceX must continue to comply with the EPFD limits outside the United States, we find this condition to be redundant and unnecessary. We instead are requiring SpaceX to operate with no more than eight (8) co-frequency, co-polarization beams in any given location, an NCo of 8, in the Ku-band consistent with its testing.[74] The "NCo of 1" condition was originally placed on SpaceX's

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[70] *See* SpaceX September 22, 2025 Letter (incorporating by reference comments of Space Exploration Holdings, LLC, SB Docket No. 25-157, at 3-4 & n.9 (July 28, 2025) (describing and citing test report from Romania); Reply Comments of Space Exploration Holdings, LLC, SB Docket No. 25-157, Technical Supplements (Aug. 27, 2025) (attaching test reports from Colombia and Nigeria); Jordan Info Document to ASMG-33, *Interference measurement campaign on EPFD limits in Jordan* (Sept. 8, 2025); Botswana Info Document 14 to APM27-2, *Botswana interference measurement campaign on EPFD limits* (Aug. 1, 2025). For example, in the testing, SpaceX operates with a maximum NCo=8 and a minimum 4 degree GSO avoidance angle.

[71] *See e.g.* SES/O3b Comments at 2, 4-7; Viasat 2025 Petition at 12, 16-17, 19; Echostar Petition at 6-13. Since we have found that SpaceX's operations, as conditioned, will protect GSO operations, we decline to reconsider analyses submitted on the record in 2022, as Viasat requests. Viasat 2025 Petition at 12, 19; *see also* Petition to Dismiss or Deny in Part of DISH Network Corporation, ICFS File Nos. SAT-LOA-20200526-00055 and SAT-AMD-20210818-00105 (filed Feb. 8, 2022) (DISH 2022 Petition); Reply of DISH Network Corporation, ICFS File Nos. SAT-LOA-20200526-00055 and SAT-AMD-20210818-00105 at 1-2, 7-8, 12, 17-18 (filed Mar. 8, 2022) (DISH 2022 Reply); Reply of Kuiper Systems LLC, ICFS File Nos. SAT-LOA-20200526-00055 and SAT-AMD-20210818-00105 at 18-19 (filed Mar. 3, 2022) (Kuiper 2022 Reply); Letter from Jarrett S. Taubman, Vice President and Deputy Chief, Government Affairs, Viasat, Inc., to Marlene H. Dortch, Secretary, FCC, ICFS File Nos. SAT-LOA-20200526-00055 and SAT-AMD-20210818-00105 at 3, Technical Annex (filed Jul. 18, 2022) (Viasat July 18, 2022 Letter).

[72] *See e.g.* Eutelsat Comments at 2-3; SES/O3b Comments at 7-8; Viasat 2025 Petition at 19-20.

[73] *See* 47 CFR § 25.146; 47 CFR § 25.108(c)(3) and (8) (incorporating by reference Article 22 of the ITU Radio Regulations and Resolution 76 of WRC-15).

[74] *See* SpaceX September 22, 2025 Letter.

authorization for its first generation constellation to address concerns raised on the record that SpaceX would not operate with an NCo of 1 as it claimed and would thus violate the EPFD limits.[75] It was similarly extended to SpaceX's second generation constellation after SpaceX made commitments on the record that it intended to operate with an NCo of 1.[76] SpaceX now requests that we remove this condition, in line with its request to waive the EPFD limits.[77] EchoStar and Viasat object to this request, arguing that this condition is necessary to protect GSO operators, because SpaceX will violate the EPFD limits without this condition.[78] As discussed above, we waive the EPFD limits and condition this authorization to protect GSO operations. If EchoStar is correct that SpaceX cannot operate with more than one frequency beam at a time in these bands without causing harmful interference, then SpaceX must operate with only one frequency beam at a time to comply with the conditions on this authorization. As discussed in prior authorizations,[79] operators may bring concerns of actual interference to the FCC and the FCC will take appropriate action.

C. Orbital Debris Mitigation

20. *Modification of first tranche of 7,500 satellites.* We find that this modification does not materially alter the already approved mitigation plan and offers additional mitigation protections. The Commission previously approved SpaceX's orbital debris mitigation plan for its first tranche of 7,500 satellites.[80] Consistent with the Commission's rules, SpaceX has also confirmed that there are no changes to its satellite design that would cause satellite components to survive atmospheric reentry and strike the ground with a force greater than 15 joules.[81] SpaceX initially provided the Commission with an envelope of physical dimensions,[82] which the Commission considered in approving its orbital debris mitigation plan.[83] While the upgraded Gen2 satellites will be larger than the original, SpaceX has confirmed that the physical dimensions are still within the previously approved parameters.[84] SpaceX's proposed changes to

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[75] *See SpaceX Gen1 Third Modification Order*, 36 FCC Rcd at 8019-8022, paras. 37-39, 43.

[76] *SpaceX Gen2 First Partial Grant*, 37 FCC Rcd at 14911-12, 14915, paras. 46, 55.

[77] *See* SpaceX Gen2 Upgrade Modification, Technical Attachment at 5.

[78] *See e.g.* EchoStar Petition at 3-6. *But see* Kuiper Comments at 3-4 (supporting SpaceX's request to remove the condition); Reply of Telesat Canada, ICFS File Nos. SAT-AMD-20241017-00228 and SAT-MOD-20241011-00224, at 4 (filed Apr. 4, 2025) (Telesat Reply) (supporting SpaceX's request to remove the condition).

[79] *See e.g. SpaceX Gen2 First Partial Grant*, 37 FCC Rcd at 14906-07, 14912, 14915, paras. 34, 46, 55.

[80] *Gen2 First Partial Grant*, 37 FCC Rcd at 14920-27, para. 70-86. The Space Bureau later addressed concerns specific to the altitudes below 400 km. *See SpaceX Gen2 SCS and 300 km* Order, 39 FCC Rcd at 12586-90, paras. 62-72.

[81] SpaceX January 31, 2025 Letter at 12; 47 CFR § 25.114(d)(14)(vii)(d)(2)(ii).

[82] *See* Letter from David Goldman, Director, Space Exploration Technologies Corp., to Marlene H. Dortch, Secretary, FCC, ICFS file Nos. SAT-LOA-20200526-00055 and SAT-AMD-20210818-00105, at 2-4 (filed Aug. 19, 2022) (SpaceX August 19, 2022 Letter); Letter from David Goldman, Senior Director, Satellite Policy, Space Exploration Technologies Corp., to Marlene H. Dortch, Secretary, FCC, ICFS File Nos. SAT-LOA-20200526-00055 and SAT-AMD-20210818-00105, Exhibit B (dated Oct. 4, 2022) (SpaceX October 4, 2022 Letter).

[83] *Gen2 First Partial Grant*, 37 FCC Rcd at 14920-27, paras. 70-86. Prior Commission approval of SpaceX's orbital debris mitigation plan was premised on the information SpaceX provided to the Commission, including logs from NASA's Debris Assessment Software (DAS) and SpaceX's inputs to those files. SpaceX clarified that it used conservative values for the physical dimensions of its satellites, larger than the satellites SpaceX intended to launch, to allow for changes in satellite design in the future. SpaceX August 19, 2022 Letter at 2-4; SpaceX October 4, 2022 Letter, Exhibit B.

[84] Gen2 Upgrade Amendment, Technical Attachment at 32; Gen2 Upgrade Modification, Technical Attachment at 22. SpaceX also provided updated DAS inputs and results to confirm the Gen2 Starlink satellites will comply with

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the orbital parameters, especially the decrease in operational altitude, demonstrate that any satellites that experience a failure on orbit preventing SpaceX from using propulsion to lower the satellites at the end of their operational life will have a lower collision risk than if the satellites were operated at higher altitudes.[85] For these reasons, we approve SpaceX's orbital debris mitigation plan for the first tranche of 7,500 satellites, as modified.

21. *Second tranche of 7,500 satellites.* We also approve the orbital debris mitigation plan for the second tranche of 7,500 satellites. In doing so, we address comments filed in 2022 that were deferred in prior orders, specifically concerns regarding collision risk and satellite failure rates.[86] We note that SpaceX continues to coordinate with NASA to protect inhabitable space stations, as well as launch windows for resupply missions to the International Space Station and NASA's science missions.[87] SpaceX also continues to operate in accordance with its Space Act agreement with NASA, including limiting satellite deployment at altitudes below 400 km as coordinated with NASA.[88] We find that these actions alleviate commenters' concerns.

22. At this time, we also find that concerns regarding SpaceX's collision risk and failure rates have been resolved. Comments on this matter were submitted in 2022 and largely based on the performance of SpaceX's first generation constellation. While commenters have incorporated these concerns into the record for the Gen2 Upgrade Applications, they have not provided additional or updated

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the Commission's collision risk rule. 47 CFR § 25.114(d)(14)(iv)(A). Gen2 Upgrade Amendment, Technical Attachment, Annex C; Gen2 Upgrade Modification, Technical Attachment, Annex C.

[85] Gen2 Upgrade Modification, Technical Attachment, Annex C. Satellites that can effectively maneuver are deemed to pose zero risk of collision under the Commission's rules, in the absence of evidence to the contrary. 47 CFR § 25.114(d)(14)(iv)(a)(1). *See also SpaceX Gen2 SCS and 300 km Order*, 39 FCC Rcd at 12586, para. 63 ("The operations of satellites in these lower orbits [below 400 km] will result in a lower collision risk in the event of an anomaly during normal operations and will shorten the time required for post-mission disposal maneuvers"); *SpaceX Gen1 Third Modification Order*, 36 FCC Rcd at 8027, para. 54 ("we agree with SpaceX that specification of a lower altitude provides for operations that present considerably lower risk than at the higher altitude").

[86] We will continue to monitor and evaluate orbital debris mitigation concerns as part of any potential authorization of additional satellites that we defer in this order, including discussion of the record regarding SpaceX's orbital debris mitigation plans, which resolves Eutelsat's request that we address concerns raised on the prior record. *See* Eutelsat Comments at 2-3 (requesting we resolve concerns raised in 2022 by its subsidiary WorldVu which WorldVu subsequently withdrew).

[87] SpaceX January 31, 2025 Letter at 11. SpaceX notes that it coordinates closely with NASA and communicates with the Chinese manned space agency to protect all inhabitable space stations and visiting vehicles, and SpaceX commits to continuing to use its automated collision avoidance system to avoid conjunctions with inhabitable space stations. We again find this coordination resolves concerns raised by NASA on the original Gen2 application, as amended, including the additional satellites we authorize in this Order. *See* NTIA February 8, 2022 Letter, NASA Letter at 1-2, 4; *see also SpaceX Gen2 SCS and 300 km Order*, 39 FCC Rcd at 12586-87, para. 63.

[88] *See e.g. SpaceX Gen2 SCS and 300 km Order*, 39 FCC Rcd at 12551-52, 12561, 12587-88, paras. 2, 18, 65; Letter from Lauren E. Morgan, NASA Representative to the Commercial Transportation Interagency Group Space Operation Mission Directorate, Launch Services Office, to Marlene H. Dortch, Secretary, FCC, ICFS File Nos. SAT-LOA-20200526-00055, SAT-AMD-20210818-00105, SAT-AMD-20221216-00175, SAT-MOD-20230207-00021, SAT-AMD-20240322-00061, SAT-MOD-20240423-00089, SAT-STA-20240522-00108, GN Docket No. 23-135 (filed Nov. 19, 2024) (NASA November 19, 2024 Letter); Letter from David Goldman, Vice President Satellite Policy, Space Exploration Technologies Corp., to Marlene H. Dortch, Secretary, FCC, ICFS File Nos. SAT- LOA-20200526-00055, SAT-AMD-20210818-00105, SAT-AMD-20240322-00061, SAT-MOD-20230207-00021, and SAT-MOD-20240423-00089 (filed Dec. 23, 2024) (SpaceX December 23, 2024 Letter); Letter from David Goldman, Vice President Satellite Policy, Space Exploration Technologies Corp.,to Marlene H. Dortch, Secretary, FCC, ICFS File Nos. SAT-MOD-20230207-00021, SAT-AMD-20240322-00061, and SAT-MOD-20240423-00089 (filed Dec. 18, 2025) (SpaceX December 18, 2025 Letter).

comments, even though SpaceX has been operating its Gen2 Starlink satellites for nearly three years.[89] Under the Commission's rules, satellites that can maneuver effectively, including through use of propulsion, are deemed to have zero collision risk.[90] SpaceX's Gen2 Starlink satellites include propulsion and thus are deemed to have a collision risk of zero. SpaceX provided collision risk values for all satellites in the event of an anomaly that would cause the satellite to lose maneuverability, and at all authorized orbital altitudes SpaceX's satellites comply with the Commission's collision risk limits.[91] Commenters who filed in 2022 focused on the rates of disposal failure that SpaceX's first-generation satellites experienced, extrapolating that failure rate to a constellation of 29,988 satellites and arguing the Commission should consider the aggregate collision risk of the constellation, the residual risk posed by maneuvering after conjunction warnings, and the risk of collision with lethal nontrackable debris.[92] But SpaceX has made vast improvements between its first- and second-generation satellites. For example, in the first year after SpaceX began reporting to the Commission for the first-generation system, SpaceX reported 6 disposal failures,[93] but in the first year operating the Gen2 Starlink satellites, SpaceX reported 2 disposal failures.[94] We acknowledge this is not a perfect comparison, as at the time SpaceX began reporting to the Commission on its first-generation constellation, it had been operating satellites for roughly two years and had already made improvements, while it reported on its second-generation constellation from the beginning. However, the difference is still stark and illustrates that commenters' concerns that hundreds to thousands of failed, non-maneuverable Gen2 Starlink satellites are unlikely to come to pass. We will continue to monitor the failure rate of the Gen2 Starlink satellites through the semiannual reports SpaceX is required to submit,[95] and will have this data available for consideration of any future Gen2 satellite authorization.[96] SpaceX also deploys its satellites at low insertion altitudes to

[89] *See e.g.* Viasat 2025 Petition at 2; Eutelsat Comments at 2-3; Viasat 2022 Petition at III, 39, 44-46; Comments of Kepler Communications, Inc., ICFS File Nos. SAT-LOA-20200526-00055 and SAT-AMD-20210818-00105 (filed Jan. 24, 2021) (Kepler 2022 Comments).

[90] 47 CFR § 25.114(d)(14)(iv)(a)(1).

[91] *Id.*

[92] *See e.g.*, Viasat 2022 Petition at III, 38-40, 44-50. We have previously addressed concerns regarding aggregate collision risk, residual risk, and lethal nontrackable debris. *Gen2 First Partial Grant*, 37 FCC Rcd at 14920-27, para. 70-86; *SpaceX Gen2 SCS and 300 km* Order, 39 FCC Rcd at 12586-90, paras. 62-72.

[93] See *generally* Report of Space Exploration Holdings, LLC, ICFS File No. SAT-MOD-20200417-00037 (filed Jul. 1, 2021) (SpaceX Gen1 July 1, 2021 Report); Report of Space Exploration Holdings, LLC, ICFS File No. SAT-MOD-20200417-00037 (filed Dec. 13, 2021) (SpaceX Gen1 December 13, 2021 Report); Report of Space Exploration Holdings, LLC, ICFS File No. SAT-MOD-20200417-00037 (filed Dec. 31, 2021) (SpaceX Gen1 December 31, 2021 Report); Report of Space Exploration Holdings, LLC, ICFS File No. SAT-MOD-20200417-00037 (filed Apr. 2, 2022) (SpaceX Gen1 April 2, 2022 Report); Report of Space Exploration Holdings, LLC, ICFS File No. SAT-MOD-20200417-00037 (filed Jul. 1, 2022) (SpaceX Gen1 July 1, 2022 Report).

[94] *See generally* SpaceX Gen2 June 30, 2023 Report; SpaceX Gen2 December 29, 2023 Report.

[95] We note that proposed reporting requirements for satellite systems are included in an ongoing rulemaking. *See Space Modernization for the 21st Century*, Notice of Proposed Rulemaking, FCC 25-69, SB Docket No. 25-306 (rel. Oct. 29, 2025) (*Space Modernization NPRM*). This condition is subject to the outcome of that rulemaking.

[96] Kuiper and Telesat both request we remove the condition on SpaceX's authorization that automatically requires SpaceX to cease deploying satellites should the number of failed satellites at operational orbits exceed 100 object years (i.e. the number of years each failed satellite remains in orbit, summed across all failed satellites). *See* Kuiper Comments at 3; Telesat Reply at 3-4. SpaceX did not request removal of this condition, and in fact has supported adding it to other NGSO authorizations. *Ex parte* letter of Space Exploration Holdings, LLC, IB Docket No. 18-313 (filed Jan. 17, 2023) (SpaceX January 17, 2023 Letter). We decline to remove the object years condition at this time. First, the object years condition is the subject of petitions for reconsideration before the full Commission. *See* Petition for Reconsideration of LeoLabs, Inc., ICFS File Nos. SAT-LOA-20200526-00055 and SAT-AMD-20210818-00105 (filed Dec. 30, 2022); Petition for Clarification of Viasat, Inc., ICFS File Nos. SAT-LOA-

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conduct initial testing so any satellites that fail during the testing process will deorbit in a matter of days.[97]

23. We also take this opportunity to address concerns related to specific orbital altitudes that SpaceX requests. Kepler expresses concerns that SpaceX's first amendment significantly densified its proposed 360 km orbital shell, posing a collision risk for satellites de-orbiting from higher, sun synchronous orbits through SpaceX's constellation, often without propulsion, like Kepler's satellites.[98] With respect to Kepler's concerns, SpaceX has previously committed to taking responsibility for conducting collision avoidance maneuvers, unless the other operator involved communicates that it prefers to conduct the maneuver.[99] Furthermore, as part of its approach to collision avoidance, SpaceX now maneuvers whenever a risk of conjunction is at least one in one million, which is two orders of magnitude more cautious than the risk threshold utilized by a number of operators.[100] These practices and commitments together resolve concerns about increased collision risk in the 360 km shell, and we see no need to impose additional conditions on SpaceX to address Kepler's concerns.

24. We do not adopt Kuiper's proposed condition that would require SpaceX to operate satellites only at nominal altitudes below 580 km, finding that the proposed condition is not necessary given the other conditions on the license.[101] With this authorization, SpaceX is not authorized to deploy satellites into nominal operational altitudes above 580 km.[102] Although we authorize SpaceX to operate satellites with orbital tolerances in line with Resolution 8 of WRC-23, the highest operational altitude authorized is 485 km, meaning that the highest a satellite could be located under this authorization is 585 km.[103] Kuiper does not request a condition to entirely restrict operations above 580 km, but rather only to restrict

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20200526-00055 and SAT-AMD-20210818-00105 (filed Jan. 3, 2023). Second, because SpaceX's disposal failure rate is so low, it is far below the 100 object years and thus nowhere close to triggering the requirement to cease deployment, so this condition does not impede SpaceX's operations while it is considered by the full Commission.

[97] *See SpaceX Gen2 First Partial Grant*, 37 FCC Rcd at 14927-28, paras. 90-91. We note that the number of Gen2 Starlink satellites that SpaceX has proactively deorbited after initial testing is considerably higher than satellites that have experienced a disposal failure. For example, in 2023, SpaceX reported that it screened 20 Gen2 Starlink satellites from further deployment, as opposed to the 2 Gen2 Starlink satellites which experienced disposal failures during the same time frame. *See* SpaceX Gen2 June 30, 2023 Report; SpaceX Gen2 December 29, 2023 Report. Without testing at low altitudes, these satellites may have failed on orbit, increasing the overall collision risk posed by the Gen2 Starlink constellation.

[98] Kepler Comments at 2. The Commission deferred consideration of this concern in 2022, as it did not authorize SpaceX to deploy satellites into its proposed 360 km shell. *See SpaceX Gen2 First Partial* Grant, 37 FCC Rcd at 14923, para. 79. We further deferred consideration of this concern in 2024, given the limited deployment of satellites authorized below 400 km. *See SpaceX Gen2 SCS and 300 km Order*, 39 FCC Rcd at 12589-90, paras. 69-70.

[99] Opposition of Space Exploration Holdings, LLC, ICFS File Nos. SAT-LOA-20200526-00055 and SAT-AMD-20210818-00105 at 10-11, 20 ((filed Feb. 24, 2022) (SpaceX 2022 Consolidated Opposition); SpaceX August 19, 2022 Letter at 4; *see also SpaceX Gen2 First Partial Grant*, 37 FCC Rcd at 14923, para 78 (noting SpaceX's commitment to conduct physical coordination when the other operator involved in a conjunction warning lacks propulsion, but also noting that collision avoidance is the responsibility of all operators, including operators whose satellites lack propulsion, and thus opposing a condition on SpaceX's authorization that would require SpaceX to take complete responsibility for collision avoidance maneuvers).

[100] *See e.g.* SpaceX Gen2 July 1, 2024 Report.

[101] Kuiper Comments at 4.

[102] We continue to defer SpaceX's request to operate satellites in shells centered at 604 km and 614 km.

[103] Satellites currently located between 525 km and 535 km that SpaceX is authorized to lower to altitudes between 475 km and 485 km may be located at altitudes higher than 585 km given the orbital tolerances authorized in this grant, but these satellites will be moved to lower altitudes because SpaceX must relocate all of its 500 km orbital shells to lower altitudes pursuant to this grant.

operations with nominal altitudes above 580 km.[104]

D. Protection of Optical Astronomy

25. The Commission and the Space Bureau have previously examined the impacts of SpaceX's Gen2 Starlink constellation on optical astronomy. The Commission has required SpaceX to work with NASA, the National Science Foundation (NSF), and the astronomy community to mitigate the impacts caused by its satellites reflecting sunlight. Further, the Commission continues to monitor the optical astronomy impacts as SpaceX deploys its satellites as part of the Commission's obligation to ensure that its actions benefit the public interest, convenience, and necessity.[105] NASA, NSF, and a number of individual astronomers, amateur astronomy groups, professional societies, and universities previously filed letters and comments on the Gen2 application, as amended, expressing concerns that the Gen2 Starlink satellites would result in severe negative impacts on astronomy, particularly because of the vast number of satellites SpaceX plans to deploy and the lower operational altitudes of its satellites (meaning that the satellites would increase brightness, though they reflect sunlight for a shorter period of time).[106] SpaceX coordinates with NSF on an ongoing basis and has committed to working with the astronomy

[104] Kuiper Comments at 3.

[105] *See SpaceX Gen2 First Partial Grant*, 37 FCC Rcd at 14930-31, paras. 96-97; *SpaceX Gen2 SCS and 300 km Order*, 39 FCC Rcd at 12593, para. 80.

[106] NTIA February 8, 2022 Letter, NASA Letter at 2-3, NSF Letter at 1; Viasat 2022 Petition at IV, 2, 61-67; Comments of the Natural Resources Defense Counsel and International Dark Sky Association, ICFS File Nos. SAT-LOA-20200526-00055 and SAT-AMD-20210818-00105 at 9-10 (filed Sept. 7, 2022) (NRDC/IDA Comments); Letter from Professor Andy Lawrence, Institute for Astronomy, University of Edinburgh, to Marlene H. Dortch, Secretary, FCC, ICFS File Nos. SAT-LOA-20200526-00055 and SAT-AMD-20210818-00105 (dated Sept. 18, 2022) (Andy Lawrence September 18, 2022 Letter); Letter from Mark Phillips, President, the Astronomical Society of Edinburgh, to Marlene H. Dortch, Secretary, FCC, ICFS File Nos. SAT-LOA-20200526-00055 and SAT-AMD-20210818-00105 (dated Sept. 23, 2022) (The Astronomical Society of Edinburgh September 23, 2022 Letter); Letter from Sierra Solter Hunt, PhD Candidate in Plasma Physics, University of Iceland, to Marlene H. Dortch, Secretary, FCC, ICFS File Nos. SAT-LOA-20200526-00055 and SAT-AMD-20210818-00105 (dated Sept. 23, 2022) (Sierra Solter Hunt September 23, 2022 Letter); Letter from Tyler Kokjohn, to Marlene H. Dortch, Secretary, FCC, ICFS File Nos. SAT-LOA-20200526-00055 and SAT-AMD-20210818-00105 (dated Sept. 26, 2022) (Tyler Kokjohn September 26, 2022 Letter); Letter from Samantha Lawler, Assistant Professor for Astronomy, University of Regina, to Marlene H. Dortch, Secretary, FCC, ICFS File Nos. SAT-LOA-20200526-00055 and SAT-AMD-20210818-00105 (dated Sept. 30, 2022) (Samantha Lawler September 30, 2022 Letter); Letter from Carrie Nugent, Associate Professor of Computational Physics and Planetary Science, Olin College of Engineering, to Marlene H. Dortch, Secretary, FCC, ICFS File Nos. SAT-LOA-20200526-00055 and SAT-AMD-20210818-00105 (dated Sept. 30, 2022) (Carrie Nugent September 30, 2022 Letter); Letter from Meredith Rawls, University of Washington Department of Astronomy, to Marlene H. Dortch, Secretary, FCC, ICFS File Nos. SAT-LOA-20200526-00055 and SAT-AMD-20210818-00105 (dated Oct. 5, 2022) (Meredith Rawls October 5, 2022 Letter); Letter from Roberto Trotta, Imperial College London and International School for Advanced Study, Trieste, Italy, to Marlene H. Dortch, Secretary, FCC, ICFS File Nos. SAT-LOA-20200526-00055 and SAT-AMD-20210818-00055 (dated Oct. 6, 2022) (Roberto Trotta October 6, 2022 Letter); Letter from Cameron Nelson, Tenzing Startup Consultants, to Marlene H. Dortch, Secretary, FCC, ICFS File Nos. SAT-LOA-20200526-00055 and SAT-AMD-20210818-00105 (dated Oct. 10, 2022) (Cameron Nelson October 10, 2022 Letter); Letter from Graeme Cuffy to Marlene H. Dortch, Secretary, FCC, ICFS File Nos. SAT-LOA-20200526-00055 and SAT-AMD-20210818-00105 (dated Oct. 11, 2022) (Graeme Cuffy October 11, 2022 Letter); Letter from Melissa Shipp, to Marlene H. Dortch, Secretary, FCC, ICFS File Nos. SAT-LOA-20200526-00055 and SAT-AMD-20210818-00105 (dated Oct. 26, 2022) (Melissa Shipp October 26, 2022 Letter); Letter from Professor Mike Edmunds, President, Royal Astronomical Society, to Marlene H. Dortch, Secretary, FCC, ICFS File Nos. SAT-LOA-20200526-00055 and SAT-AMD-20210818-00105 (dated Nov. 10, 2022) (RAS November 10, 2022 Letter). While none of these parties (except Viasat) have reiterated their concerns in the proceeding for the Gen2 Upgrade Applications, we consider their comments again given the increase in satellites we authorize in this Order and the Commission's previous commitments to reevaluate and continue to monitor the effects of the system.

community to mitigate impacts of its satellites on optical astronomy.[107] SpaceX has also made critical strides in mitigating the brightness of its satellites through darkening and light deflection away from the Earth, along with making detailed satellite tracking information available to astronomers.[108] While we authorize SpaceX to deploy additional satellites, we find that the SpaceX's commitments and actions taken to work with Federal agencies and the astronomy community to coordinate and mitigate the impacts of its Gen2 Starlink constellation continue to be sufficient to resolve concerns raised on the prior record.[109] SpaceX continues to work with the astronomy community in good faith to minimize the impacts of its satellites' reflectivity on optical astronomy, so that Americans can continue to benefit from both the Starlink service and the scientific and cultural importance of the night sky.

E. Protection of the Human Environment

26. Based on the orbital debris mitigation plan and efforts to protect optical astronomy discussed above, and review by the Federal Aviation Administration (FAA) discussed below, we find that, at this juncture, environmental review under the National Environmental Policy Act (NEPA) is unnecessary.[110] In the *SpaceX Gen2 First Partial Grant*, the Commission evaluated environmental concerns raised on the record in the context of SpaceX's first and second-generation satellites combined, which, prior to this authorization, totaled 11,908 satellites.[111] We follow the same approach the Commission took in the *SpaceX Gen2 First Partial Grant*, which was upheld by the D.C. Circuit, where the Commission assumed that the National Environmental Policy Act (NEPA) applies to authorization of SpaceX's Gen2 Starlink constellation and evaluated whether environmental review under NEPA was required, without deciding on whether NEPA applies to activities that take place entirely in outer space in

[107] *See SpaceX Gen2 First Partial Grant*, 37 FCC Rcd at 14930-31, para. 96; *SpaceX Gen2 SCS and 300 km Order*, 39 FCC Rcd at 12592-93, para. 79; SpaceX Gen2 December 29, 2023 Report, Attachment 2 at 1-2; *see* Letter from David Goldman, Vice President of Satellite Policy, Space Exploration Technologies Corp., to Merissa L. Velez, Chief, Satellite Programs and Policy Division, FCC, ICFS File Nos. SAT-LOA-20200526-00055, SAT-AMD-20210818-00105, SAT-AMD-20221216-00175, SAT-MOD-20240423-00089, SAT-MOD-20230207-00021, SAT-AMD-20240322-00061, and GN Docket No. 23-135 at 7-8 (dated June 20, 2024) (SpaceX June 20, 2024 Letter). We also note specifically that since SpaceX is lowering the altitude of the satellites previously operating between 525 and 535 km, SpaceX will no longer be operating Gen2 Starlink satellites at nominal altitudes above the Hubble Space Telescope, greatly minimizing NASA's concerns about impacts to Hubble's operations. *See* NTIA February 8, 2022 Letter, NASA Letter at 2-3, NSF Letter at 1.

[108] As discussed in prior SpaceX orders, SpaceX has taken a number of measures to mitigate reflected sunlight from its satellites, including incorporating brightness mitigation into the design of its satellites and making changes to material specifications, satellite geometries, and maneuver operations to reduce brightness. While SpaceX has explained that its satellites will be bright enough to be visible to the naked eye immediately after launch and during orbit-raising and deorbit phases, as well as during collision avoidance burns, as during these times SpaceX cannot maneuver to mitigate reflected sunlight while also meeting mission objectives, SpaceX is continuing to refine its mitigation practices to resolve this problem. SpaceX has continued to coordinate with NSF, NASA, and the astronomy community to minimize the impact of its satellites on science missions, including to ensure any increased brightness of lower altitude satellites is offset by benefits such as transiting more quickly through the field of view, being visible to fewer observers, and passing into Earth's shadow more quickly after sunset. *SpaceX Gen2 First Partial Grant*, 37 FCC Rcd at 14930-31, para. 96; *SpaceX Gen2 SCS and 300 km Order*, 39 FCC Rcd at 12592-93, para. 79.

[109] We note that the Commission and Space Bureau have previously found that these actions and commitments are also sufficient to mitigate concerns that satellite reflectivity will increase diffuse sky glow. *See SpaceX Gen2 First Partial* Grant, 37 FCC Rcd at 14944-45, para. 122-123; *SpaceX Gen2 SCS and 300 km Order*, 39 FCC Rcd at 12593-94, para. 81. We continue to find this to be the case.

[110] *See SpaceX Gen2 First Partial Grant*, 37 FCC Rcd at 14933-46, paras. 103-125.

[111] *Id.* at 14937, 14942, paras. 112, 117.

general.[112] Viasat, the Natural Resources Defense Counsel and International Dark Sky Association (NRDC/IDA),[113] and the Ukrainian Congress Committee of America (UCCA) raise concerns related to atmospheric effects caused by rocket launches and reentering satellites,[114] effects on the orbital environment from increased collision risk in space,[115] and impacts to professional and amateur astronomy and human health and culture caused by satellites reflecting sunlight.[116]

27. We reiterate that the FAA conducts environmental review of the environmental effects of rocket launches, and has thus reviewed or is reviewing any potential impacts from SpaceX's launches.[117] Under NEPA, an agency need not undertake environmental review that is already conducted by another agency.[118] We also reiterate that we have reviewed SpaceX's orbital debris mitigation plans and SpaceX's commitments to mitigate the impacts of its satellites' reflectivity on astronomy under the Commission's rules, and our review indicates that allegations of a significant environmental effect in these contexts are insufficient to warrant further environmental review under NEPA.[119] As to the potential impacts of reentering satellites on the atmosphere, we found in the *SpaceX Gen2 First Partial Grant* that petitioners had not demonstrated potential impacts with the specificity necessary to overcome the categorical exclusion.[120] Specifically, the scientific evidence presented at the time, as confirmed by a Government Accountability Office review, recognized that there was uncertainty surrounding potential

[112] *Id.* at 14933-34, para. 103. The Commission at that time found that the concerns raised on the record did not warrant environmental review under NEPA. *Id.* at 14935-36, para. 109. We note the Commission recently adopted a notice of proposed rulemaking proposing to modify its NEPA regulations to conform with recent changes to the NEPA statute, Supreme Court decisions, and executive orders, including a proposal to explicitly exclude satellites and space-based operations from review under NEPA. *See Modernizing the Commission's National Environmental Policy Act Rules,* Notice of Proposed Rulemaking, WT Docket No. 25-217, FCC 25-47, para. 33 (Aug. 7, 2025). (*NEPA NPRM*).

[113] We note the NRDC/IDA did not participate in the Gen2 Upgrade Application proceeding, though as part of the Commission's commitment to revisit these concerns for a larger deployment of Gen2 Starlink satellites, we consider their comments filed in 2022 as part of this analysis. *See* NRDC/IDA Comments.

[114] *See e.g.* Viasat 2022 Petition at III-IV, 2, 56-61; NRDC/IDA Comments at 1-2, 5-6, 7, 8; Petition to Deny or Hold in Abeyance of Ukrainian Congress Committee of America, Inc., ICFS File Nos. SAT-MOD-20241011-00224 and SAT-MOD-20240813-00183 at 3-4, 6-11 (filed Dec. 4, 2024) (UCCA Petition) .

[115] *See e.g.* Viasat 2022 Petition at IV-V, 67.

[116] *See e.g.* Viasat 2022 Petition at IV, 2, 61-67; NRDC/IDA Comments at 9-10; Andy Lawrence September 18, 2022 Letter; The Astronomical Society of Edinburgh September 23, 2022 Letter; Sierra Solter Hunt September 23, 2022 Letter; Tyler Kokjohn September 26, 2022 Letter; Samantha Lawler September 30, 2022 Letter; Carrie Nugent September 30, 2022 Letter; Meredith Rawls October 5, 2022 Letter; Roberto Trotta October 6, 2022 Letter; Graeme Cuffy October 11, 2022 Letter; RAS November 10, 2022 Letter.

[117] *See SpaceX Gen2 First Partial Grant*, 37 FCC Rcd at 14938-39, para. 115. *See also* Federal Aviation Administration, Final Environmental Assessment SpaceX Falcon 9 Operations at Space Launch Complex 40, Cape Canaveral Space Force Station, Florida, https://www.faa.gov/space/stakeholder_engagement/SpaceX_Falcon_SLC_40_EA (Aug. 22, 2025); Federal Aviation Administration, SpaceX Starship-Super Heavy Project at Kennedy Space Center Launch Complex 39A, Draft Environmental Impact Statement, https://www.regulations.gov/document/FAA-2024-1395-0075 (Aug. 2025).

[118] 47 CFR § 1.1311(e) ("An EA need not be submitted to the Commission if another agency of the Federal Government has assumed responsibility for determining whether [ ] the facilities in question will have a significant effect on the quality of the human environment...."); *See also SpaceX Gen2 First Partial Grant*, 37 FCC Rcd at 14938-39, para. 115. We note that the Commission's recent notice of proposed rulemaking to modify its NEPA regulations includes a proposal to amend these rules to comply with the amended NEPA or otherwise streamline the rules and how to document review by another agency. *NEPA NPRM* at paras. 74-79.

[119] *See SpaceX Gen2 First Partial Grant*, 37 FCC Rcd at 14943-45, para. 119, 122-23, 125, sections III.c and d.

[120] *Id.* at 14942-43, para. 117-118.

effects and that further study would be beneficial.[121] Three years later, petitioners have not presented any new information on the record. Viasat merely incorporates its 2022 petition into the record of the Gen2 Upgrade Applications,[122] and while the UCCA provides an estimate of how many tons of Gen2 Starlink satellites are expected to reenter the atmosphere daily, it provides no specific evidence supporting potential or actual impacts on the atmosphere caused by these reentering satellites.[123] The record still does not demonstrate that reentering satellites may impact the human environment. We note that SpaceX has committed to working with the scientific community to develop methods to study the effects of reentering satellites on the atmosphere,[124] and we find at this time no additional review under NEPA is necessary.

F. UCCA's Motion for Stay

28. Finally, we deny UCCA's Motion for Stay.[125] The UCCA argues that Elon Musk's appointment as co-head of the Department of Government Efficiency (DOGE) was a violation of the Federal Advisory Committee Act (FACA) of 1972 and therefore the FCC should stop processing all applications and requests filed by SpaceX until any conflicts of interest are eliminated.[126] In considering requests for a stay, the Commission generally looks to the four criteria set forth in *Virginia Petroleum Jobbers Association*.[127] These criteria are: (1) a likelihood of success on the merits; (2) the threat of irreparable harm absent the grant of preliminary relief; (3) the degree of injury to other parties if relief is granted; and (4) the issuance of the order will further the public interest.[128] The Commission then balances these interests in order to determine an administrative response on a case-by-case basis.[129] We conclude that UCCA has not demonstrated a likelihood of success on the merits. DOGE did not make any submissions in the record of the above-captioned proceedings. Accordingly, given the lack of any such submissions, the Commission did not rely on any input from DOGE in these proceedings. In addition, Elon Musk left his government role around the end of May 2025,[130] so the conflict-of-interest

[121] *Id.* at 14942-43, para. 117-118; *see* also GAO Technology Assessment, Large Constellations of Satellites, Mitigating Environmental and Other Effects, GAO-22-105166, at 10-17 (Sept 2022).

[122] *See* Viasat 2025 Petition at 2; Viasat 2022 Petition at 58-61.

[123] *See* UCCA Petition at 3.

[124] Letter from David Goldman, Director, Satellite Policy, Space Exploration Technologies Corp., to Marlene H. Dortch, Secretary, FCC, ICFS File Nos. SAT-LOA-20200526-00055 and SAT-AMD-20210818-00105 at 2 (dated Oct. 27, 2022) (SpaceX October 27, 2022 Letter); *see also SpaceX Gen2 First Partial Grant*, 37 FCC Rcd at 14942, para. 117.

[125] Ukrainian Congress Committee of America, Inc., Motion for Stay of Application of Space Exploration Holdings, LLC, for Amendment of Application for the SpaceX Gen2 NGSO Satellite System, ICFS File No. SAT-MOD-20241011-00224 (filed Dec. 4, 2024). We note that the Motion for Stay was filed in ICFS File No. SAT-MOD-20240813-00183, which is SpaceX's application for modification of the V-band NGSO Satellite System. The file number in the caption of the Motion for Stay, however, is SAT-MOD-20241011-00224, the SpaceX Gen2 Upgrade Modification. We address this Motion for Stay here, as it is addressed to SpaceX's Gen2 Upgrade Modification and Amendment, rather than the SpaceX V-band Milestone Modification Application.

[126] UCCA Motion for Stay at 1-2 ("Musk's dual role as head of SpaceX and his proposed role with DOGE violates FACA.").

[127] *Virginia Petroleum Jobbers Ass'n v. Federal Power Commission*, 259 F.2d 921, 925 (D.C. Cir. 1958). *See also Implementation of Sections 309(j) and 337 of the Communications Act of 1934 as Amended*, Order, 18 FCC Rcd 25491, 25494, para. 6 (2003) (*PLMR Narrowband Stay Order*).

[128] *PLMR Narrowband Stay Order*, 18 FCC Rcd at 25494, para. 6.

[129] *Id.*

[130] *See* CNBC, "Elon Musk Thanks Trump, Says He's Leaving Government Work with DOGE" (May 29, 2025), https://www.cnbc.com/2025/05/28/elon-musk-trump-doge.html.

concerns underlying the Motion for Stay are moot. We also find that staying the processing of all applications and requests filed by SpaceX as requested by UCCA would harm the public interest by delaying the deployment of new services to the public and that the other criteria in *Virginia Petroleum Jobbers Association* do not weigh in favor of a stay. Accordingly, we deny the Motion for Stay.

IV. ORDERING CLAUSES

29. Accordingly, IT IS ORDERED, that the Gen2 Upgrade Applications filed by Space Exploration Holdings, LLC (SpaceX), ARE GRANTED-IN-PART and DEFERRED-IN-PART to the extent set forth above, pursuant to sections 0.51 and 0.261 of the Commission's rules, 47 CFR §§ 0.51 and 0.261, and section 309(a) of the Communications Act of 1934, as amended, 47 USC § 309(a).

30. IT IS FURTHER ORDERED that the petitions to deny filed by Viasat, Inc. in 2022 and 2025 are DENIED-IN-PART and DEFERRED-IN-PART, to the extent set forth above.

31. IT IS FURTHER ORDERED that the petition to deny filed by Echostar Corporation is DENIED.

32. IT IS FURTHER ORDERED that the petition to deny filed by DISH Network Corporation in 2022 is DENIED.

33. IT IS FURTHER ORDERED that the petition to deny or hold in abeyance filed by the Ukrainian Congress Committee of America, Inc., is DENIED-IN-PART and DEFERRED-IN-PART, to the extent set forth above.

34. IT IS FURTHER ORDERED that the opposition filed by Anuvu Licensing Holdings LLC is DENIED.

35. IT IS FURTHER ORDERED that the petition filed by Iridium Constellation LLC is DENIED-IN-PART and DEFERRED-IN-PART, to the extent set forth above.

36. IT IS FURTHER ORDERED that the petition filed by Globalstar Inc. is DEFERRED.

37. IT IS FURTHER ORDERED that the motion for stay filed by the Ukrainian Congress Committee of America is DENIED.

FEDERAL COMMUNICATIONS COMMISSION

Jay Schwarz
Chief
Space Bureau