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SPECIFIC INSTRUCTIONS FOR SCHEDULE S

Schedule S, along with the FCC 312 Main Form, is to be completed when:

- Applying for a license for a new space station;
- Amending a pending space station application, when information in a previously-filed Schedule S is being amended;
- Applying for a license for a replacement satellite;
- Applying for a modification of a space station authorization, if information in Schedule S on file would be modified; and
- Filing a Petition for Declaratory Ruling seeking to access the U.S. market, including requests for a space station to be added to the Permitted list, or an earth station application requesting new authority to serve the United States with a non-U.S.-licensed space station.

PURPOSE OF FILING

Schedule S is used for space station filings that do not involve assignments of license or transfers of control. It collects technical and operational data associated with space station license and market access applications. An applicant must complete Schedule S and the associated FCC 312 Main Form (which is referred to as "Form 312" in the International Communications Filing System (ICFS) and in these instructions) when filing an application for: (1) a license for new space station(s); (2) an amendment to a pending space station application that include changes to the previously-submitted Schedule S; (3) a modification to an existing space station authorization that include changes to the Schedule S on file; or (4) a request for new authority to use non-U.S. licensed satellites to provide service in the United States. Collection of this data is intended to expedite the Commission's review of satellite applications.

Important Note: Schedule S does not collect all of the information required by the Commission's rules with respect to space stations. In addition to the information required in this form, the applicant is required to provide all other information specified in section 25.114 of the Commission's rules, 47 CFR § 25.114. This information, as well as any other information that the applicant wishes to provide in connection with the application, may be attached in ICFS as exhibits to the Form 312.

FILING PROCEDURES

Applicants are strongly encouraged to first complete and save the information required in the associated Form 312. After completing Form 312, the user will be prompted to complete Schedule S, if required. For amendments and modifications to an application, the applicant is advised to immediately save its Form 312, upon first opening the form, in order for the most current version of the Schedule S in the underlying application to be uploaded and attached to the Form 312. An applicant may work on its Schedule S prior to filling out Form 312, but its Form 312 must be completed, and both Schedule S and Form 312 must be error-free, before submitting the entire application to the Commission via ICFS.

Important Note: All information marked by a red * in the Schedule S is required.

Options for Providing Information in Schedule S

Applicants may choose to provide the technical information on their satellite network(s) either manually using the self-guided version of the ServiceNow software or through a REST API using JSON formatting.

a. To fill out Schedule S manually using the ServiceNow software: Click the **Save as Draft** button in the Form 312, and the **Edit Schedule S** button will appear for the user to access the associated Schedule S. An applicant can bypass filling out Form 312 to populate the Schedule S first, but several fields within Schedule S are auto-filled from the information entered in Form 312. Therefore, it is highly recommended that the user complete Form 312 first to avoid errors in the information entered into Schedule S.

b. To fill out Schedule S using the REST API feature: The user must locate the specific "form_312" ID number, which is the assigned FCC application number preceded by the word "DRAFT" (e.g., DRAFT-SAT-LOA-xxxxxxxx-xxxxx). This application ID number can be found either under the "My Filings" tab on the ICFS Main Menu under the "Drafts" section or at the top left side of Schedule S via the **Edit Schedule S** button which will show the file number in the data field labeled "File Number." The applicant may then download a template, upload a modified template, or download a read-only JSON of a Schedule S by using the connection information below in their preferred API builder/script
    - To upload or edit a Schedule S template, the following is needed:
        1. URL: https://api-prod.fcc.gov/api/exp/v1/icfs312/schedule_s/get_template
        2. Parameters: **form_312** (string data - file number for the SAT application) (e.g. DRAFT-SAT-LOA-xxxxxxxx-xxxxx)
        3. Authentication: CORES username and password

    - To upload data modified in a Schedule S template, the following is needed:
        1. URL: https://api-prod.fcc.gov/api/exp/v1/icfs312/schedule_s/upload_data
        2. Parameters: **form_312** (string data - file number for the SAT application) (e.g. DRAFT-SAT-LOA-xxxxxxxx-xxxxx)
        3. Authentication: CORES username and password
        4. Body: modified JSON that has been obtained from the **get_template** call

    - To get a read-only JSON of the specific Schedule S data, the following is needed:
        1. URL: https://api-prod.fcc.gov/api/exp/v1/icfs312/schedule_s/get_json
        2. Parameters: **form_312** (string data - file number for the SAT application) (e.g. DRAFT-SAT-LOA-xxxxxxxx-xxxxx)
        3. Authentication: CORES username and password

Organization of Schedule S

Schedule S collects information for each satellite network in eight sections, labeled sections S1 through S8. Each section and its corresponding subsections should be completed sequentially to reduce the chance of errors.

a. If filling out Schedule S for the first time, confirm that entries in section S1 are entered correctly and saved using the **Save Record** button before accessing sections S2 through S8.
b. Section S1 is considered the "Main Menu" screen for the Schedule S, and sections S2 through S8 are represented as tabs on that page. The applicant must click the **Save Record** button

before advancing to the next section or subsection. The **Save Record** button allows the user to verify that the information is complete and the appropriate fields are populated and formatted correctly. It also allows for a variety of other buttons to become available for the user to navigate through Schedule S.

c. If any field is deemed incomplete or improperly formatted, an error message (in the form of a red text box) will appear after the section has been saved. Any warnings in a section or subsection should be corrected before proceeding to the next section of Schedule S.
d. All errors must be corrected before the applicant can electronically file the Form 312 and associated Schedule S.

SECTION INSTRUCTIONS

S1. Satellite Information

This section contains information which is auto-filled from Form 312, including: Space Station or Satellite Network Name; Orbit Type; Estimated Operational Lifetime of Space Station(s) from Date of Launch; Space Station Operating on Common Carrier Basis; and Application Description. Any edits to data fields S1.a through S1.d. will change the corresponding data entered in the Form 312, upon clicking the **Save Record** button. Similarly, any changes to the associated data entered in Form 312 will also change the corresponding data entered in section S1 of Schedule S.

Important Note: Changing the Orbit Type will erase all data entered in the Schedule S and will require the user to reconfirm or update certain data provided in the Form 312.

Upon completing this section, click the **Save Record** button to verify that the information provided is complete and accurate.

S2. Operating Frequency Bands

This section collects information regarding the frequency bands for the proposed space station or satellite network, along with their associated "Type of Service" and "Direction of Transmission," to create a list of the frequency bands on the proposed space station or satellite network.

Multiple types of service can be chosen for a frequency band, but each frequency band listed can only be associated with one type of service specified in each row. To add a new frequency band to the list, select the **New** button and complete data fields S2.a through S2.g. for each frequency band. To complete this section, at least one transmit frequency band and one receive frequency band must be provided.

To delete a particular row in the summary table of frequency bands, click the check box (which is on the left side of the row containing the frequency band to be deleted) and select "Delete" from the pop-up menu shown under the "Actions on selected rows …" entry, which is next to the **New** button. Users may also click the **Delete Record** button within each data entry screen for the associated entry screen for the associated band.

a. Type of Service. Select the proposed type of service from the drop-down list or select "OTHER: Other Satellite Service" if the service for which the user is applying is not listed.
b. If S2.a is "Other," provide a description. This field will only be made available if "OTHER: Other Satellite Service" is selected under "a. Type of Service." Provide a brief description (limited to 40 characters) of the unlisted type of service requested in the application.

c. Satellite Frequency Band (MHz). To select the proposed satellite frequency band, either select the satellite frequency band from the drop-down list or start typing the lowest frequency in the satellite frequency band and a dynamic list of frequency bands associated with the "Type of Service" will appear. If the proposed frequency band does not appear, select "Other" from the drop-down list, and enter the satellite frequency range in data fields "d. Satellite Frequency (Lower Band Edge) (MHz) and "e. Satellite Frequency (Upper Band Edge) (MHz)."
d. Satellite Frequency (Lower Band Edge) (MHz). This field will only be available to fill out if "OTHER: Other Satellite Service" is selected from the drop-down list in S2.a. Manually type in the lowest frequency of the proposed frequency range in MHz.
e. Satellite Frequency (Upper Band Edge) (MHz). This field will only be available to fill out if "OTHER: Other Satellite Service" is selected from the drop-down list in S2.a. Manually type in the highest frequency of the proposed frequency range in MHz.
f. Direction of Transmission. Using the drop-down list, select the direction of transmission between Earth and space stations for each proposed frequency band.
g. Non-Conforming Indicator. This box is checked automatically if the user has selected "Other" in S2.a or S2.c, notifying the applicant and reviewer that a waiver request will or should be provided with the appropriate justification for this non-conforming use. This box can be unchecked if the applicant is applying for contiguous frequency bands that are allocated for the same type of service.

Upon completing this section, click the **Save Record** button to verify that the information provided is complete and accurate. The user must enter the requested information in sections S2 and S3 before proceeding to fill out the remaining sections S4, S5, S6, S7, and S8.

S3. GSO or NGSO Orbital Information.

This section collects information for geostationary orbit (GSO) or non-geostationary orbit (NGSO) satellites, depending on which type of system is selected in Form 312.

Orbital Information for GSO Satellites

If applying for a GSO network, select the "S3. GSO Orbital Information" tab. A summary table will appear where all orbital parameters for the satellite network can be entered. Once the information is entered, click the **Save Record** button, and then the **Return to Main Menu** button to review the information entered in the summary table under the "S3. GSO Orbital Information" tab. To access, preview, or edit a particular row in the summary table, either click the information bubble and select the **Open Record** button from the pop-up window to populate the data entry screen, or double-click any of the fields shown in the summary table of the GSO orbital information to edit or re-save the information in each row.

a. Orbital Longitude (°). Enter the orbital longitude of the space station in degrees.
b. Hemisphere of Orbital Longitude (E/W). Enter hemisphere as either East (E) or West (W).
c. East/West Station-Keeping Range: Toward East (°). Enter the easternmost longitudinal boundary in which the satellite can maneuver or drift from the nominal orbital location in degrees.

d. East/West Station-Keeping Range: Toward West (°). Enter the westernmost longitudinal boundary in which the satellite can maneuver or drift from the nominal orbital location in degrees.
e. North/South Station-Keeping Range: Toward North (°). Enter the northern most latitudinal boundary in which the satellite can maneuver or drift from the nominal orbital location on the equatorial plane in degrees.
f. North/South Station-Keeping Range: Toward South (°). Enter the southernmost latitudinal boundary in which the satellite can maneuver or drift from the nominal orbital location on the equatorial plane in degrees.
g. Maximum Orbital Eccentricity. Maximum orbital eccentricity is a dimensionless parameter that determines the amount by which a satellite's orbit around another body deviates from a perfect circle. The maximum orbital eccentricity is only required if the applicant is applying to operate within any portion of the 17300-17800 MHz band. (Limited to 7 places right of the decimal point (e.g., 0.1234567)).
h. Antenna Axis Altitude Accuracy: Roll (°). Enter the satellite antenna roll in degrees
i. Antenna Axis Altitude Accuracy: Pitch (°). Enter the satellite antenna pitch in degrees.
j. Antenna Axis Altitude Accuracy: Yaw (°). Enter the satellite antenna yaw in degrees.

Important Note: Antenna axis altitude accuracy is the pointing accuracy of the antenna on a satellite based on a three-axis coordinate system, as defined by a satellite's roll, pitch, and yaw. In a satellite three-axis coordinate system, the roll axis is the direction of the satellite motion, the pitch axis is normal to the orbital plane, and the yaw axis in the plane of the orbit is directed toward the center of the Earth.

Upon completing this section, click the **Save Record** button to verify that the information provided is complete and accurate. The user should enter the requested information in sections S2 and S3 before proceeding to fill out the remaining sections S4, S5, S6, S7, and S8.

Orbital Information for NGSO Satellites

If applying for a NGSO network, select the "S3. NGSO Orbital Information" tab. A summary table will appear where all orbital parameters for the satellite network can be entered. Once the information is entered, click the **Save Record** button and then the **Return to Main Menu** button to review the information entered in the summary table under the "S3. NGSO Orbital Information" tab. To access, preview, or edit a particular row in the summary table, either click the information bubble and then select the **Open Record** button from the pop-up window to populate the data entry screen, or double-click any of the fields shown in the summary table of the NGSO orbital information to edit or re-save the information in each row.

a. Total Number of Simultaneously Operating Satellites in Constellation. The total number of simultaneous operating satellites in the full constellation is auto-populated based on information provided in S3.g.
b. Total Number of Satellites Deployed During the License Term. Enter the total number of satellites that will be deployed during the license term. This number should be greater than or equal to the total number of simultaneously operating satellites in the constellation specified in S3.a.
c. Orbit Epoch Date. Enter information using the drop-down calendar or by manually entering the date in MM/DD/YYYY format. This date references the exact moment in time when all satellites within a constellation will be positioned in their proposed orbital parameters.

d. Celestial Reference Body. Use the drop-down list to select the celestial body the satellite or satellite constellation will orbit (Earth, Mars, Moon, Sun, or Other). If "Other" is selected, enter the name of the celestial body in S3.e.
e. If d. is "Other," provide the name of the celestial body being referenced. Enter the name of the celestial body that the satellite or satellite constellation will orbit.
f. Total Number of Orbital Planes. The total number of orbital planes for the proposed constellation are auto-populated based on information provided in S3.g.

Upon completing this section, click the **Save Record** button to verify that the information provided is complete and accurate. This will also generate a table to enter the associated orbital plane information under the "g. Orbital Plane Information" tab.

g. Orbital Plane Information. In this subsection, enter the orbital plane information for each new orbital plane by clicking the **New** button. In each row, enter the corresponding set of orbital plane information in S3.g.(i) through g.(xix). To add a new orbital plane with the same orbital plane information as another orbital plane already entered, open the record for the orbital plane to be replicated, click the **Clone Orbital Plane** button and another row will be added to the "S3.g. Orbital Plane Information" subsection, having the same "Orbital Plane No." as the orbital plane being cloned. Make sure to enter a new "Orbital Plane No." in data field S3.g.(i) for the new orbital plane that was created.

   Important Note: The data in S3.a. and S3.f. will be automatically updated with each new set of orbital plane information added to, or removed from, this subsection.

   (i) Orbital Plane No. Enter a unique orbital plane number to identify each particular orbital plane. If a new orbital plane has been created by cloning the orbital information of another orbital plane, make sure to enter a new "Orbital Plane No." in this data field for the new orbital plane that was created.

   (ii) Number of Satellites in Plane. Enter the total number of active satellites in the plane. Describe any in-orbit spares in the narrative section of the application.

   (iii) Inclination Angle (°). Enter the inclination angle in degrees.

   (iv) Inclination Angle Tolerance (+/- °). Enter the maximum inclination angle tolerance/variation in +/- degrees.

   (v) Orbital Period (seconds). Enter the orbital period in seconds.

   (vi) Apogee (km). Enter apogee in kilometers, entered as the altitude above the surface of the celestial reference body which the satellite is orbiting. The value entered must be equal to or greater than the nominal altitude entered for perigee.

   (vii) Apogee Tolerance (+/- km). Enter the maximum apogee tolerance/variation in +/- kilometers. The value entered must be less than the altitude entered for apogee.

   (viii) Perigee (km). Enter the perigee in kilometers, entered as the altitude above the surface of the celestial reference body which the satellite is orbiting. The value entered must be greater than 0 and less than or equal to the nominal altitude entered for apogee.

(ix) Perigee Tolerance (+/- km). Enter the maximum perigee tolerance/variation in +/- km. The value entered must be less than the altitude entered for perigee.

(x) Argument of Perigee (°). Enter the argument of perigee in degrees.

(xi) Right Ascension of Ascending Node (°). Enter right ascension of ascending node (RAAN) in degrees.

(xii) Right Ascending of Ascending Node Tolerance (+/- °). Enter right ascension of ascending node (RAAN) in degrees and the maximum right ascension of ascending node tolerance/variation in +/- degrees.

(xiii) Active Service Arc Begin Angle with Respect to Ascending Node (°). Enter the active service arc begin angle with respect to the ascending node in degrees.

- For NGSO satellites that orbit in the equatorial plane, enter 0 degrees for the begin angle.
- For NGSO satellites in polar orbit that are active during the entire orbit, enter -90 degrees for the begin angle.
- For NGSO satellites in orbits inclined more than 0 degrees and less than 180 degrees (except for satellites in polar orbit that are active for the entire orbit), or for satellites in polar orbits that are only active during a single segment of arc during each orbit, enter the minimum latitude bounding that segment of arc in the begin angle.
- For NGSO satellites in orbits inclined more than 0 degrees and less than 180 degrees (except for satellites in polar orbits), or for satellites in polar orbits that are active during multiple non-contiguous segments of arc during each orbit, enter the south latitude corresponding to the inclination angle of the orbit as the begin angle and describe the active arc segments in the narrative portion of the application.

(xiv) Active Service Arc End Angle with Respect to Ascending Node (°). Enter the active service arc end angle with respect to ascending node in degrees.

- For NGSO satellites that orbit in the equatorial plane, enter 0 degrees for the end angle.
- For NGSO satellites in polar orbits that are active during the entire orbit, enter +90 degrees for the end angle.
- For NGSO satellites in orbits inclined more than 0 degrees and less than 180 degrees (except for satellites in polar orbits that are active for the entire orbit), or for satellites in polar orbits that are only active during a single segment of arc during each orbit, enter the maximum latitude bounding that segment of arc in the end angle.
- For NGSO satellites in orbits inclined more than 0 degrees and less than 180 degrees (except for satellites in polar orbits), or for satellites in polar orbits that are active during multiple non-contiguous segments of arc during each orbit, enter the north latitude corresponding to the inclination angle of the orbit as the end angle and describe the active arc segments in the narrative portion of the application.

(xv) Is additional information on the active service arc provided in the application? Confirm if any additional information describing the active service arc segments is contained in the application narrative by selecting “yes” or “no” from the drop-down list.

(xvi) Satellite Spacing. Applicants are required to specify whether all satellites in an orbital plane are evenly or irregularly spaced to generate a table under S3.h to collect the initial phase angle information for all satellites in the same orbital plane.

Important Note: If all satellites in the orbital plane are evenly spaced, provide the "Phase Angle Spacing" and "First Initial Phase Angle" information in S3.g.(xvii) and S3.g.(xviii), respectively, to auto-populate the information in the summary table under the "h. Initial Phase Angle Information" tab. If all satellites in the orbital plane are irregularly spaced, manually fill in the "h.(ii) Initial Phase Angle" column of the summary table, which is under the "h. Initial Phase Angle Information" tab, with the initial phase angles (in degrees) at the orbit epoch date for each satellite in the plane. Click each data field and a fillable pop-up box will appear. To save or delete the data, either click the green checkmark or the red "x."

(xvii) Phase Angle Spacing. If all satellites are evenly spaced, provide the spacing interval between these satellites to generate a table of each satellite and the associated phase angle.

(xviii) First Satellite Initial Phase Angle. If all satellites are evenly spaced, provide the initial phase angle of the first satellite to generate a table of each satellite and the associated phase angle.

(xix) Maximum Orbital Eccentricity. This is the amount by which a satellite's orbit around another body deviates from a perfect circle. This field is required if the applicant plans to operate within any portion of the 17300-17800 MHz frequency band.

Upon completing this section, click the **Save Record** button to verify that the information provided is complete and accurate. This will also generate a table to enter the associated initial phase angle information under the "h. Initial Phase Angle Information" tab.

h. Initial Phase Angle Information. Based on the information provided in S3.g(ii), g(xvi), g(xvii) and g(xviii), a table will be generated containing the initial phase angle information for each satellite in a particular plane with a row created for each satellite.

(i) Satellite No. This data field is auto-populated. A row will be created for each satellite based on the total number of satellites identified in S3.g(ii).

(ii) Initial Phase Angle (°). If all satellites are irregularly spaced, provide the initial phase angle (in degrees) at the orbit epoch date for each satellite in the plane. For evenly spaced satellites, an auto-generated, auto-populated table will appear.

Upon completing this section, click the **Save Record** to verify that the information provided is complete and accurate. The user should enter the requested information in sections S2 and S3 before proceeding to fill out the remaining sections S4, S5, S6, S7, and S8.

S4. Earth-to-Space (Receive) Beam

This section collects information necessary to represent the transmission links from each Earth station to its associated space station(s). Select the "S4. Earth-to-Space (Receive) Beam" tab, and a summary table will appear displaying each receive (uplink) beam with the associated parameters. Click the **New** button to add each new receive beam to the list of receive beams for the satellite network. There must be one receive beam for every receive frequency band range listed in the "S2. Operating Frequency Bands" table,

and each listed receive frequency band must have one or more beams that utilize the entire frequency band requested. Once the information is populated for each beam, click the **Save Record** button.

a. Beam ID. Enter a unique descriptive beam identifier. (Limited to 10 alphanumeric characters).
b. Beam Frequency (Lower Band Edge) (MHz). Enter the frequency at the lower band edge of the receive beam frequency band. The band specified must be within one of the receive frequency band ranges specified in the "S2. Operating Frequency Bands" summary table.
c. Beam Frequency (Upper Band Edge) (MHz). Enter the frequency band at the upper edge of the receive beam frequency band. The band specified must be within one of the receive frequency band ranges specified in the "S2. Operating Frequency Bands" summary table.
d. Polarization. Select whether the polarization is H (Horizontal Linear), EP (Elliptical Polarization), LHCP (Left-Hand Circular Polarization), SP (Slant Polarization), RHCP (Right-Hand Circular Polarization), or V (Vertical Linear) from the drop-down list.
e. Can the space station vary the channel bandwidth with on-board processing? Confirm if the proposed space station has an on-board processor.
f. Is this a command beam? (Check box if Yes). Confirm if the receive antenna beam is being used for telecommand services.
g. Is the beam shapeable? (Check box if Yes). Confirm if the receive antenna beam is shapeable.
h. Is the beam steerable? (Check box if Yes). Confirm if the receive antenna beam is steerable.
i. Is the beam fed into transponders? (Check box if Yes). Confirm if the receive antenna beam is fed into transponders.
j. Maximum G/T (dB/K). For non-command beams, enter the G/T value at beam peak in dB/K. For beams that are both non-command and shapeable, enter the maximum G/T value within the coverage area in dB/K. For command beams, enter the maximum G/T value in dB/K.
k. Minimum G/T (dB/K). For beams that are both non-command and shapeable, enter the minimum G/T value within the coverage area in dB/K. For all other beams, enter the minimum G/T value in dB/K.
l. Maximum Saturation Flux Density (dBW/m^2). For beams that are non-command, non-shapeable, and fed into transponders, enter the maximum saturation flux density value at beam peak in dBW/m^2. For beams that are non-command, shapeable and fed into transponders, enter the maximum saturation flux density value, within the 0 dB isoline, in dBW/m^2. For all other beams fed into transponders, enter the maximum saturation flux density value at beam peak in dBW/m^2.
m. Minimum Saturation Flux Density (dBW/m^2). For beams that are non-command, non-shapeable, and fed into transponders, enter the minimum saturation flux density value at beam peak in dBW/m^2. For beams that are non-command, shapeable and fed into transponders, enter the minimum saturation flux density value, within the 0 dB isoline, in dBW/m^2. For all other beams fed into transponders, enter the minimum saturation flux density value at beam peak in dBW/m^2.
n. Beam Peak Flux Density at Command Threshold (dBW/m^2). For command beams, enter beam peak flux density at command threshold value in dBW/m^2.
o. Peak Isotropic Antenna Gain (dBi). Enter peak isotropic antenna gain in dBi. This information is required for inter-satellite links, but optional for all other beams.

p. Isotropic Antenna Gain at 3dB Beamwidth (dBi). Enter isotropic antenna gain at 3dB beamwidth in dBi. This information is required for inter-satellite links, but optional for all other beams.

q. Antenna Pointing Error (°). Enter the amount of variation in the "physical" orientation of an antenna beam in the reference direction in +/- degrees. This is a measure of the inability of an antenna to point in a desired direction.

r. Antenna Rotational Error (°). Enter the amount of variation in the "polarity" orientation of an antenna beam in the reference direction that the signal is rotated from its reference position in +/- degrees. This is a measure of the polarization misalignment for an antenna as it points in the desired direction.

s. Will a GIMS container file containing all antenna contour data be provided? Confirm if an ITU-BR GIMS container file for this beam will be attached to Schedule S. If "Yes," attach the GIMS container file under the "S8. Attachments" tab. If "No," attach the antenna contour diagrams as GXT files, and/or the antenna contour data as DOC or XLS files, under the "z. Beam Attachments" tab in this section of Schedule S.

t. Under what rules will the associated antenna contours be submitted? Click the padlock symbol and identify the subsection(s) of section 25.114 of the Commission's rules under which the antenna gain contour diagrams and data will be provided as attachments to this form.

u. Provide a list of each orbital plane in which this antenna beam is used. For NGSO applications, click the padlock symbol and use the drop-down list to select each Plane ID in which the proposed antenna beam is used.

v. Are all space stations in the NGSO constellation identical? For NGSO applications, confirm if the space stations are identical.

w. What information will be provided with the predicted antenna gain contours? For GSO or NGSO applications with a large number of identical fixed spot gains, use the drop-down list to indicate which documents will be provided in accordance with section 25.114 of the Commission's rules. Multiple documents can be selected from the drop-down list. These documents can be attached under the "z. Beam Attachments" tab or under the "S8. Attachments" tab.

Click the **Save Record** to generate a table to enter the associated channel information under the "x. Receive Channels" tab and to attach the required documentation under the "z. Beam Attachments" tab.

x. Receive Channels. Enter all the data in the displayed fields for each receive channel by clicking the **New** button for each Receive Channel. Complete sections S4.x(i)-x(vi) by filling in the appropriate channel ID, channel bandwidth and/or center frequency, and channel type information for each channel on the given receive beam. If the space station can vary the channel bandwidth with on-board processing, no channel information will be required.

(i) Channel ID. Enter a unique descriptive channel identifier.

(ii) Channel Bandwidth (MHz). For a channel on a non-command antenna beam, enter channel bandwidth in MHz. The channel center frequency, plus or minus one-half of the assigned channel bandwidth, must be within one of the associated receive beam frequency ranges in the "S4. Earth-to-Space (Receive) Beam" summary page. For a channel on a command antenna beam, this is not required.

(iii) Center Frequency (MHz). For a channel on a command and non-command antenna beam, enter the center frequency in MHz.
(iv) Channel Frequency (Lower Band Edge) (MHz). This data field is auto-populated for a channel on a non-command antenna beam.
(v) Channel Frequency (Upper Band Edge) (MHz). This data field is auto-populated for a channel on a non-command antenna beam.
(vi) Channel Type. Select whether the channel is used as a feeder link, service link, or for telemetry/telecommand/control (TT&C) from the drop-down list.

Upon filling out the channel information for a receive channel, click the **Save Record** button to verify that the information provided is complete and accurate and to return to the associated beam page. Click the **Return to Beam Information** button to return to the associated beam page, add additional channels to this section, or go on to complete the next section of Schedule S.

z. Beam Attachments Tab. Attach antenna gain contour and service area data for the associated beam by selecting the **New** button under "z. Beam Attachments." For sections S4.z.(i)-z.(iii), choose the appropriate document type from the drop-down list, or if "Other," provide a brief description of the document and upload the document using the "Click to add …" link. All documents attached for a particular beam will appear in both the summary table under the "z. Beam Attachments" tab and under the "S8. Attachments" tab.

Upon completing this section, click the **Save Record** button to verify that the information provided is complete and accurate. Click the **Return to Main Menu** button to locate and complete the next section of Schedule S.

S5. Space-to-Earth (Transmit) Beams

This section collects information regarding the transmission links from each space station to its associated Earth station(s). Select the "S5. Space-to-Earth (Transmit) Beam" tab, and a summary table will appear displaying each transmit (downlink) beam with the associated parameters. Click the **New** button to add each new transmit beam to the list of transmit beams for the satellite network. There must be at least one transmit beam for every transmit frequency band range listed in the "S2. Operating Frequency Bands" summary table with at least one or more beams that utilize the entire frequency band requested. Once the information is populated for each beam, click the **Save Record** button.

a. Beam ID. Enter a unique beam identifier. (Limited to 10 alphanumeric characters).
b. Beam Frequency (Lower Band Edge) (MHz). Enter the frequency at the lower band edge of the transmit beam frequency band. The frequency band specified must be within one of the transmit frequency band ranges listed in the "S2. Operating Frequency Bands" summary table.
c. Beam Frequency (Upper Band Edge) (MHz). Enter the frequency at the upper band edge of the transmit beam frequency band. The frequency range specified must be within one of the transmit frequency band ranges listed in the "S2. Operating Frequency Bands" summary table.
d. Polarization. From the drop-down list, select whether the polarization for the beam is H (Horizontal Linear), EP (Elliptical Polarization), LHCP (Left-Hand Circular

Polarization), SP (Slant Polarization), RHCP (Right-Hand Circular Polarization) or V (Vertical Linear).

e. Can the space station vary the channel bandwidth with on-board processing? Confirm if the proposed space station has an on-board processor. If so, it is understood that the space station has the ability to vary the channel bandwidth within the beam frequency band, and there will be no need to collect the channel information requested under the "x. Transmit Channels" tab.

f. Is this a command beam? (Check box if Yes). N/A.

g. Is the beam shapable? (Check box if Yes). Confirm if the transmit antenna beam is shapeable.

h. Is the beam steerable? (Check box if Yes). Confirm if the transmit antenna beam is steerable.

i. Is the beam fed into transponders? (Check box if Yes). Confirm if the transmit antenna beam is fed into transponders.

j. Maximum Transmit EIRP Density (dBW/Ref. BW). For all transmit beams, enter the maximum effective isotropic radiated power (EIRP) density in dBW per reference bandwidth. For shapeable beams, specify the maximum possible value within each proposed coverage area. For bands below 15 GHz EIRP density, specify value in dBW/4 kHz. For bands equal to or more than 15 GHz, specify value in dBW/MHz.

k. Maximum Transmit EIRP (dBW). For all transmit beams, enter the maximum effective isotropic radiated power (EIRP) value in dBW.

l. Minimum Cross-Polar Isolation within Service Area (dB). Enter the minimum cross-polar isolation value in dB. Minimum cross-polar isolation information will only be requested if a GSO applicant is applying to transmit within any portion of the 17300-17800 MHz frequency band.

m. Minimum Saturation Flux Density (dBW/m^2). N/A.

n. Beam Peak Flux Density at Command Threshold (dBW/m^2). N/A.

o. Peak Isotropic Antenna Gain (dBi). Enter peak isotropic antenna gain in dBi. This information is required for inter-satellite links, but optional for all other beams.

p. Isotropic Antenna Gain at 3dB Beamwidth (dBi). Enter isotropic antenna gain at 3dB beamwidth in dBi. This information is required for inter-satellite links, but optional for all other beams.

q. Antenna Pointing Error (°). Enter the amount of variation in the "physical" orientation of an antenna beam in the reference direction in +/- degrees. This is a measure of the inability of an antenna to point in a desired direction.

r. Antenna Rotational Error (°). Enter the amount of variation in the "polarity" orientation of an antenna beam in the reference direction that the signal is rotated clockwise/counter-clockwise from its reference position in +/- degrees. This is a measure of the polarization misalignment for an antenna as it points in the desired direction.

s. Will a GIMS container file containing all antenna contour data be provided? Use the drop-down list to confirm if an ITU-BR GIMS container file, containing all antenna contour data for this beam, will be attached to Schedule S. If "Yes," attach the GIMS container file under the "S8. Attachments" tab. If "No, attach the antenna contour diagrams as GXT files and/or the antenna contour data as DOC or XLS files under the "z. Beam Attachments" tab in this section.

t. Under what rules will the associated antenna contours be submitted? Click the padlock symbol and identify the sub-section(s) of section 25.114 of the Commission's rules under

which antenna gain contour diagrams and data will be provided as attachment(s) to Schedule S. Multiple rule sections can be selected from the drop-down list.

u. Provide a list of each orbital plane in which this antenna beam is used. For NGSO applications, click the padlock symbol and select each orbital plane in which the proposed antenna beam is used on at least one space station, in accordance with section 25.114 of the Commission's rules. Multiple "Plane ID(s)" can be selected by clicking the magnifying glass and choosing each of the orbital plane numbers from the drop-down list.

v. Are all space stations in the NGSO constellation identical? For NGSO applications, confirm if all space stations in the NGSO constellation are identical.

w. What information will be provided with the predicted antenna gain contours? For GSO or NGSO applications with a large number of identical fixed spot gains, use the drop-down list to indicate which documents will be provided in accordance with section 25.114 of the Commission's rules. Multiple documents can be selected from the drop-down list. These documents can be attached under the "z. Beam Attachments" tab or under the "S8. Attachments" tab.

Click the **Save Record** button to generate a table to enter the associated channel information under the "x. Transmit Channels" tab and the maximum power-flux density information under the "y. Max. Power-Flux Densities" tab, and to attach the required documentation under the "z. Beam Attachments" tab.

x. Transmit Channels. Enter each transmit channel by clicking the **New** button under the "x. Transmit Channels" section. For sections S5.x(i)-x(v), fill in the appropriate channel ID, channel bandwidth, channel center frequency, and channel type information for each channel on the given transmit beam. Channel information for at least one transmit channel should be provided for each transmit beam listed in the "S5. Space-to-Earth (Transmit) Beam" summary page. If the space station can vary the channel bandwidth with on-board processing, no channel information will be required.
   (i) Channel ID. Enter a unique descriptive channel identifier.
   (ii) Channel Bandwidth (MHz). Enter the channel bandwidth in MHz. The channel center frequency, plus or minus one-half of the assigned channel bandwidth, must be within one of the associated transmit beam frequency ranges in the "S5. Space-to-Earth (Transmit) Beam" summary page.
   (iii) Center Frequency (MHz). Enter the channel center frequency in MHz.
   (iv) Channel Frequency (Lower Band Edge) (MHz). This data field is auto-populated based on the "Channel Bandwidth (MHz)" and "Center Frequency (MHz)" information provided in S5.x.(ii) and S5.x.(iii), respectively.
   (v) Channel Frequency (Upper Band Edge) (MHz). This data field is auto-populated based on the "Channel Bandwidth (MHz)" and "Center Frequency (MHz)" information provided in S5.x.(ii) and S5.x.(iii), respectively.
   (vi) Channel Type. From the drop-down list, select whether the channel is used as a feeder link, service link, or TT&C.

Upon filling out the channel information for a transmit channel, click the **Save Record** to verify that the information entered is complete and accurate. Click the **Return to Beam Information** button to return to the associated beam page, add additional channels to this section, or go on to complete the next section of Schedule S.

y. Max. Power-Flux Densities. Enter the required maximum power-flux density values for each sub-frequency band within the beam frequency band of the beam by clicking the **New** button under the "y. Max. Power-Flux Densities" section. Fill in sections S5.y.(i)-y.(xiv) with the appropriate reference bandwidth, maximum PFD values for the given angles of arrival or geographic regions, and the energy dispersal bandwidth for each given sub-frequency band of the transmit beam.

(i) Beam Sub-Frequency (Lower Band Edge) (MHz). Enter the lower frequency band edge, of a sub-frequency band within the given beam frequency band, for which the maximum power-flux density information is being provided.

(ii) Beam Sub-Frequency (Upper Band Edge) (MHz). Enter the upper frequency band edge, of a sub-frequency band within the given beam frequency band, for which the maximum power-flux density information is being provided.

(iii) Reference Bandwidth (BW). Select the appropriate reference bandwidth for which the maximum power-flux density information is being provided, as requested in accordance with section 25.208 of the Commission's rules.

(iv) - (ix) Angles of Arrival PFD. In accordance with section 25.208 of the Commission's rules, provide the required maximum power-flux density values for the concerned frequency bands at the appropriate angles of arrival. In general, for any NGSO/FSS applicant sharing with MVDDS in the 12200-12700 MHz frequency band, provide the maximum PFD values at angles of arrival of 0-2°, 2-5° above the horizon, in dBW/m²/Reference BW. For all other satellite services and frequency bands, provide the maximum PFD values at angles of arrival of 0-5°, 5-15°, 15-20°, 20-25°, 25-90° above the horizon in dBW/m²/Reference BW, where applicable.

(x) - (xiii) Geographic Region PFD. In accordance with section 25.208(w) of the Commission's rules, provide the required maximum power-flux density values by geographic region for any satellite service operating in any portion of the 17300-17700 MHz frequency band. The maximum PFD values should be provided for the Southeastern, Northeastern, Western and "Other" geographic regions in dBW/m²/Reference BW. For DBS or 17/24 GHz BSS applicants, and/or service in the entire 17300-17800 MHz frequency band, provide the maximum PFD values at angles of arrival of 0-5°, 5-15°, 15-20°, 20-25°, 25-90° above the horizon in dBW/m²/Reference BW for the 17700-17800 MHz frequency band.

(xiv) Energy Dispersal Bandwidth (kHz). Enter energy dispersal bandwidth in kHz.

z. Beam Attachments. Attach antenna gain contour and service area data for the associated beam by clicking the **New** button under the "z. Beam Attachments" section. For sections S5.z.(i)-z.(iii), choose the appropriate document type from the drop-down list, or if "Other," provide a brief description of the document and upload the document using the "Click to add …" link. All documents attached for a particular beam will appear in the summary table under both the "z. Beam Attachments" tab and the "S8. Attachments" tab.

Upon completing this section, click the **Save Record** button to verify that the information entered is complete and accurate. Click the **Return to Main Menu** button to locate and complete the next section of Schedule S.

S6. Space-to-Space (Receive Beams)

This section collects information necessary to represent the transmission links between associated space stations. Select the "S6. Space-to-Space (Receive) Beam" tab and a summary table will appear where each receive beam for a space-to-space link, as well as the associated parameters, will be collected and displayed. Click the **New** button to add each new receive beam for a space-to-space link to the list of receive beams for the satellite network. For a space-to-space link, there must be at least one receive beam for every receive frequency band range listed in the "S2. Operating Frequency Bands" summary table, and each listed receive frequency band must have at least one or more beams that utilize the entire frequency band requested. Once the information is populated for each beam, click the **Save Record** button.

a. Beam ID. Enter a unique descriptive beam identifier. (Limited to 10 alphanumeric characters).
b. Beam Frequency (Lower Band Edge) (MHz). Enter the frequency at the lower band edge of the receive beam frequency band. The frequency band specified must be within one of the receive frequency band ranges listed in the "S2. Operating Frequency Bands" summary table.
c. Beam Frequency (Upper Band Edge) (MHz). Enter the frequency at the upper band edge of the receive beam frequency band. The frequency range specified must be within one of the receive frequency band ranges listed in the "S2. Operating Frequency Bands" summary table.
d. Polarization. Use the drop-down list to select whether the polarization for the beam is H (Horizontal Linear), EP (Elliptical Polarization), LHCP (Left-Hand Circular Polarization), SP (Slant Polarization), RHCP (Right-Hand Circular Polarization) or V (Vertical Linear).
e. Can the space station vary the channel bandwidth with on-board processing? Confirm if the proposed space station has an on-board processor. If so, there will be no need to collect the channel information under the "x. Receive Channels" tab.
f. Is this a command beam? (Check box if Yes). Confirm if the receive antenna beam is being used for telecommand services.
g. Is the beam shapeable? (Check box if Yes). Confirm if the receive antenna beam is shapeable.
h. Is the beam steerable? (Check box if Yes). Confirm if the receive antenna beam is steerable.
i. Is the beam fed into transponders? (Check box if Yes). Confirm if the receive antenna beam is fed into transponders.
j. Maximum G/T (dB/K). For non-command beams, enter the G/T value at beam peak in dB/K. For beams that are both non-command and shapeable, enter the maximum G/T value within the coverage area in dB/K. For command beams, enter the maximum G/T value in dB/K.
k. Minimum G/T (dB/K). For beams that are both non-command and shapeable, enter the minimum G/T value within the coverage area in dB/K. For all other beams, enter the minimum G/T value in dB/K.
l. Maximum Saturation Flux Density (dBW/m^2). For beams that are non-command, non-shapeable, and fed into transponders, enter the maximum saturation flux density value at

beam peak in dBW/m². For beams that are non-command, shapeable and fed into transponders, enter the maximum saturation flux density value, within the 0 dB isoline, in dBW/m². For all other beams fed into transponders, enter the maximum saturation flux density value at beam peak in dBW/m².

m. Minimum Saturation Flux Density (dBW/m^2). For beams that are non-command, non-shapeable, and fed into transponders, enter the minimum saturation flux density value at beam peak in dBW/m². For beams that are non-command, shapeable and fed into transponders, enter the minimum saturation flux density value, within the 0 dB isoline, in dBW/m². For all other beams fed into transponders, enter the minimum saturation flux density value at beam peak in dBW/m².

n. Beam Peak Flux Density at Command Threshold (dBW/m^2). For command beams, enter beam peak flux density at command threshold value in dBW/m^2.

o. Peak Isotropic Antenna Gain (dBi). Enter peak isotropic antenna gain in dBi. This information is required for inter-satellite links but is optional for all other beams.

p. Isotropic Antenna Gain at 3dB Beamwidth (dBi). Enter isotropic antenna gain at 3dB beamwidth in dBi. This information is required for inter-satellite links but is optional for all other beams.

q. Antenna Pointing Error (°). Enter the amount of variation in the "physical" orientation of an antenna beam in the reference direction in +/- degrees. This is a measure of the inability of an antenna to point in a desired direction.

r. Antenna Rotational Error (°). Enter the amount of variation in the "polarity" orientation of an antenna beam in the reference direction that the signal is rotated from its reference position in +/- degrees. This is a measure of the polarization misalignment for an antenna as it points in the desired direction.

s. Will a GIMS container file containing all antenna contour data be provided? Confirm if an ITU-BR GIMS container file containing all antenna contour data for this beam will be attached to Schedule S. If "Yes," attach the GIMS container file under the "S8. Attachments" tab in the Main Menu. If "No," attach the antenna contour diagrams as GXT files, and/or the antenna contour data as DOC or XLS files, under the "z. Beam Attachments" tab.

t. Under what rules will the associated antenna contours be submitted? Click the padlock symbol and identify the sub-section(s) of section 25.114 of the Commission's rules under which the antenna gain contour diagrams and data will be provided as attachment(s). Multiple rule sections can be selected from the drop-down list.

u. Provide a list of each orbital plane in which this antenna beam is used. For NGSO applications, click the padlock symbol and select each orbital plane in which the proposed antenna beam is used on at least one space station, in accordance with section 25.114 of the Commission's rules. Multiple "Plane ID(s)" can be selected by first clicking the magnifying glass and then choosing each of the orbital plane numbers from the drop-down list.

v. Are all space stations in the NGSO constellation identical? For NGSO applications, confirm if all space stations in the NGSO constellation are identical.

w. What information will be provided with the predicted antenna gain contours? For GSO or NGSO applications with a large number of identical fixed spot beams, use the drop-down list to indicate which documents will be provided in accordance with section 25.114 of the Commission's rules. Multiple documents can be selected in the drop-down

list. These documents can be attached under the "z. Beam Attachments" tab or under the "S8. Attachments" tab.

Click the **Save Record** button to generate a table to enter the associated channel information under the "x. Receive Channels" tab and to attach the required documentation under the "z. Beam Attachments" tab.

x. Receive Channels. Complete sections S6.x.(i)-x.(vi) by filling in the appropriate channel ID, bandwidth and/or center frequency, channel type, and point of communication information for each channel on the given receive beam. Enter each receive channel by clicking the **New** button. If the space station can vary the channel bandwidth with on-board processing, no channel information will be required.

(i) Channel ID. Enter a unique descriptive channel identifier.
(ii) Channel Bandwidth (MHz). For a channel on a non-command antenna beam, enter the channel bandwidth in MHz. The channel center frequency, plus or minus one-half of the assigned channel bandwidth, must be within one of the associated receive beam frequency ranges listed in the "S6. Space-to-Space (Receive Beam)" summary page. This is not applicable for a channel on a command antenna beam.
(iii) Center Frequency (MHz). For a channel on a command and non-command antenna beam, enter the center frequency in MHz.
(iv) Channel Frequency (Lower Band Edge) (MHz). This data field is auto-populated for a channel on a non-command antenna beam based on the "Channel Bandwidth (MHz)" and "Center Frequency (MHz)" information provided in S6.x.(ii) and S6.x.(iii), respectively.
(v) Channel Frequency (Upper Band Edge) (MHz). This data field is auto-populated for a channel on a non-command antenna beam based on the "Channel Bandwidth (MHz)" and "Center Frequency (MHz)" information provided in S6.x.(ii) and S6.x.(iii), respectively.
(vi) Channel Type. From the drop-down list, select whether the channel is used as a feeder link, service link or for TT&C.
(vii) Point of Communication. Enter a list of all space stations communicated with using this receive channel.

Upon filling out the channel information for a receive channel, click the **Save Record** button to verify that the information provided is complete and accurate. Click the **Return to Beam Information** button to return to the associated beam page button, add additional channels to this section, or to go on to complete the next section of Schedule S.

z. Beam Attachments. Attach antenna gain contour and service area data for the associated beam by clicking the **New** button under the "z. Beam Attachments" section. For sections S6.z.(i) through z.(iii), use the drop-down list to select the document type. If "Other" is selected, provide a brief description of the document and upload the document using the "Click to add …" link. All documents that have been attached for a particular beam will appear in the summary table under both the "z. Beam Attachments" tab and the "S8. Attachments" tab.

Upon completing this section, click the **Save Record** button to verify that the information entered is complete and accurate. Click the **Return to Main Menu** button to locate and complete the next section of Schedule S.

S7. Space-to-Space (Transmit) Beams

This section collects information necessary to represent the transmission links between associated space stations. Select the "S7. Space-to-Space (Transmit) Beam" tab, and a summary table will appear where each transmit beam for a space-to-space link, as well as the associated parameters, will be collected and displayed. Click the **New** button to add each new transmit beam for a space-to-space link to the list of transmit beams for the satellite network. There must be at least one transmit beam for every transmit frequency band range listed in the "S2. Operating Frequency Bands" summary table with at least one or more beams that utilize the entire frequency band requested. Once the information is populated for each beam, click the **Save Record** button.

a. Beam ID. Enter a unique descriptive beam identifier.
b. Beam Frequency (Lower Band Edge) (MHz). Enter the frequency at the lower band edge of the transmit beam frequency band. The frequency band specified must be within one of the transmit frequency band ranges listed in the "S2. Operating Frequency Bands" summary table.
c. Beam Frequency (Upper Band Edge) (MHz). Enter the frequency at the upper band edge of the transmit beam frequency band. The frequency range specified must be within the operating transmit band frequency ranges listed in the "S2. Operating Frequency Bands" summary table.
d. Polarization. From the drop-down list, select whether the polarization for the beam is H (Horizontal Linear), EP (Elliptical Polarization), LHCP (Left-Hand Circular Polarization), SP (Slant Polarization), RHCP (Right-Hand Circular Polarization) or V (Vertical Linear).
e. Can the space station vary the channel bandwidth with on-board processing? Use the drop-down list to select the appropriate answer.
f. Is this a command beam (Check box if Yes)? N/A.
g. Is the beam shapeable (Check box if Yes)? Confirm if the transmit antenna beam is shapeable.
h. Is the beam steerable (Check box if Yes)? Confirm if the transmit antenna beam is steerable.
i. Is the beam fed into transponders (Check box if Yes)? Confirm if the transmit antenna beam is fed into transponders.
j. Maximum Transmit EIRP Density (dBW/Ref. BW). For all transmit beams, enter the maximum effective isotropic radiated power (EIRP) density in dBW per reference bandwidth. For shapeable beams, specify the maximum possible value within each proposed coverage area. For bands below 15 GHz EIRP density, specify in dBW/4 kHz; and for bands equal to or more than 15 GHz, specify in dBW/MHz.
k. Maximum Transmit EIRP (dBW). For all transmit beams, enter the maximum effective isotropic radiated power (EIRP) value in dBW.
l. Minimum Saturation Flux Density (dBW/m^2). N/A.
m. Beam Peak Flux Density at Command Threshold (dBW/m^2). N/A.

o. Peak Isotropic Antenna Gain (dBi). Enter peak isotropic antenna gain in dBi. This information is required for inter-satellite links, but optional for all other beams.
p. Isotropic Antenna Gain at 3dB Beamwidth (dBi). Enter isotropic antenna gain at 3dB beamwidth in dBi. This information is required for inter-satellite links, but optional for all other beams.
q. Antenna Pointing Error (°). Enter the amount of variation in the "physical" orientation of an antenna beam in the reference direction in +/- degrees. This is a measure of the inability of an antenna to point in a desired direction.
r. Antenna Rotational Error (°). The amount of variation in the "polarity" orientation of an antenna beam in the reference direction that the signal is rotated clockwise/counter-clockwise from its reference position in +/- degrees. It is a measure of the polarization misalignment for an antenna as it points in the desired direction.
s. Will a GIMS container file containing all antenna contour data be provided? Use the drop-down list to confirm if an ITU-BR GIMS container file, containing all antenna contour data for this beam, will be attached to Schedule S. If "Yes," attach the GIMS container file under the "S8. Attachments" tab in the Main Menu. If "No," attach the antenna contour diagrams as GXT files, and/or the antenna contour data as DOC or XLS files, under the "z. Beam Attachments" tab in this section of Schedule S.
t. Under what rules will the associated antenna contours be submitted? Click the padlock symbol and use the drop-down list to identify the sub-section(s) of section 25.114(c) under which antenna gain contour diagrams and data will be provided as attachment(s) to Schedule S. Multiple rule sections can be selected from the drop-down list.
u. Provide a list of each orbital plane in which this antenna beam is used. For NGSO applications, click the padlock symbol and use the drop-down list to select each orbital plane in which the proposed antenna beam is used on at least one space station, in accordance with section 25.114 of the Commission's rules. Multiple "Plane ID(s)" can be selected by first clicking the magnifying glass and then choosing each of the orbital plane numbers from the drop-down list.
v. Are all space stations in the NGSO constellation identical? For NGSO applications, use the drop-down list to confirm if all space stations in the NGSO constellation are identical.
w. What information will be provided with the predicted antenna gain contours? For GSO or NGSO applications having a large number of identical fixed spot beams, use the drop-down list to indicate which documents will be provided, as requested in accordance with section 25.114 of the Commission's rules. Multiple documents can be selected from the drop-down list. These documents can be attached under the "z. Beam Attachments" tab or under the "S8. Attachments" tab.

Click the **Save Record** button to generate a table with the associated channel information under the "x. Transmit Channels" tab and the maximum power-flux density information under the "y. Max. Power-Flux Densities" tab, and to attach the required documentation under the "z. Beam Attachments" tab.

x. Transmit Channels. Enter each transmit channel by clicking the **New** button. In sections S7.x.(i)-x.(vii), fill in the appropriate channel ID, channel bandwidth, channel center frequency, channel type, and point of communication information for each channel on the given transmit beam. Information for at least one transmit channel should be provided for each transmit beam listed in the "S7. Space-to-Space (Transmit) Beam"

summary page. If the space station can vary the channel bandwidth with on-board processing, no channel information will be required.

(i) Channel ID. Enter a unique descriptive channel identifier.
(ii) Channel Bandwidth (MHz). Enter channel bandwidth in MHz. The channel center frequency, plus or minus one-half of the assigned channel bandwidth, must be within one of the associated transmit beam frequency ranges in the "S7. Space-to-Space (Transmit) Beam" summary page.
(iii) Center Frequency (MHz). Enter the channel center frequency in MHz.
(iv) Channel Frequency (Lower Band Edge) (MHz). This data field is auto-populated based on the "Channel Bandwidth (MHz)" and "Center Frequency (MHz)" information provided in S7.x.(ii) and S7.x.(iii), respectively.
(v) Channel Frequency (Upper Band Edge) (MHz). This data field is auto-populated based on the "Channel Bandwidth (MHz)" and "Center Frequency (MHz)" information provided in S7.x.(ii) and S7.x.(iii), respectively.
(vi) Channel Type. From the drop-down list, select whether the channel is used as a feeder link, service link or for TT&C.
(vii) Point of Communication. Enter a list of all space stations communicated with using this transmit channel.

Upon filling out the channel information for a transmit channel, click the **Save Record** button to verify that the information provided is complete and accurate. Click the **Return to Beam Information** button to return to the associated beam page, add additional channels to this section, or go on to complete the next section of Schedule S.

y. Max-Power Flux Densities. Enter the required maximum power-flux density values for each sub-frequency band within the beam frequency band of the beam, by clicking the **New** button under the "y. Max. Power-Flux Densities" section. For sections S7.y.(i)-y.(xiv), fill in the appropriate reference bandwidth, maximum PFD values for the given angles of arrival or geographic regions, and the energy dispersal bandwidth for each given sub-frequency band of the transmit beam.

(i) Beam Sub-Frequency (Lower Band Edge) (MHz). Enter the lower frequency band edge of a sub-frequency band for which the maximum PFD information is being provided.
(ii) Beam Sub-Frequency (Upper Band Edge) (MHz). Enter the upper frequency band edge of a sub-frequency band for which the maximum PFD information is being provided.
(iii) Reference Bandwidth (BW). Select the appropriate reference bandwidth for which the maximum PFD information is being provided.
(iv) – (ix) Angles of Arrival PFD. Provide the required maximum PFD values for the concerned frequency bands at the appropriate angles of arrival.
(x) – (xiii) Geographic Region PFD. Provide the required maximum PFD values by geographic region for any satellite service operating in any portion of the 17300-17700 MHz band.
(xiv) Energy Dispersal Bandwidth (kHz). Enter the energy dispersal bandwidth in kHz.

z. Beam Attachments. Attach antenna gain contour and service area data for the associated beam by clicking the **New** button under the "z. Beam Attachments" section. For sections S7.z.(i)-z.(iii), use the drop-down list to select the document type. If "Other" is selected, provide a brief description of the document and upload the document using the "Click to add …" link. All documents attached for a particular beam will appear in the summary table under both the "z. Beam Attachments" tab and the "S8. Attachments" tab.

Upon completing this section, click the **Save Record** button to verify that the information entered is complete and accurate. Click the **Return to Main Menu** button to locate and complete the next section of Schedule S.

S8. Attachments

In this section, attach any documents that need to be associated with Schedule S by clicking the **New** button under the "S8. Attachments" tab. Once selected, a data entry screen will appear for users to attach the appropriate documentation requested for a particular beam, a set of beams, or all beams within Schedule S. Using the magnifying glass on the right side of the "Beam ID" field, select an associated "Beam ID" from the pop-up menu, enter the document type and document description, and attach/upload the desired file. The "Direction of Transmission" field, which is directly below the "Beam ID" field, will auto-populate based on the "Beam ID" selected.

Each uploaded file cannot exceed 100 MB in size. If applicants consolidate all GXT and data files for both transmit and receive beams into a GIMS database container file, the associated MDB file can be attached with that file instead. If a GIMS file is attached, name the file as "All Beams" to identify the file as an MDB container file.

If an attached document type is not included in the "Document Type" drop-down list and relates to multiple beams in Schedule S, leave the "Beam ID" data field blank, select "Other" as the "Document Type," and provide a brief description of the document with reference to the relevant Beam IDs. Attach and upload the document using the "Click to add …" link.

All documents attached under "z. Beam Attachments" in sections S4, S5, S6, and S7 will also appear under section S8. Any documents deleted from other sections will also delete from section S8, and vice versa. If a document was attached to Schedule S in error, manually delete the document from the list of attachments in the section where the document was attached.

For fixed beams on space stations in the geostationary orbit: Specify the predicted space station antenna gain contour(s) for each transmit and receive antenna beam, except for beams where the contour at 8 dB below peak falls entirely beyond the edge of the visible Earth. These contour(s) should be plotted on an area map 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. Applicants must present this information in a GIMS-readable format.

For space stations in non-geostationary orbits: Specify each unique orbital plane the predicted antenna gain contour(s) for each transmit and receive 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. A file containing a cross-reference to each satellite and its associated space station type should be attached as well. 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. For intersatellite links, specify the peak antenna gain and 3 dB beamwidth.

For space stations with shapeable beams: Specify the contours for the transmitting beam configuration that results with the highest EIRP density. Specify the contours for the receiving beam configuration with the smallest gain-to-temperature ratio and the highest required saturation power flux density. The proposed maximum coverage area must be clearly specified.

For space stations with shapeable beams that 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.

For space stations with steerable beams that are not shapeable: Specify the applicable contours, as defined in section 25.114, with a description of the area that the steerable beam(s) is expected to serve, or provide the contour information described in section 25.114 of the Commission's rules.

For geostationary satellites with large numbers of identical fixed spot beams: Other than DBS satellites, applicants may, as an alternative to the above, provide the predicted antenna gain contours for one transmit and receive antenna beam with one of the following supporting documents:

a. An area map showing all of the spot beams depicted on the surface of the Earth;
b. A table identifying the maximum antenna gain point(s) in latitude and longitude to the nearest 0.1 degree; or
c. A map of the isolines formed by combining all of the spot beams into one or more composite beams.

For non-geostationary satellites with large numbers of identical fixed spot beams: As an alternative to submitting the information above, applicants may specify the predicted antenna gain contours for one transmit and receive beam pointed to nadir, together with an area map showing all the spot beams depicted on the surface of the earth with the satellites' peak antenna gain pointed to a selected latitude and longitude within the service area.

Service area / coverage area: Attach one or more GXT, TXT, DOC and/or PDF files for each receive and transmit beam. If all of the GXT and data files for the applicant's beams are in a GIMS database container file, the associated MDB file can be attached. If a service area diagram is not being attached, provide a service area description that can be attached as service area data. Geographic designators such as State Codes, ITU Codes, or Figure Numbers can be used in the description to define the given service area for the particular beam.

FILING SCHEDULE S

Generating a PDF. At any time prior to submitting Schedule S, users may view, print, or save a PDF version of Schedule S by clicking the **Schedule S Review** button, and then clicking the **Generate PDF** button.

Checking for Errors

- When filling out the various sections and subsections of the Schedule S, users may click the **Schedule S Review** button on the Main Menu page. A list of errors will appear in a table under the "Schedule S Errors" tab on the "Schedule S Review" page. The errors are listed by Record, Field, Beam ID, Channel ID, and Error. Next to the "Schedule S Errors" tab, a hyperlink will take the user to the exact location of each error.
- As each error is corrected in a section or sub-section, click the **Save Record** button, then the **Return to Menu** button, and finally the **Schedule S Review** button to return back to the "Schedule S Errors" table.
- If an error has been corrected but is not reflected in the form, click the **Validate Schedule S** button to refresh the page.

Final Review and Submission

- The "Schedule S Review" page is provided for final review of the Schedule S.
- When the user clicks on the **Validate Schedule S** button and no more errors appear under the "Schedule S Errors" tab, a **Submit Schedule S** button will appear on the "Schedule S Review" page.
- Clicking the **Submit Schedule S** button will attach a PDF version of the completed Schedule S to the associated Form 312 and return the applicant to the Schedule S Main Menu page. The Schedule S Main Menu page will now appear as a greyed-out, unfillable version of the completed Schedule S.
- Once the Schedule S is complete, users may click the **Form 312** button to return to the associated Form 312, to review and validate it before final submission of both the Form 312 and the associated Schedule S to the Commission.

Paperwork Reduction and Privacy Notice. The solicitation of personal information requested in this form is authorized by the Communications Act of 1934, as amended, and the Telecommunications Act of 1996, Pub. L. 104-104 (February 8, 1996). The FCC will use the information provided in this form to determine whether grant of this application is in the public interest. In reaching that determination, or for law enforcement purposes, it may become necessary to refer personal information contained in this form to another government agency. In addition, all information provided in this form will be available for public inspection. If information requested on this form is not provided, processing of the application may be delayed or the application may be returned without action pursuant to the Commission rules. Your response is required to obtain the requested authority.

We have estimated that each response to this collection of information will take up to 80 hours. Our estimate includes the time to read the instructions, look through existing records, gather and maintain the required data, and actually complete and review the form or response. If you have any comments on this estimate, or on how we can improve the collection and reduce the burden it causes you, please write the Federal Communications Commission, AMD-PERM, Paperwork Reduction Project (3060-0678), Washington, DC 20554. We will also accept your comments via the Internet if you send them to pra@fcc.gov. Please do not send completed applications to this address.

You are not required to respond to a collection of information sponsored by the Federal government, and the government may not conduct or sponsor this collection, unless it displays a currently valid OMB

control number or if we fail to provide you with this notice. This collection has been assigned an OMB control number of 3060-0678.

The foregoing notice is required by the Privacy Act of 1974, Pub.L. 93-597, December 31, 1974, 5 U.S.C. § 552a(c)(3), and the Paperwork Reduction Act of 1995, Pub.L. 104-13, October 1, 1995, 44 U.S.C. § 3507.