

Rule	Requirement	Notes
§25.110 - Submitting your application	(b)(2) Except as provided in paragraph (b)(3) of this section, applications for space station licenses must be filed electronically on FCC Form 312 in accordance with the applicable provisions of part 1, subpart Y of this chapter and include all information required by §25.114.	See FCC Form 312
§25.111 - Additional information, ITU filings and ITU cost recovery	<p>(b) Applicants and licensees of radio stations governed by this part must provide the Commission with the information required for Advanced Publication Information, Coordination, and Notification of frequency assignment filings, including due diligence information, pursuant to the RR of the ITU. No protection from interference caused by radio stations authorized by other Administrations is guaranteed unless ITU procedures are timely completed or, with respect to individual Administrations, coordination agreements are successfully completed. A license for which such procedures have not been completed may be subject to additional terms and conditions required for coordination of the frequency assignments with other Administrations</p> <p>(d) The Commission will submit filings to the ITU on behalf of an applicant, licensee, or other requesting party only after the party has filed a signed declaration of unconditional acceptance of all consequent ITU cost-recovery responsibility. Applicants and licensees must file the declaration electronically in the “Other Filings” tab of the application file in the IBFS database, and must also mail a paper copy to the International Bureau, Satellite Division. In addition, applicants and licensees must reference the call sign and name of the satellite network in the declaration. All cost-recovery declarations must include the name(s), address(es), email address(es), and telephone number(s) of a contact person, or persons, responsible for cost recovery inquiries and ITU correspondence and filings. Supplements must be filed as necessary to apprise the Commission of changes in the contact information until the ITU cost-recovery responsibility is discharged. The applicant, licensee, or other party must remit payment of any resultant cost-recovery fee to the ITU by the due date specified in the ITU invoice, unless an appeal is pending with the ITU that was filed prior to the due date. A license granted in reliance on such a commitment will be conditioned upon discharge of any such cost-recovery obligation. Where an applicant or licensee has an overdue ITU cost-recovery fee and does not have an appeal pending with the ITU, the Commission will dismiss any application associated with that satellite network.</p>	See Legal Narrative Section III.A ADDITIONAL LEGAL AND TECHNICAL INFORMATION - Legal

§25.112 - Dismissal and return of applications	(a) An application will be unacceptable for filing and will be returned to the applicant with a brief statement identifying the omissions or discrepancies if:	See Legal Narrative. IV. REQUESTS FOR WAIVER OF FCC RULES
	(a)(1) The application is defective with respect to completeness of answers to questions, informational showings, internal inconsistencies, execution, or other matters of a formal character;	
	(a)(3) The application requests authority to operate a space station in a frequency band that is not allocated internationally for such operations under the Radio Regulations of the International Telecommunication Union.	See Technical Narrative Section II.4. Explanations of how uplink frequencies are connected to downlink frequencies Astra confirm all freq follow ITU allocations - Astra requests to operate only in frequency bands allocated internationally under the Radio Regs
	(b) Applications for space station authority found defective under paragraph (a)(3) or (a)(4) of this section will not be considered. Applications for authority found defective under paragraphs (a)(1) or (a)(2) of this section may be accepted for filing if:	See Legal Narrative - Footnote 12
	(b)(1) The application is accompanied by a request which sets forth the reasons in support of a waiver of (or an exception to), in whole or in part, any specific rule, regulation, or requirement with which the application is in conflict;	
§25.113 - Station construction, deployment approval and operation of spare satellites	(g) Except as set forth in paragraphs (h) and (i) of this section, approval for orbital deployment and a station license (i.e., operating authority) must be applied for and granted before a space station may be deployed and operated in orbit. Approval for orbital deployment may be requested in an application for a space station license. However, an application for authority to deploy and operate an on-ground spare satellite will be considered pursuant to the following procedures:	See Technical Narrative Section II.C.2. Operations
	(g)(1) Applications for deployment and operation of an on-ground spare NGSO-like satellite will be considered pursuant to the procedures set forth in §25.157, except as provided in paragraph (g)(3) of this section.	

	<p>(g)(3) Neither paragraph (g)(1) nor (g)(2) of this section will apply in cases where the space station to be deployed is determined to be an emergency replacement for a previously authorized space station that has been lost as a result of a launch failure or a catastrophic in-orbit failure.</p>	
	<p>(h) An operator of NGSO space stations under a blanket license granted by the Commission need not apply for license modification to operate technically identical in-orbit spare satellites in an authorized orbit. However, the licensee must notify the Commission within 30 days of bringing an in-orbit spare into service and certify that its activation has not exceeded the number of space stations authorized to provide service and that the licensee has determined by measurement that the activated spare is operating within the terms of the license.</p>	
	<p>(i) An operator of NGSO space stations under a blanket license granted by the Commission, except for those granted pursuant to the application process in § 25.122 or § 25.123, need not apply for license modification to deploy and operate technically identical replacement satellites in an authorized orbit within the term of the system authorization. However, the licensee must notify the Commission of the intended launch at least 30 days in advance and certify that its operation of the additional space station(s) will not increase the number of space stations providing service above the maximum number specified in the license.</p>	
<p>§25.114 - Applications for space station authorizations</p>	<p>(a)(1) A license application filed pursuant to § 25.110(b)(2) for a GSO space station or NGSO space station or space-station constellation must comprise a comprehensive proposal and must be submitted on FCC Form 312, Main Form and Schedule S, with attached exhibits required by paragraph (d) of this section.</p>	<p>See FCC Form 312, Schedule S and Attachments</p>
	<p>(a)(2) An application for blanket authority for an NGSO constellation of space stations that are not all technically identical must provide the information required by paragraphs (c) and (d) of this section for each type of station in the constellation.</p>	<p>See Technical Narrative Section II. Astra's Constellation; All space stations will be technically identical.</p>
	<p>(b) Each application for a new or modified space station authorization must contain the formal waiver required by 47 U.S.C. 304.</p>	<p>See Form 312</p>
	<p>(c) The following info shall be filed on FCC Form 312, Main form and Schedule S:</p>	<p>See FCC Form 312 and Schedule S</p>
	<p>(c)(1) Name, address, and telephone number of the applicant</p>	
	<p>(c)(2) Name, address, and telephone number of the person(s), including counsel, to whom inquiries or correspondence should be directed</p>	

<p>(c)(3) Type of authorization requested (e.g., launch authority, station license, modification of authorization);</p>	
<p>(c)(4)(i) For each space station transmitting and receiving antenna beam (including telemetry and tracking beams but not command beams), specify channel center frequencies and bandwidths and polarization plan. For command beams, specify each of the center frequencies within a 5 MHz range or a range of 2 percent of the assigned bandwidth, whichever is smaller, and the polarization plan. If the space station can vary channel bandwidth in a particular frequency band with on-board processing, specify only the range of frequencies in that band over which the beam can operate and the polarization plan.</p>	<p>See Schedule S</p>
<p>(c)(4)(ii) Specify maximum EIRP and maximum EIRP density for each space station transmitting antenna beam. If the satellite uses shapeable antenna beams, as defined in § 25.103, specify instead maximum possible EIRP and maximum possible EIRP density within each shapeable beam's proposed coverage area. Provide this information for each frequency band in which the transmitting antenna would operate. For bands below 15 GHz, specify EIRP density in dBW/4 kHz; for bands at and above 15 GHz, specify EIRP density in dBW/MHz. If the EIRP density varies over time, specify the maximum possible EIRP density.</p>	
<p>(c)(4)(v) For each space station receiving beam other than command beams, specify the gain-to-temperature ratio at beam peak. For receiving beams fed into transponders, also specify the minimum and maximum saturation flux density at beam peak. If the satellite uses shapeable beams, specify the minimum and maximum gain-to-temperature ratio within each shapeable beam's proposed coverage area, and for shapeable receiving beams fed into transponders, specify the minimum and maximum saturation power flux density within the 0 dB relative antenna gain isoline. Provide this information for each frequency band in which the receiving beam can operate. For command beams, specify the beam peak flux density at the command threshold;</p>	

<p>(c)(4)(vi)(B) For NGSOs, specify for each unique orbital plane the predicted antenna gain contour(s) for each Tx and Rx antenna beam for one space station if all space stations are identical in the constellation. If individual space stations in the constellation have different antenna beam configurations, specify the predicted antenna gain contours for each transmit and receive beam for each space station type and orbit or orbital plane requested. The contours should be plotted on an area map with the beam depicted on the surface of the earth with the space stations' peak antenna gain pointed at nadir to a latitude and longitude within the proposed service area. The contour(s) should be plotted at 2 dB intervals down to 10 dB below the peak gain and at 5 dB intervals between 10 dB and 20 dB below the peak gain. For inter-satellite links, specify the peak antenna gain and 3 dB beamwidth.</p>	<p>See Technical Narrative X.D. Astra's Predicted Space Station Antenna Gain Contours</p>
<p>(c)(4)(vi)(C) For space stations with shapeable antenna beams, specify the contours, as defined in paragraph (c)(4)(vi)(A) or (B) of this section, for the transmitting beam configuration that results in the highest EIRP density for the beams listed in paragraph (c)(4)(ii) of this section and for the receiving beam configuration with the smallest gain-to-temperature ratio and the highest required saturation power flux density for the beams listed in paragraph (c)(4)(v) of this section. If the shapeable beams are also steerable, include the contours that would result from moving the beam peak around the limit of the effective beam peak area and the 0 dB relative antenna gain isoline. The proposed maximum coverage area must be clearly specified.</p>	<p>Astra will comply.</p>
<p>(c)(6) For space stations in non-geostationary orbit: (c)(6)(i-ix): (i) The number of orbital planes and the number of space stations in each plane, (ii) The inclination of the orbital plane(s), (iii) The orbital period, (iv) The apogee, (v) The perigee, (vi) The argument(s) of perigee, (vii) Active service arc(s), (viii) Right ascension of the ascending node(s), and (ix) For each satellite in each orbital plane, the initial phase angle at the reference time.</p>	<p>See Schedule S and Technical Narrative Section II. Astra's Constellation</p>

	(c)(7) Frequency bands, types of service, and coverage area	See Technical Narrative Section II.4. Explanation of how uplink frequencies are connected to downlink frequencies
	(c)(8) Calculated maximum power flux-density levels within each coverage area and energy dispersal bandwidths, if any, needed for compliance with § 25.208, for the angles of arrival specified in the applicable paragraph(s) of § 25.208, except for an NGSO FSS applicant certifying compliance with PFD limits under § 25.146(a)(1);	See Technical Narrative Section III.B. Compliance of PFD Limits
	(c)(10) Estimated operational lifetime	See Technical Narrative Section II.A Astra's Constellation - Space Segment
	(c)(11) Whether the space station is to be operated on a common carrier basis;	See Form 312
	(d) The following information in narrative form shall be contained in each application:	See Technical Narrative Section II.C Astra's Constellation - Facilities, Operations and Services
	(d)(1) Overall description of system facilities, operations and services and explanation of how uplink frequency bands would be connected to downlink frequency bands;	
	(d)(6) Public interest considerations in support of the grant	See Legal Narrative Section II. THE PUBLIC INTEREST WILL BE SERVED BY AUTHORIZING THE ASTRA CONSTELLATION
§25.114(d)(14) - Orbital Debris Mitigation	A description of the design and operational strategies that will be used to mitigate orbital debris, including the following information:	See Technical Narrative Section IV. Astra's Orbital Debris Mitigation Plan.
	(i) A statement that the space station operator has assessed and limited the amount of debris released in a planned manner during normal operations . Where applicable, this statement must include an orbital debris mitigation disclosure for any separate deployment devices, distinct from the space station launch vehicle, that may become a source of orbital debris;	

<p>(ii) A statement indicating whether the space station operator has assessed and limited the probability that the space station(s) will become a source of debris by collision with small debris or meteoroids that would cause loss of control and prevent disposal. The statement must indicate whether this probability for an individual space station is 0.01 (1 in 100) or less, as calculated using the NASA Debris Assessment Software or a higher fidelity assessment tool;</p>	<p>Astra will comply.</p> <p>Once the space station is past Critical Design Review (CDR) and the design is firm, an Orbital Debris Assessment Report, validating all NASA NS 8719.14B Requirements, will be submitted based off simulations using NASA Debris Assessment Software (DAS).</p>
<p>(d)(14)(iii) A statement that the space station operator has assessed and limited the probability, during and after completion of mission operations, of accidental explosions or of release of liquids that will persist in droplet form. This statement must include a demonstration that debris generation will not result from the conversion of energy sources on board the spacecraft into energy that fragments the spacecraft. Energy sources include chemical, pressure, and kinetic energy. This demonstration should address whether stored energy will be removed at the spacecraft's end of life, by depleting residual fuel and leaving all fuel line valves open, venting any pressurized system, leaving all batteries in a permanent discharge state, and removing any remaining source of stored energy, or through other equivalent procedures specifically disclosed in the application;</p>	<p>See Technical Narrative Section IV. Astra's Orbital Debris Mitigation Plan.</p>

<p>(d)(14)(iv) A statement that the space station operator has assessed and limited the probability of the space station(s) becoming a source of debris by collisions with large debris or other operational space stations.</p>	<p>Astra will comply.</p> <p>Once the space station is past Critical Design Review (CDR) and the design is firm, an Orbital Debris Assessment Report, validating all NASA NS 8719.14B Requirements, will be submitted based off simulations using NASA Debris Assessment Software (DAS)</p>
<p>(d)(14)(iv)(A) Where the application is for an NGSO space station or system, the following information must also be included:</p> <p>(d)(14)(iv)(A)(1) A demonstration that the space station operator has assessed and limited the probability of collision between any space station of the system and other large objects (10 cm or larger in diameter) during the total orbital lifetime of the space station, including any de-orbit phases, to less than 0.001 (1 in 1,000). The probability shall be calculated using the NASA Debris Assessment Software or a higher fidelity assessment tool. The collision risk may be assumed zero for a space station during any period in which the space station will be maneuvered effectively to avoid colliding with large objects.</p>	<p>Astra will comply.</p> <p>Once the space station is past Critical Design Review (CDR) and the design is firm, an Orbital Debris Assessment Report, validating all NASA NS 8719.14B Requirements, will be submitted based off simulations using NASA Debris</p>

<p>(d)(14)(iv)(A)(1)(Proposed) A demonstration that the space station operator has assessed and limited the probability of collision between any space station of the system and other large objects (10 cm or larger in diameter) during the total orbital lifetime of the space station, including any de-orbit phases, to less than 0.001 (1 in 1,000). The probability shall be calculated using the NASA Debris Assessment Software or a higher fidelity assessment tool. The collision risk may be assumed zero for a space station during any period in which the space station will be maneuvered effectively to avoid colliding with large objects. For systems consisting of multiple space stations, the statement must also include an assessment of the total probability of collision, calculated as the sum of the probability of collision associated with each individual space station. The total estimated number of space stations deployed over a 15-year period, including any replacement space stations, must be used for this calculation. Where the total probability of collision exceeds 0.001 (1 in 1,000) assuming a 10% failure rate of any maneuvering capability at an orbit that presents the worst case for collision risk, the statement must include an additional demonstration of the expected failure rate of maneuverability, and the orbit where the operator would expect most failures to occur, and calculate the total probability of failure based on those assumptions.</p>	
<p>(d)(14)(iv)(A)(2) The statement must identify characteristics of the space station(s)' orbits that may present a collision risk, including any planned and/or operational space stations in those orbits, and indicate what steps, if any, have been taken to coordinate with the other spacecraft or system, or what other measures the operator plans to use to avoid collision.</p>	<p>See Technical Narrative Section. II Astra's Constellation</p>
<p>(d)(14)(iv)(A)(3) If at any time during the space station(s)' mission or de-orbit phase the space station(s) will transit through the orbits used by any inhabitable spacecraft, including the International Space Station, the statement must describe the design and operational strategies, if any, that will be used to minimize the risk of collision and avoid posing any operational constraints to the inhabitable spacecraft.</p>	<p>See Technical Narrative Section IV. Astra's Orbital Debris Mitigation Plan</p>

<p>(d)(14)(iv)(A)(4) The statement must disclose the accuracy, if any, with which orbital parameters will be maintained, including apogee, perigee, inclination, and the right ascension of the ascending node(s). In the event that a system is not able to maintain orbital tolerances, e.g., its propulsion system will not be used for orbital maintenance, that fact must be included in the debris mitigation disclosure. Such systems must also indicate the anticipated evolution over time of the orbit of the proposed satellite or satellites. All systems must describe the extent of satellite maneuverability, whether or not the space station design includes a propulsion system.</p>	<p>Spacecraft will be trackable. See Technical Narrative II.C.2.b. In Orbit Operations</p>
<p>(d)(14)(iv)(A)(5) The space station operator must certify that upon receipt of a space situational awareness conjunction warning, the operator will review and take all possible steps to assess the collision risk, and will mitigate the collision risk if necessary. As appropriate, steps to assess and mitigate the collision risk should include, but are not limited to: contacting the operator of any active spacecraft involved in such a warning; sharing ephemeris data and other appropriate operational information with any such operator; and modifying space station attitude and/or operations.</p>	
<p>(d)(14)(v) A statement addressing the trackability of the space station(s). Space station(s) operating in low-Earth orbit will be presumed trackable if each individual space station is 10 cm or larger in its smallest dimension, excluding deployable components. Where the application is for an NGSO space station or system, the statement shall also disclose the following:</p>	<p>See Technical Narrative II.C.2.a. Launch</p>
<p>(d)(14)(v)(A) How the operator plans to identify the space station(s) following deployment and whether space station tracking will be active or passive;</p>	<p>See Technical Narrative II.C.2.b. In Orbit Operations</p>
<p>(d)(14)(v)(B) Whether, prior to deployment, the space station(s) will be registered with the 18th Space Control Squadron or successor entity; and</p>	
<p>(d)(14)(v)(C) The extent to which the space station operator plans to share information regarding initial deployment, ephemeris, and/or planned maneuvers with the 18th Space Control Squadron or successor entity, other entities that engage in space situational awareness or space traffic management functions, and/or other operators.</p>	
<p>(d)(14)(vi) A statement disclosing planned proximity operations, if any, and addressing debris generation that will or may result from the proposed operations, including any planned release of debris, the risk of accidental explosions, the risk of accidental collision, and measures taken to mitigate those risks.</p>	<p>Astra will comply. No proximity approaches are planned.</p>

<p>(d)(14)(vii) A statement detailing the disposal plans for the space station, including the quantity of fuel—if any—that will be reserved for disposal maneuvers. In addition, the following specific provisions apply:</p>	<p>See Technical Narrative Section II.C.2.b. End of Life</p>
<p>(d)(14)(vii)(B) For space stations terminating operations in an orbit in or passing through the low-Earth orbit region below 2,000 km altitude, the statement must disclose whether the spacecraft will be disposed of through atmospheric re-entry, specifying if direct retrieval of the spacecraft will be used. The statement must also disclose the expected time in orbit for the space station following the completion of the mission.</p>	
<p>(d)(14)(vii)(D) For all space stations under (B) or (C), the following additional specific provisions apply:</p>	<p>See Technical Narrative Section II.C.2.b. End of Life</p>
<p>(d)(14)(vii)(D)(1) The statement must include a demonstration that the probability of success of the chosen disposal method will be 0.9 or greater for any individual space station. For space station systems consisting of multiple space stations, the demonstration should include additional information regarding efforts to achieve a higher probability of success, with a goal, for large systems, of a probability of success for any individual space station of 0.99 or better. For space stations under paragraph (d)(14)(vii)(B) of this section, successful disposal is defined as atmospheric re-entry of the spacecraft within 25 years or less following completion of the mission. For space stations under paragraph (d)(14)(vii)(C) of this section, successful disposal will be assessed on a case-by-case basis.</p>	<p>Astra will comply.</p> <p>Once the space station is past Critical Design Review (CDR) and the design is firm, documentation showing compliance with this requirement will be provided to the Commission.</p>
<p>(d)(14)(vii)(D)(2) If planned disposal is by atmospheric re-entry, the statement must also include:</p>	<p>See Technical Narrative Section II.C.2.b. End of Life</p>
<p>(d)(14)(vii)(D)(2)(i) A disclosure indicating whether the atmospheric re-entry will be an uncontrolled re-entry or a controlled targeted reentry.</p>	

	(d)(14)(vii)(D)(2)(ii) An assessment as to whether portions of any individual spacecraft will survive atmospheric re-entry and impact the surface of the Earth with a kinetic energy in excess of 15 joules, and demonstration that the calculated casualty risk for an individual spacecraft using the NASA Debris Assessment Software or a higher fidelity assessment tool is less than 0.0001 (1 in 10,000).	Astra will comply. Once the space station is past Critical Design Review (CDR) and the design is firm, an Orbital Debris Assessment Report, validating all NASA NS 8719.14B Requirements, will be submitted based off simulations using NASA Debris Assessment Software (DAS)
§25.121 - License Term and Renewals	(d)(2) For NGSO space stations, the license period will begin at 3 a.m. Eastern Time on the date when the licensee notifies the Commission pursuant to 25.173(b) that operation of an initial space station is compliant with the license terms and conditions and that the space station has been placed in its authorized orbit. Operating authority for all space stations subsequently brought into service pursuant to the license will terminate upon its expiration	Astra will comply.
§25.159 - Limits on pending applications and unbuilt satellite systems	(b) Applicants with an application for one NGSO-like satellite system license on file with the Commission in a particular frequency band, or one licensed-but-unbuilt NGSO-like satellite system in a particular frequency band, will not be permitted to apply for another NGSO-like satellite system license in that frequency band.	See Legal Narrative Section III.A ADDITIONAL LEGAL AND TECHNICAL INFORMATION - Legal
§25.164 - System deployment time frame; milestone reporting	(b)(1) The recipient of an initial authorization for an NGSO satellite system, other than an SDARS system, must launch 50 percent of the maximum number of space stations authorized for service, place them in their assigned orbits, and operate them in accordance with the station authorization no later than 6 years after the grant of the authorization, unless a different schedule is established by Title 47, Chapter I. This paragraph does not apply to replacement NGSO space stations as defined in § 25.165(e).	See Legal Narrative Section III.A ADDITIONAL LEGAL AND TECHNICAL INFORMATION - Legal; See Technical Narrative Section II.C.2.a Launch

	<p>(b)(2) A licensee that satisfies the requirement in paragraph (b)(1) of this section 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 nine years after the grant of the authorization</p>	
	<p>(f) A licensee subject to the requirements in paragraph (a) or (b) of this section must either demonstrate compliance with the applicable requirement or notify the Commission in writing that the requirement was not met, within 15 days after the specified deadline. Compliance with a milestone requirement in paragraph (a) or (b) of this section may be demonstrated by certifying pursuant to §25.121(d) that the space station(s) in question, has, or have, been launched and placed in the authorized orbital location or non-geostationary orbit(s) and that in-orbit operation of the space station or stations has been tested and found to be consistent with the terms of the authorization.</p>	
	<p>(h) In cases where the Commission grants a satellite authorization in different stages, such as a license for a satellite system using feeder links or inter-satellite links, the earliest of the milestone schedules will be applied to the entire satellite system.</p>	
<p>§25.165 - Surety Bonds</p>	<p>(a) For all space station licenses issued after September 20, 2004, other than licenses for DBS space stations, SDARS space stations, space stations licensed in accordance with § 25.122 or § 25.123, and replacement space stations as defined in paragraph (e) of this section, the licensee must post a bond within 30 days of the grant of its license. Space station licensed in accordance with § 25.122 or § 25.123 must post a bond within one year plus 30 days of the grant of the license. Failure to post a bond will render the license null and void automatically.</p>	<p>See Legal Narrative Section III.A ADDITIONAL LEGAL AND TECHNICAL INFORMATION - Legal</p>
	<p>(a)(1) An NGSO licensee must have on file a surety bond requiring payment in the event of default as defined in paragraph (c) of this section, in an amount, at a minimum, determined according to the following formula, with the resulting dollar amount rounded to the nearest \$10,000: $A = \\$1,000,000 + \\$4,000,000 * D / 2192$, where A is the amount to be paid and D is the lesser of 2192 or the number of days that elapsed from the date of license grant until the date when the license was surrendered</p>	

<p>§25.170 - Annual Reporting Requirements</p>	<p>Link to an amendment published at 86 FR 11888, Mar. 1, 2021. All operators of U.S.-licensed space stations and operators of non-U.S.-licensed space stations granted U.S. market access must, on June 30 of each year, file a report with the International Bureau containing the following information:</p> <p>(a) Identification of any space station(s) not available for service or otherwise not performing to specifications as of May 31 of the current year, any spectrum within the scope of the part 25 license or market access grant that the space station is unable to use, the cause(s) of these difficulties, and the date when the space station was taken out of service or the malfunction was identified; and</p> <p>(b) A current listing of the names, titles, addresses, email addresses and telephone numbers of the points of contact for resolution of interference problems and for emergency response. Contact personnel should include those responsible for resolution of short term, immediate interference problems at the system control center, and those responsible for long term engineering and technical design issues</p> <p>(c) Construction progress and anticipated launch dates for authorized replacement satellites</p>	<p>Astra will comply.</p>
<p>§25.171 - Space station point of contact reporting requirements.</p>	<p>(a) On June 30 of each year, a space station licensee or market access recipient must provide a current listing of the names, titles, addresses, email addresses, and telephone numbers of the points of contact for resolution of interference problems and for emergency response. Contact personnel should include those responsible for resolution of short-term, immediate interference problems at the system control center, and those responsible for long-term engineering and technical design issues.</p> <p>(b) If a space station licensee or market access recipient point of contact information changes, the space station licensee or market access recipient must file the updated information within 10 days of the change.</p>	<p>Astra will comply.</p>
<p>§25.172 - Requirements for reporting space station control arrangements</p>	<p>(a) The operator of any space station licensed by the Commission or granted U.S. market access must file the following information with the Commission prior to commencing operation with the space station, or in the case of a non-U.S.-licensed space station, prior to commencing operation with U.S. earth stations</p> <p>(a)(1) The information required by § 25.171(a).</p> <p>(a)(2) The call signs of any telemetry, tracking, and command earth station(s) communicating with the space station from any site in the U.S.</p>	<p>Astra will comply.</p>

	(a)(3) The location, by city and country, of any telemetry, tracking and command earth station(s) communicating with the space station from any site in the U.S.	
	(a)(4) Alternatively, instead of listing the call signs and/or locations of earth stations currently used for telemetry, tracking and command, the space station operator may provide 24/7 contact information for a satellite control center and a list of the call signs of any U.S. earth stations, and the locations of any non-U.S. earth stations, that are used or may be used for telemetry, tracking and command communication with the space station(s) in question.	
	(a)(5) The information required by paragraph (a) of this section must be filed electronically in the Commission's IBFS, in the "Other Filings" tab of the space station's current authorization file. If call sign or location information provided pursuant to paragraph (a) of this section becomes invalid due to a change of circumstances, the space station operator must file updated information in the same manner within 30 days, except with respect to changes less than 30 days in duration, for which no update is necessary	
§25.202 - Frequencies, frequency tolerance, and emission limits	(a)(1) In addition to the frequency-use restrictions set forth in §2.106 of this chapter, the following restrictions apply:	See II.B.2. Gateway Antennas
	(a)(1)(ii) Use of the 37.5-40 GHz band by the FSS (space-to-Earth) is limited to individually licensed earth stations. Earth stations in this band must not be ubiquitously deployed and must not be used to serve individual consumers.	
	(e) The carrier frequency of each space station transmitter authorized in these services shall be maintained within 0.002 percent of the reference frequency	Astra will comply.
	(f) The mean power of emissions shall be attenuated below the mean output power of the transmitter in accordance with the schedule set forth in paragraphs (f)(1) through (f)(4) of this section.	Astra will comply.
	(f)(1) In any 4 kHz band, the center frequency of which is removed from the assigned frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth: 25 dB	
	(f)(2) In any 4 kHz band, the center frequency of which is removed from the assigned frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth: 35 dB	
	(f)(3) In any 4 kHz band, the center frequency of which is removed from the assigned frequency by more than 250 percent of the authorized bandwidth: An amount equal to 43 dB plus 10 times the logarithm (to the base 10) of the transmitter power in watts;	

	(f)(4) In any event, when an emission outside the authorized bandwidth causes harmful interference, the Commission may, at its discretion, require greater attenuation than specified in paragraphs (f)(1), (2) and (3) of this section	Astra will comply.
	(g)(1) Telemetry, tracking, and command signals may be transmitted in frequencies within the assigned bands that are not at a band edge only if the transmissions cause no greater interference and require no greater protection from harmful interference than the communications traffic on the satellite network or have been coordinated with operators of authorized co-frequency space stations at orbital locations within six degrees of the assigned orbital location.	Astra's telemetry and telecommand will be transmitted at band edge.
	(g)(2) Frequencies, polarization, and coding of telemetry, tracking, and command transmissions must be selected to minimize interference into other satellite networks.	See Technical Narrative Section II.4. Explanation of how uplink frequencies are connected to downlink frequencies
	(J) For earth stations in the Fixed-Satellite Service (Earth-to-space) that transmit in the 49.7-50.2 GHz and 50.4-50.9 GHz bands, the unwanted emission power in the 50.2-50.4 GHz band shall not exceed -20 dBW/200 MHz (measured at the input of the antenna), except that the maximum unwanted emission power may be increased to -10 dBW/200 MHz for earth stations having an antenna gain greater than or equal to 57 dBi. These limits apply under clear-sky conditions. During fading conditions, the limits may be exceeded by earth stations when using uplink power control.	Astra will comply.
§25.203(h)	Sites and frequencies for GSO and NGSO earth stations, operating in a frequency band where both have a coprimary allocation, shall be selected to avoid earth station antenna main lobe-to-satellite antenna mainlobe coupling, between NGSO systems and between NGSO and GSO systems, in order to minimize the possibility of harmful interference between these services. Prior to filing an earth station application, in bands with co-primary allocations to NGSO and GSO earth stations, the applicant shall coordinate with proposed site and frequency usage with existing earth station licensees and with current earth station authorization applications.	See Technical Narrative Section III.A. Coordination

§25.204(c)	<p>In bands shared coequally with terrestrial radiocommunication services, the equivalent isotropically radiated power transmitted in any direction towards the horizon by an earth station operating in frequency bands above 15 GHz shall not exceed the following limits except as provided for in paragraph (c) of this section:</p> <p>+64 dBW in any 1 MHz band for theta less than or equal to 0 degrees;</p> <p>+64 + 3(theta) dBW in any 1 MHz band for theta between 0 and 5 degrees where theta is as defined in paragraph a of this section</p>	Astra will comply.
§25.204(d)	<p>For angles of elevation of the horizon greater than 5 degrees there shall be no restriction as to the EIRP transmitted by an ES towards the horizon</p>	Astra will comply.
§25.204(e)	<p>To the extent specified in paragraphs (e)(1) through (e)(3) of this section, earth stations in the Fixed-Satellite Service may employ uplink adaptive power control or other methods of fade compensation to facilitate transmission of uplinks at power levels required for desired link performance while minimizing interference between networks.</p>	<p>See Technical Narrative Section II.B Astra's Constellation - Ground Segment</p>
§25.205(a)	<p>Earth station antennas must not transmit at elevation angles less than five degrees, measured from the horizontal plane to the direction of maximum radiation, in a frequency band shared with terrestrial radio services or in a frequency band with an allocation to space services operating in both the Earth-to-space and space-to-Earth directions. In other bands, earth station antennas must not transmit at elevation angles less than three degrees. In some instances, it may be necessary to specify greater minimum elevation angles because of interference considerations.</p>	
§25.207 - Cessation of emissions	<p>Space stations shall be made capable of ceasing radio emissions by the use of appropriate devices (battery life, timing devices, ground command, etc.) that will ensure definite cessation of emissions.</p>	<p>See Technical Narrative Section II.C.2.B. In-Orbit Operations</p>

§25.208 -
Power flux-
density limits

(r) In the band 37.5-40.0 GHz, the power flux-density at the Earth's surface produced by emissions from a non-geostationary space station for all methods of modulation shall not exceed the following values:
(1) This limit relates to the power flux-density which would be obtained under assumed free space conditions (that is, when no allowance is made for propagation impairments such as rain-fade):
-132 dB(W/m²) in any 1 MHz band for angles of arrival between 0 and 5 degrees above the horizontal plane;
-132 + 0.75 (delta-5) dB(W/m²) in any 1 MHz band for angles of arrival delta (in degrees) between 5 and 25 degrees above the horizontal plane; and
-117 dB(W/m²) in any 1 MHz band for angles of arrival between 25 and 90 degrees above the horizontal plane;

(r)(2) This limit relates to the maximum PFD which would be obtained anywhere on the surface of the Earth during periods when FSS system raises power to compensate for rain-fade conditions at the FSS ES:
-120 dB(W/m²) in any 1 MHz band for angles of arrival between 0 and 5 degrees above the horizontal plane;
-120 + 0.75(delta-5) dB(W/m²) in any 1 MHz band for angles of arrival delta (in degrees between 5 and 25 degrees above the horizontal plane; and
-105 dB(W/m²) in any 1 MHz band for angles of arrival between 25 and 90 degrees above the horizontal plane.

Note to paragraph (r): The conditions under which satellites may exceed these power flux-density limits for normal free space propagation described in paragraph (q)(1) to compensate for the effects of rain fading are under study and have therefore not yet been defined. Such conditions and the extent to which these limits can be exceeded will be the subject of a further rulemaking by the Commission on the satellite service rules.

See Technical
Narrative Section III.B.
Compliance with PFD
Limits

	<p>(s) In the 40.0 - 40.5 GHz band, the PFD at the Earth's surface produced by emissions from a space station for all conditions and for all methods of modulation shall not exceed the following values:</p> <ul style="list-style-type: none"> -115 dB(W/m²) in any 1 MHz band for angles of arrival between 0 and 5 degrees above the horizontal plane; -115 + 0.5 ($\delta-5$) dB(W/m²) in any 1 MHz band for angles of arrival δ (in degrees) between 5 and 25 degrees above the horizontal plane; and -105 dB(W/m²) in any 1 MHz band for angles of arrival between 25 and 90 degrees above the horizontal plane; <p>Note to paragraph (s): These limits relate to the power flux-density that would be obtained under assumed free-space propagation conditions.</p>	
	<p>(t) In the band 40.5 - 42 GHz, the PFD at the Earth's surface produced by emissions from a NGSO space station for all conditions and for all methods of modulation shall not exceed the following values:</p> <ul style="list-style-type: none"> -115 dB(W/m²) in any 1 MHz band for angles of arrival between 0 and 5 degrees above the horizontal plane; -115 + 0.5 ($\delta-5$) dB(W/m²) in any 1 MHz band for angles of arrival δ (in degrees) between 5 and 25 degrees above the horizontal plane; and -105 dB(W/m²) in any 1 MHz band for angles of arrival between 25 and 90 degrees above the horizontal plane; <p>Note to paragraph (t): These limits relate to the power flux density that would be obtained under assumed free-space propagation conditions.</p>	
<p>§25.210 - Technical requirements for space stations</p>	<p>(f) All space stations in the FSS operating in any portion of the 3600 - 4200 MHz, 5091 - 5250 MHz, 5850 - 7025 MHz, 10.7 - 12.7 GHz, 12.75 - 13.25 GHz, 13.75 - 14.5 GHz, 15.43 - 15.63 GHz, 18.3-20.2 GHz, 24.75 - 25.25 GHz, or 27.5 - 30 GHz band, including feeder links for other space services and in the BSS in the 17.3 - 17.8 GHz band (space-to-Earth) shall employ state-of-the-art full frequency reuse, either through the use of orthogonal polarizations within the same beam and/or the use of spatially independent beams. This requirement does not apply to telemetry, tracking and command operation</p>	<p>While not applicable to the bands of this processing round, Astra has committed to meeting this requirement.</p> <p>See Technical Narrative Section II.C Astra's Constellation: Facilities, Operations and Services</p>
<p>§25.261 - Sharing among NGSO FSS space stations</p>	<p>(a) Scope. This section applies to NGSO FSS operation with earth stations with directional antennas anywhere in the world under a Commission license, or in the United States under a grant of U.S. market access.</p>	<p>See Technical Narrative Section IV. Interference Mitigation:</p>

	<p>(b) Coordination. NGSO FSS operators must coordinate in good faith the use of commonly authorized frequencies.</p> <p>(c) Absent coordination between two or more satellite systems, whenever the increase in system noise temperature of an earth station receiver, or a space station receiver for a satellite with onboard processing, of either system, $\Delta T/T$, exceeds 6 percent due to interference from emissions originating in the other system in a commonly authorized frequency band, such frequency band will be divided among the affected satellite networks in accordance with the following procedure:</p> <p>(c)(1) Each of n (number of) satellite networks involved must select 1/n of the assigned spectrum available in each of these frequency bands. The selection order for each satellite network will be determined by the date that the first space station in each satellite system is launched and capable of operating in the frequency band under consideration;</p> <p>(c)(2) The affected station(s) of the respective satellite systems may operate in only the selected (1/n) spectrum associated with its satellite system while the $\Delta T/T$ of 6 percent threshold is exceeded;</p> <p>(c)(3) All affected station(s) may resume operations throughout the assigned frequency bands once the threshold is no longer exceeded.</p>	Coordination and PFD Compliance
§25.271 - Control of transmitting station	<p>(a) The licensee of a facility licensed under this part is responsible for the proper operation and maintenance of the station</p> <p>(d) The licensee shall ensure that the licensed facilities are properly secured against unauthorized access or use whenever an operator is not present at the transmitter. For space station operations, this includes securing satellite commands against unauthorized access and use.</p>	See Technical Narrative II.C.1. Facilities
§25.272 - General inter-system coordination procedures	<p>(a) Each space station licensee in the FSS shall establish a satellite network control center which will have the responsibility to do the following:</p> <p>(a)(1) Monitor space-to-Earth transmissions in its system (thus indirectly monitoring uplink earth station transmission in its system) and</p> <p>(a)(2) Coordinate transmissions in its satellite system with those of other systems to prevent harmful interference incidents or, in the event of a harmful interference incident, to identify the source of the interference and correct the problem promptly</p>	

	(d)(5) The space station licensee may delegate the responsibility and duties of the satellite network control center to a technically qualified user or group of users, but the space station licensee shall remain ultimately responsible for the performance of those duties	Astra will comply.
§25.273 - Duties regarding space communications transmissions	(a) No person shall:	Astra will comply.
	(a)(1) Transmit to a satellite unless the specific transmission is first authorized by the satellite network control center;	See Technical Narrative Section II.C.2.b Astra's Constellation: In-Orbit Operations; Technical Narrative Section IV. Interference Mitigation: Coordination and PFD Compliance
	(a)(2) Conduct transmissions over a transponder unless the operator is authorized to transmit at that time by the satellite licensee or the satellite licensee's successor in interest; or	
	(a)(3) Transmit in any manner that causes unacceptable interference to authorized transmission of another licensee	
	(b) Satellite operators shall provide upon request by the Commission and by earth station licensees authorized to transmit on their satellites relevant information needed to avoid unacceptable interference to other users, including the polarization angles for proper illumination of a given transponder.	
(c) Space station licensees are responsible for maintaining complete and accurate technical details of current and planned transmissions over their satellites, and shall require that authorized users of transponders on their satellites, whether by tariff or contract, provide any necessary technical information in this regard including that required in 25.272. Based on this information, space station licensees shall exchange among themselves general technical information concerning current and planned transmission parameters as needed to identify and promptly resolve any potential cases of unacceptable interference between their satellite systems		
§25.275 - Particulars of operation	(b) When authorized frequency bands are specified in the station authorization, the licensee is authorized to transmit any number of r.f. carriers on any discrete frequencies within an authorized frequency band in accordance with the other terms and conditions of the authorization and the requirements of this part. Specific r.f. carrier frequencies within the authorized frequency band shall be selected by the licensee to avoid unacceptable levels of interference being caused to other earth, space or terrestrial stations. Any coordination agreements, both domestic and international, concerning specific frequency usage constraints, including non-use of any particular frequencies within the frequency bands listed in the station authorization, are considered to be conditions of the station authorization.	Astra will comply.

	(c) A license for a transmitting earth station will normally specify only the r.f. carriers having the highest e.i.r.p. density, the narrowest bandwidth, and the largest bandwidth authorized for transmission from that station. Unless otherwise specified in the station authorization, the licensee is authorized to transmit any other type of carrier not specifically listed which does not exceed the highest e.i.r.p., e.i.r.p. density and bandwidth prescribed for any listed emission	
§25.278 - Additional coordination obligation for NGSO and GSO systems allocated to the FSS	Licensees of non-geostationary satellite systems that use frequency bands allocated to the Fixed-Satellite Service for their feeder link operations shall coordinate their operations with licensees of geostationary Fixed-Satellite Service systems licensed by the Commission for operation in the same frequency bands. Licensees of geostationary Fixed-Satellite Service systems in the frequency bands that are licensed to non-geostationary satellite systems for feeder link operations shall coordinate their operations with the licensees of such non-geostationary satellite systems.	Technical Narrative Section III.A Coordination
§25.283 End-of-life disposal	(c) Upon completion of any relocation authorized by paragraph (b) of this section, or any relocation at end-of-life specified in an authorization, or upon a spacecraft otherwise completing its authorized mission, a space station licensee shall ensure, unless prevented by technical failures beyond its control, that all stored energy sources onboard the satellite are discharged, by venting excess propellant, discharging batteries, relieving pressure vessels, and other appropriate measures	See Technical Narrative Section II.C Astra's Constellation: Facilities, Operations and Services
§25.289 Protection of GSO networks by NGSO systems	Unless otherwise provided in this chapter, an NGSO system licensee must not cause unacceptable interference to, or claim protection from, a GSO FSS or GSO BSS network. An NGSO FSS licensee operating in compliance with the applicable equivalent power flux-density limits in Article 22, Section II of the ITU Radio Regulations (incorporated by reference, § 25.108) will be considered as having fulfilled this obligation with respect to any GSO network.	See Technical Narrative Section IV. Interference Mitigation: Coordination and PFD Compliance