ATTACHMENT A (TECHNICAL ANNEX)

I. SYSTEM DESCRIPTION

The Astra Constellation is a non-geostationary ("NGSO") fixed-satellite-service ("FSS") system providing secure, low-latency broadband to enterprise, government, and institutional users in the United States and worldwide.

A. Space Segment

Each space station carries an on-board-processed, regenerative payload that connects the Earth-to-space ("uplink") frequencies to the space-to-Earth ("downlink") frequencies. Both user and, if applicable, feeder (gateway) links across the V-, Ka-, and Ku-bands are served by electronically-steered phased-array antennas, which steer and shape beams to users and gateways simultaneously and, being electronically steered, requires no mechanical pointing. Each array's effective aperture is approximately 0.5 m and is best characterized by the per-band Schedule S peak gains it produces (Ku ≈ 34 dBi, Ka ≈ 38-42 dBi, V ≈ 45-47 dBi); the shared aperture means the user and gateway transmit/receive gain contours are common per band. Two gimballed parabolic reflector dishes provide backup feeder-link support and make-before-break handover.

The transmit antenna pattern conforms to the satellite reference pattern used in the power-flux density ("PFD") and equivalent power-flux density ("EPFD") analyses. For all operations, Astra employs full frequency reuse through right-hand and left-hand circular polarization ("RHCP" and "LHCP," respectively) and spatially independent beams. The satellites are inter-satellite-link ("ISL")-capable.

B. Frequency Plan

The frequency bands, directions, links and polarization are set out in Table 1. The telemetry and telecommand channels are placed at band edge to minimize interference into other satellite networks.

Table 1. Beam Transmission Characteristics.

Band Class	Band (GHz)	Direction	Link	Polarization	Identifier
Ku	10.7-12.75	space-to-Earth	User + GW	RHCP / LHCP	TU
	12.75-13.25	Earth-to-space	User + GW	RHCP / LHCP	RU
	13.75-14.5	Earth-to-space	User + GW	RHCP / LHCP	RU
Ka	17.8-18.6	space-to-Earth	User + GW	RHCP / LHCP	TA
	18.6-18.8	space-to-Earth	Downlink	RHCP / LHCP	TA
	18.8-19.3	space-to-Earth	User + GW	RHCP / LHCP	TA
	19.3-19.7	space-to-Earth	GW	RHCP / LHCP	TA
	19.7-20.2	space-to-Earth	User + GW	RHCP / LHCP	TA
	24.75-25.75	Earth-to-space	GW	RHCP / LHCP	RK
	27.5-30.0	Earth-to-space	User + GW	RHCP / LHCP	RA
	19.3-19.31	space-to-Earth	TT&C (telemetry)	RHCP	TLMA
	28.60-28.61	Earth-to-space	TT&C (command)	RHCP	CMDA
V	37.5-42.0	space-to-Earth	User + GW	RHCP / LHCP	TQ
	47.2-50.2	Earth-to-space	User + GW	RHCP / LHCP	RV
	50.4-51.4	Earth-to-space	User + GW	RHCP / LHCP	RV
	37.5-37.51	space-to-Earth	TT&C (telemetry)	RHCP	TLMQ
	47.2-47.21	Earth-to-space	TT&C (command)	RHCP	CMDV

The V-band is sought for both FSS and MSS use (MSS on the 39.5-40.0 / 40.0-42.0 GHz space-to-Earth segments, and 50.4-51.4 GHz secondary). Within the Ka spans, Astra is also requesting utilization for both FSS and MSS use. 19.4-19.7 GHz is used for FSS downlink on a shared allocation (subject to PFD and coordination).

C. Ground Segment

The ground segment consists of user terminals at customer premises and gateway earth stations connected via fiber to the Internet, operating over the frequencies of Table 1. Uplink adaptive power control and Adaptive Coding and Modulation ("ACM") manage fade.
User terminals (parabolic-dish and phased-array architectures) operate down to a minimum elevation of 20°, with the exception of 17.7-19.3 GHz in Ka band, which is limited to 25 degrees by PFD limits. Gateway earth stations are 1-5 m parabolic dishes operating to minimum elevation of 15° across bands, again with the exception of 17.7-19.3 GHz, where it is PFD limited to 25 degrees. Because deep V-band rain events can exceed the static link margin, the system will use gateway site diversity (smart-gateway, N+P switching) with uplink power control and ACM to achieve link availability in regions with high rain fades. Astra has designed the system with geographic siting, protection zones, and Upper Microwave Flexible Use Service ("UMFUS") coordination in mind.

D. System Operations

Astra will establish a U.S. satellite network control center that monitors all transmissions, coordinates with other systems to prevent harmful interference, and promptly identifies and corrects any interference. Satellites maneuver on command via a Hall effect / inert-gas propulsion subsystem and carry global navigation satellite system for precise positioning; all satellites exceed 10 centimeters in their smallest dimension and are trackable. Astra will register with the U.S. Space Force's 18th Space Control Squadron (or successor), share ephemeris and planned-maneuver data, publish two-line element ("TLE") sets, and coordinate conjunctions with other active operators. Ground spares are launched on Astra's in-house launch services within days. Astra will deploy and operate 50% of the Astra Constellation within six years of grant and the remainder within nine years.

II. ORBITAL PARAMETERS

The Astra Constellation consists of 12,280 identical satellites, deployed in three phases distributed at equatorial, mid-inclination, and sun-synchronous ("SSO") low-Earth orbit ("LEO") inclinations and altitudes. The orbital parameters, plane count, satellites per plane, satellites per shell, and total satellites per phase are provided in Table 2.

Table 2. Astra Constellation Phases

<table>
<tr><th>Phase</th><th>Shell</th><th>Altitude (km)</th><th>Inclination (deg.)</th><th>Number of Planes</th><th>Satellites per Plane</th><th>Satellites per Shell</th><th>Total Satellites per Phase</th></tr>
<tr><td>Phase 1.0</td><td>Equatorial</td><td>700</td><td>0</td><td>1</td><td>40</td><td>40</td><td>40</td></tr>
<tr><td rowspan="2">Phase 2.0</td><td>Sun-Sync</td><td>455</td><td>97</td><td>18</td><td>64</td><td>1,152</td><td rowspan="2">2,304</td></tr>
<tr><td>Med-inclined</td><td>700</td><td>55</td><td>36</td><td>32</td><td>1,152</td></tr>
<tr><td rowspan="3">Phase 3.0</td><td>High-inclined</td><td>380</td><td>67</td><td>52</td><td>36</td><td>1,872</td><td rowspan="3">9,936</td></tr>
<tr><td>Low-inclined</td><td>390</td><td>45</td><td>72</td><td>48</td><td>3,456</td></tr>
<tr><td>Med-inclined</td><td>400</td><td>55</td><td>64</td><td>72</td><td>4608</td></tr>
</table>

Each phase supports Astra's iterative approach to product development: Phase 1.0 is a minimum-viable equatorial deployment; Phase 2.0 provides continuous broadband at all latitudes; and Phase 3.0 scales capacity worldwide and adopts a lower 400 km operational altitude to use spectrum more efficiently and to accelerate end-of-life de-orbit. Astra's minimum service elevation is 20° for user terminals and generally 15° for gateways, subject to refinement as Astra completes EPFD analyses. Astra will observe a 25-degree minimum elevation angle for 17.7-19.3 GHz operations to comply with applicable PFD limits.

A. Space Safety and Orbital Separation

Astra is prioritizing space safety and on-orbit collision-risk mitigation with respect to the International Space Station ("ISS"), the planes of its own system, and other constellations at comparable altitudes:

- **ISS protection** — Astra plans to operate above and below ISS historical altitude range over the past five years (approximately 406-430 km), and commits to maintaining a minimum separation of at least 20 km via active conjunction avoidance, rather than a static altitude gap.
- **Intra-system** — orbital shells separated by at least 10 km in altitude. Astra's Hall-effect propulsion systems have demonstrated holding +/- 2 km altitude on customers' satellites across 350-450 km orbits, so Astra expects it may be possible to reduce this spacing in the future if necessary.
- **Other LEO systems** — distinct operational altitudes of 380, 390, 400, 455, and 700 km. The smallest altitude separations to any other operator is 10 km to AST SpaceMobile and 15 km to SpaceX Starlink; all others are 20 km or more. Table 3 summarizes the minimum altitude separations.
- **Other crewed space facilities** — Additional crewed space stations are in development, and Astra expects many to operate in the same altitude band the ISS operates. The PRC operates a crewed space station with a 5-year median altitude of approximately 384 km, which is within Astra's proposed phase 3 shells at 380 km and 390 km. As it is a single object, Astra is confident that active conjunction avoidance will enable safe operations.

Astra will also investigate narrowing its within-shell operating altitude band and moving 390 km shell slightly higher and 380 shell slightly lower to provide a larger range of altitudes with no conjunction risk.

Table 3. Altitude separation between other operators and Astra's Constellation.

Operator	Constellation(s)	Orbital altitudes (km)	Min. separation from Astra (km)
SpaceX	Starlink Gen 2 VLEO	340, 345, 350, 355, 360, 365	15
	Starlink Gen 2 - mid	475, 480, 485 (lowering from 525, 530, 535)	20
	Starlink Gen 1	540, 550, 560, 570	85
Amazon	Leo Gen 1 & Gen 2	590, 610, 630	70
	Leo Gen 2 Polar	600, 620, 650	50
AST & Science	Space Mobile	520, 685, 690	10
O3b	O3b	507, 8062	52
Iridium	Iridium Next	780	80
Telesat	Phase 0/1/2	1015, 1325	315
OneWeb	Gen 1	1200	500
ViaSat	ViaSat LEO	1300	600
Globalstar	Globalstar	1414	714

More than 80% of Astra's satellites operate at 380-400 km, below the most heavily populated LEO shells, where a relatively low spatial density of existing debris and strong atmospheric drag support rapid drag-assisted disposal. An additional 9% operate at 455 km with similar benefits.

III. PREDICTED SPACE STATION ANTENNA GAIN CONTOURS

The following sections provide the predicted antenna gain contours for each unique orbital shell, for each transmit and receive beam, in each band group (Ku, Ka, V). Contours are plotted on an area map with the space station's peak antenna gain pointed at nadir to a point within the service area (~31°N, 100°W, the edge of Texas), at 2 dB intervals down to 10 dB below peak and 5 dB intervals from 10 to 20 dB below peak. The contour data are embedded in the Schedule S as GXT files.

A. Ku-Band Beams

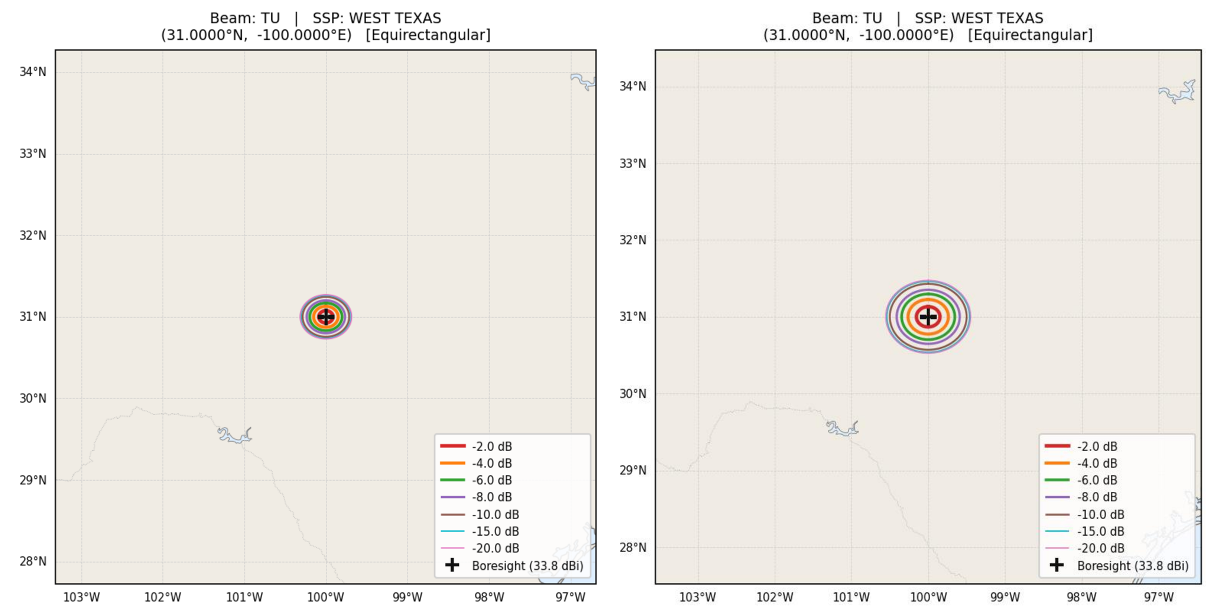

Figure 1. TU Antenna Beam Projection over WEST TEXAS from Orbit altitude of 400 km (left) and 700 km (right).

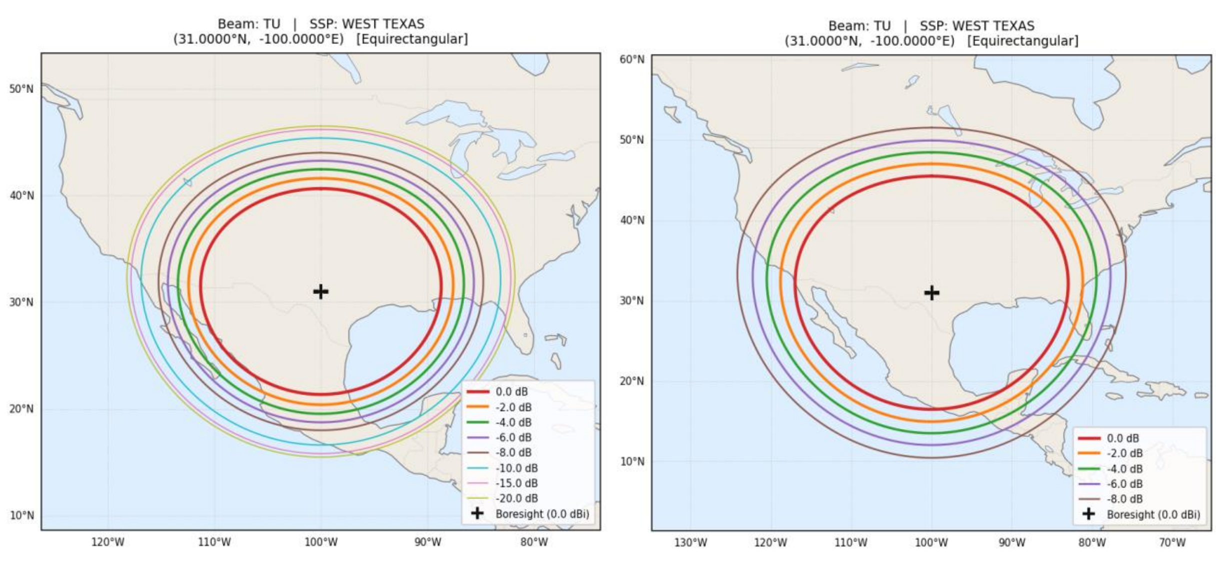

Figure 2. TU Antenna Beam Projection (max scan extent) over WEST TEXAS from Orbit altitude of 400 km (left) and 700 km (right).

B. Ka-Band Beams

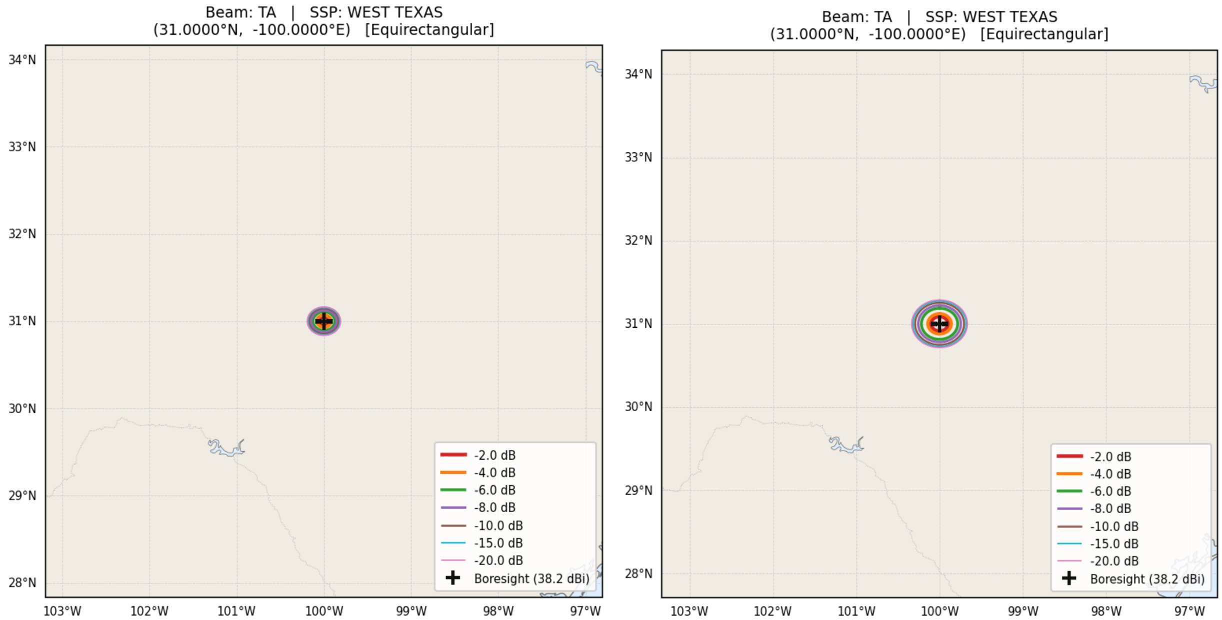

Figure 3. TA Antenna Beam Projection over WEST TEXAS from Orbit altitude of 400 km (left) and 700 km (right)

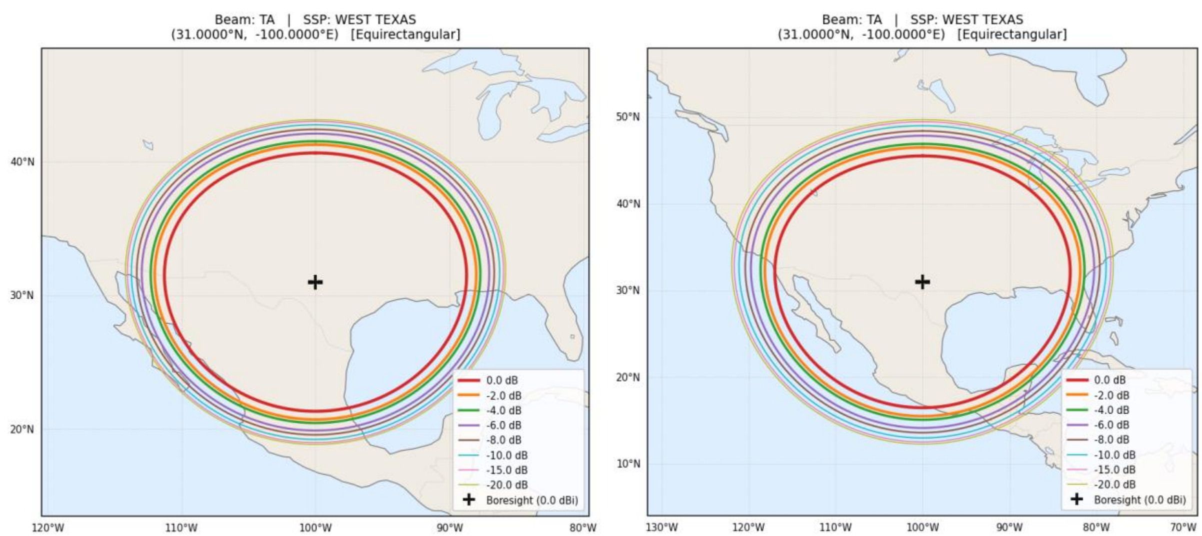

Figure 4. TA Antenna Beam Projection (max scan extent) over WEST TEXAS from Orbit altitude of 400 km (left) and 700 km (right).

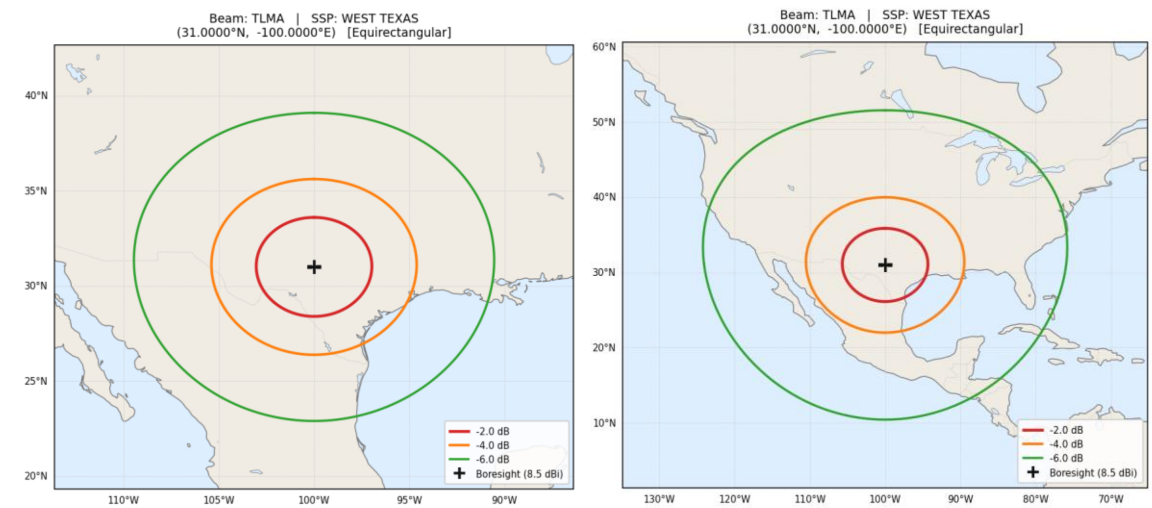

Figure 5. TLMA Antenna Beam Projection over WEST TEXAS from Orbit altitude of 400 km (left) and 700 km (right).

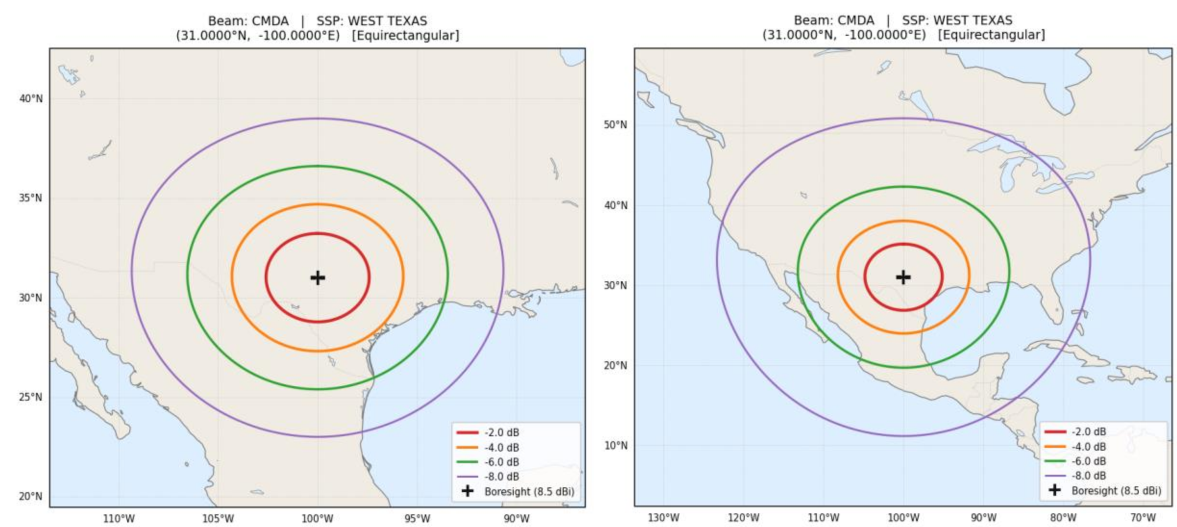

Figure 6. CMDA Antenna Beam Projection over WEST TEXAS from Orbit altitude of 400 km (left) and 700 km (right).

C. V-Band Beams

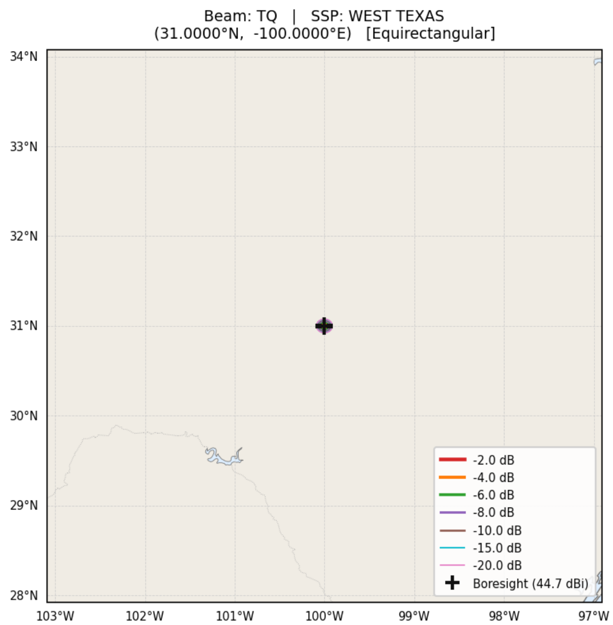

Figure 7. TQ Antenna Beam Projection over WEST TEXAS from Orbit altitude of 400 km (left) and 700 km (right).

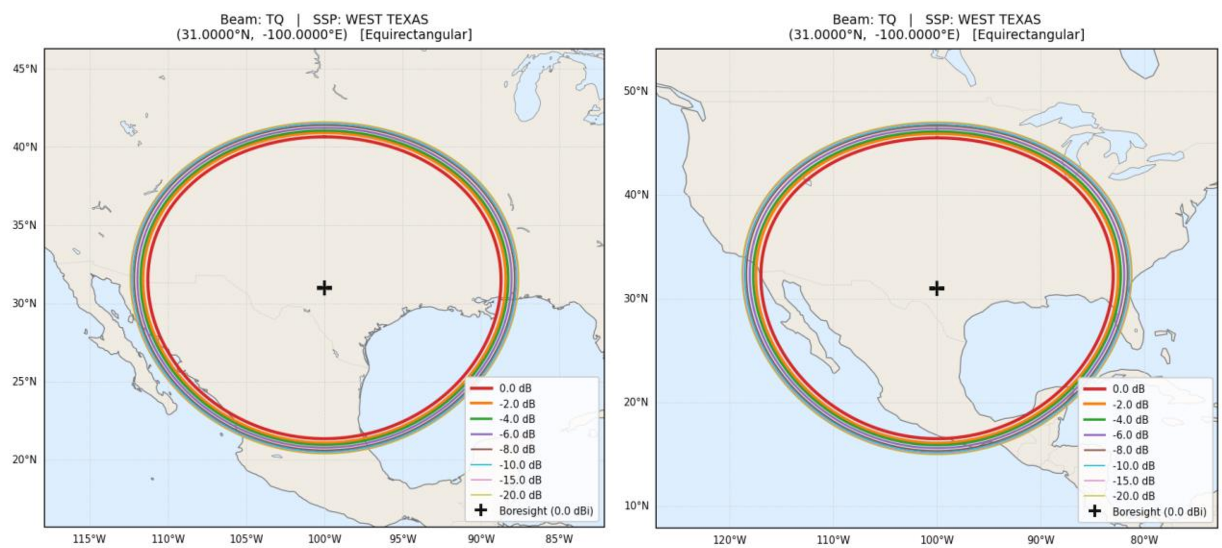

Figure 8. TQ Antenna Beam Projection (max scan extent) over WEST TEXAS from Orbit altitude of 400 km (left) and 700 km (right).

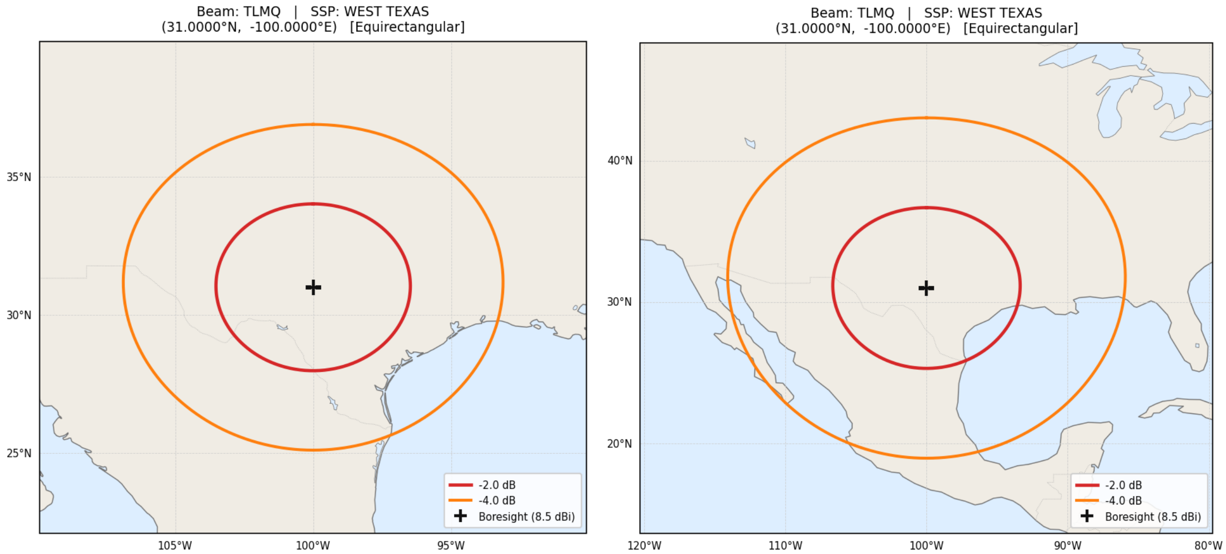

Figure 9. TLMQ Antenna Beam Projection over WEST TEXAS from Orbit altitude of 400 km (left) and 700 km (right).

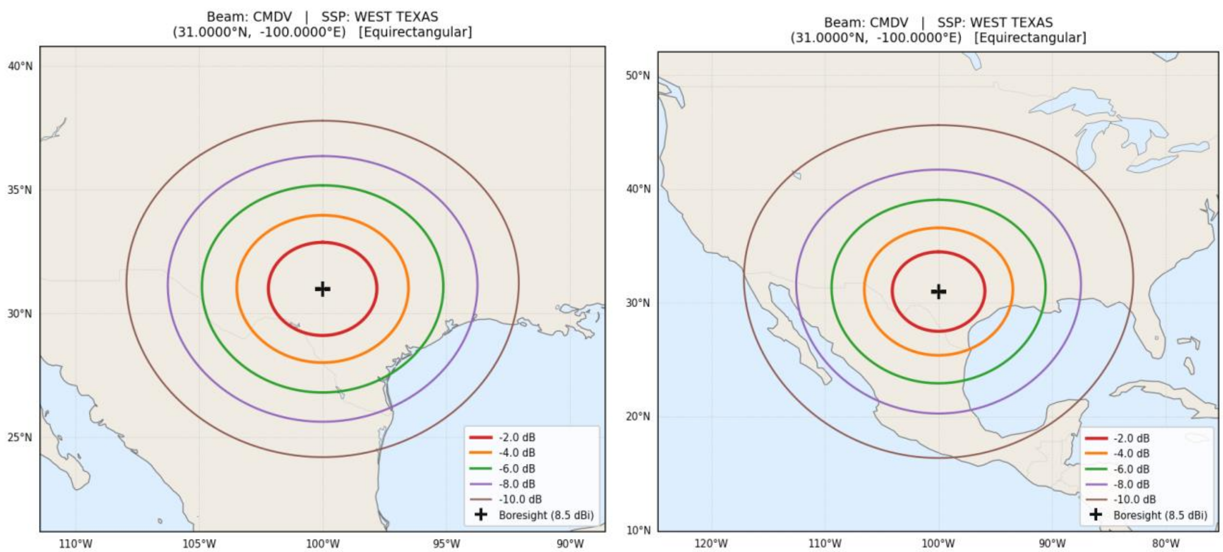

Figure 10. CMDV Antenna Beam Projection over WEST TEXAS from Orbit altitude of 400 km (left) and 700 km (right).

IV. COMPLIANCE WITH PFD LIMITS

Astra's downlinks comply with the applicable FCC (section 25.208) and ITU Article 21 power-flux-density PFD limits, and its uplinks operate within committed earth-station EIRP masks. Below Astra presents the showing via figures.

A. PFD Limits in the Ku-Band

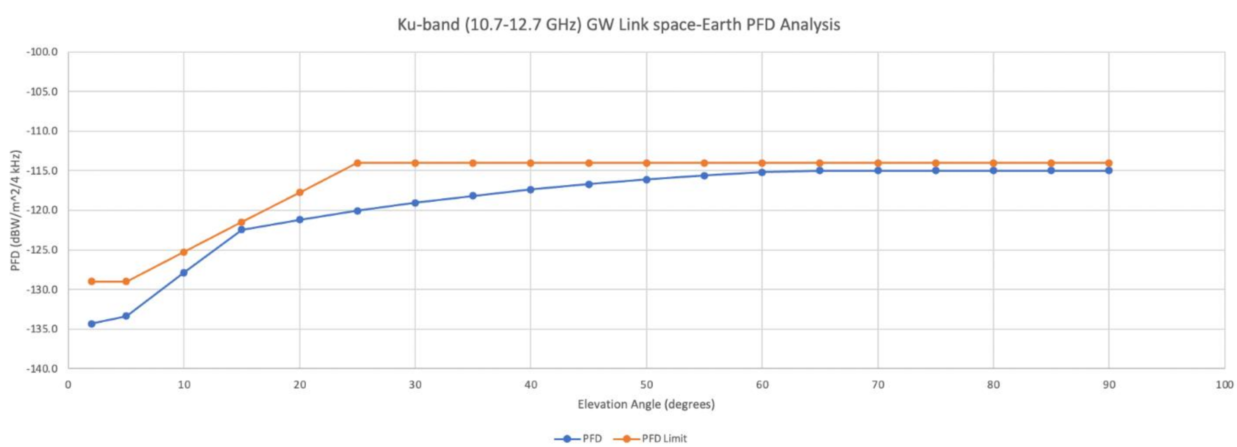

Figure 11: Ku 10.7-12.7 GHz PFD from 700 km altitude.

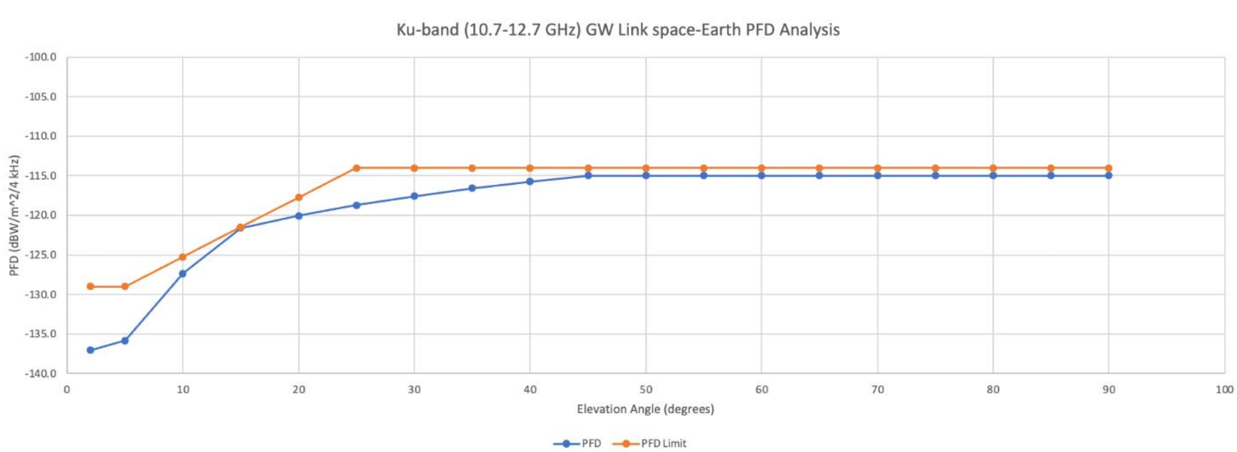

Figure 12: Ku 10.7-12.7 GHz PFD from 400 km altitude.

B. PFD Limits in the Ka-Band

In the 17.7 -19.3 GHz band, PFD is driven by 21.16.6. For the Astra Space constellation N>6000 so the X-factor is computed as 10*log10(Nv)+1. The following PFD analysis assumed an Nv of 500 based upon preliminary constellation coverage analysis.

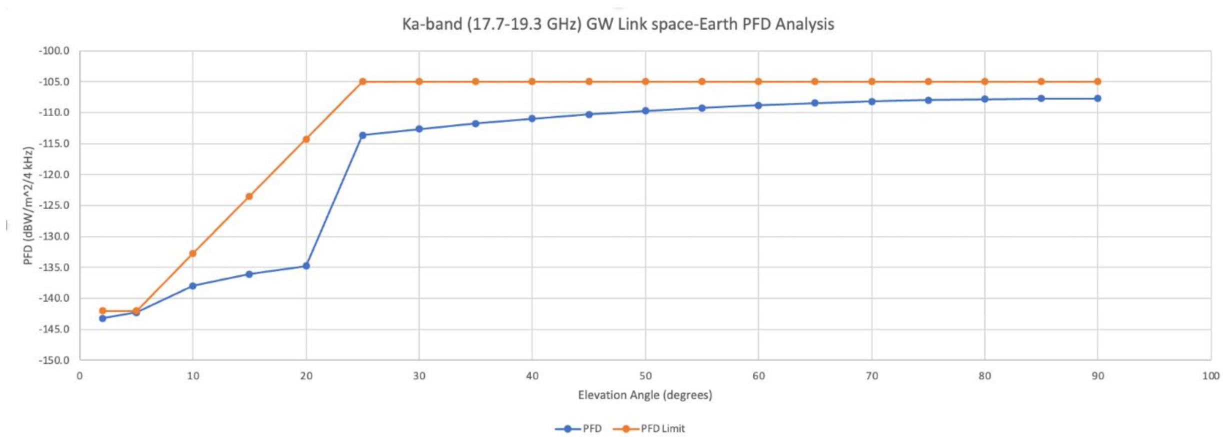

Figure 13: Ka 17.7-19.3 GHz PFD from 700 km altitude.

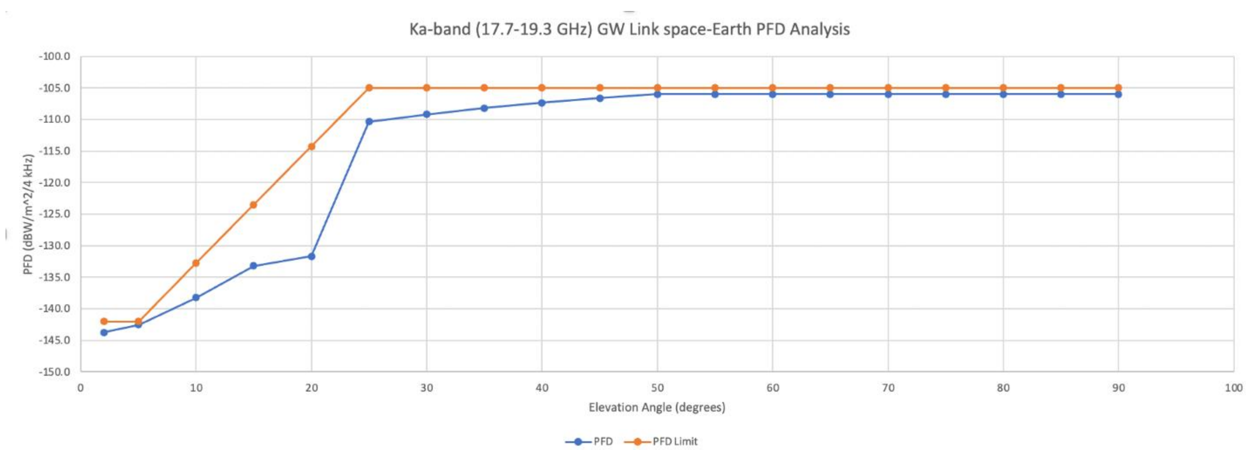

Figure 14: Ka 17.7-19.3 GHz PFD from 400 km altitude.

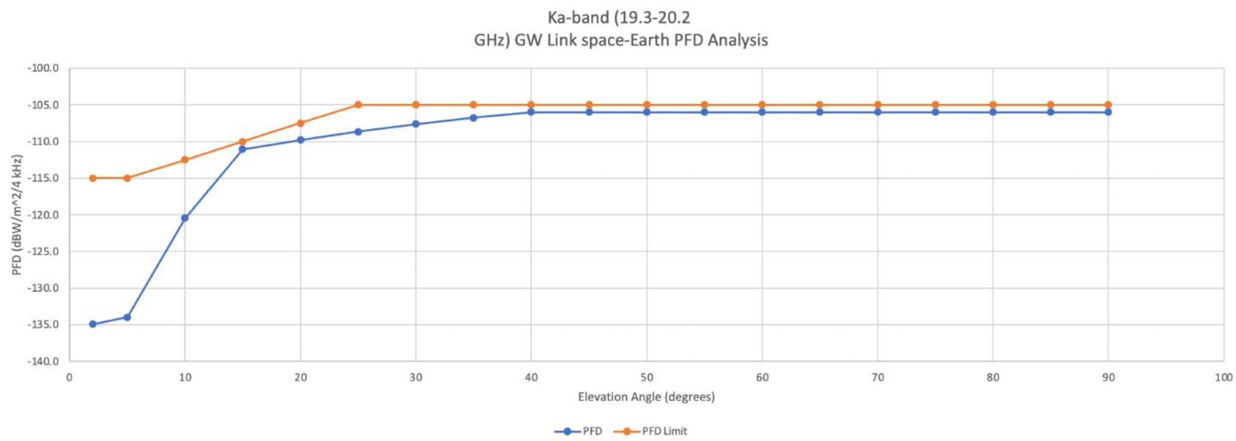

Figure 15: Ka 19.3-20.2 GHz PFD from 700 km altitude.

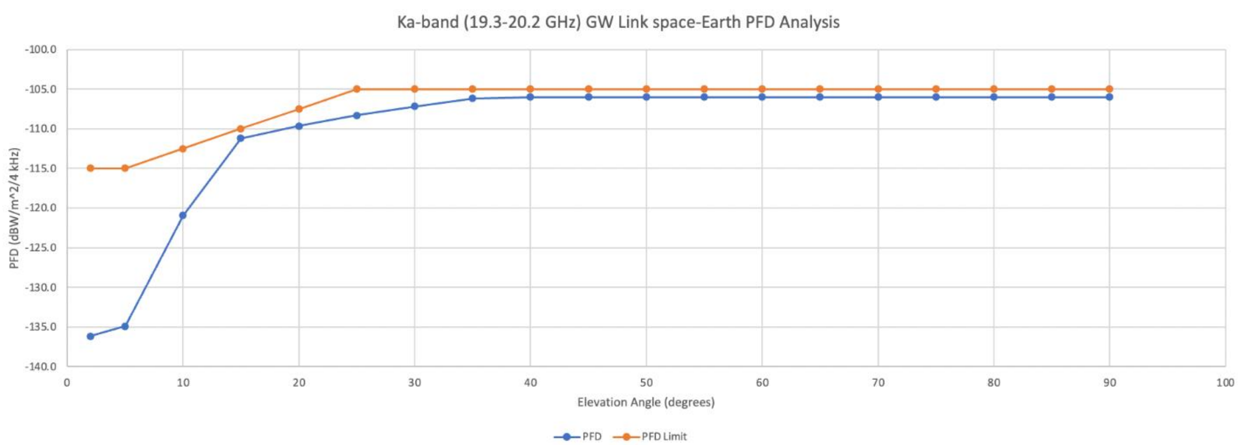

Figure 16: Ka 19.3-20.2 GHz PFD from 400 km altitude.

C. PFD Limits in the V-Band

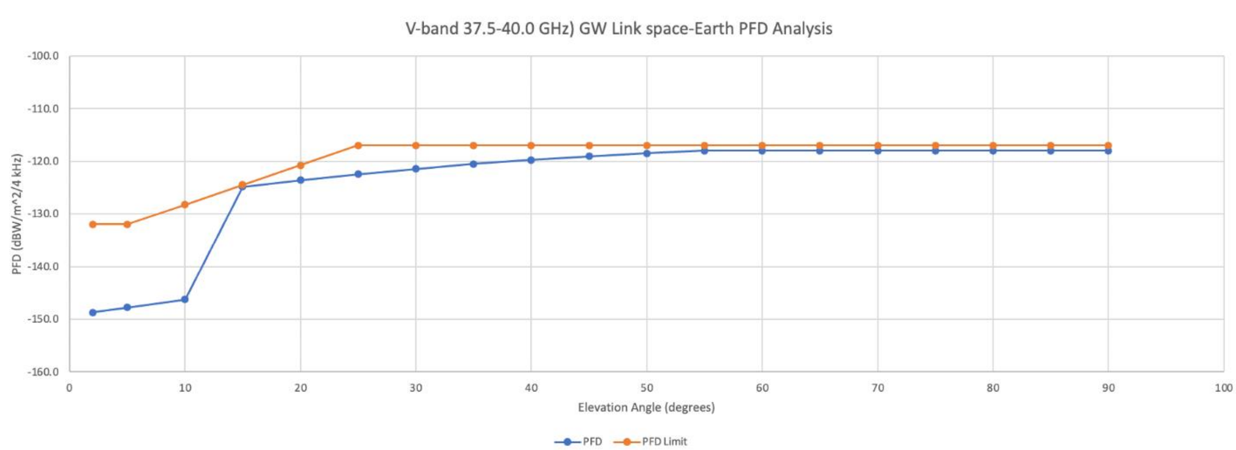

Figure 17: V 37.5-40.0 GHz PFD from 700 km altitude.

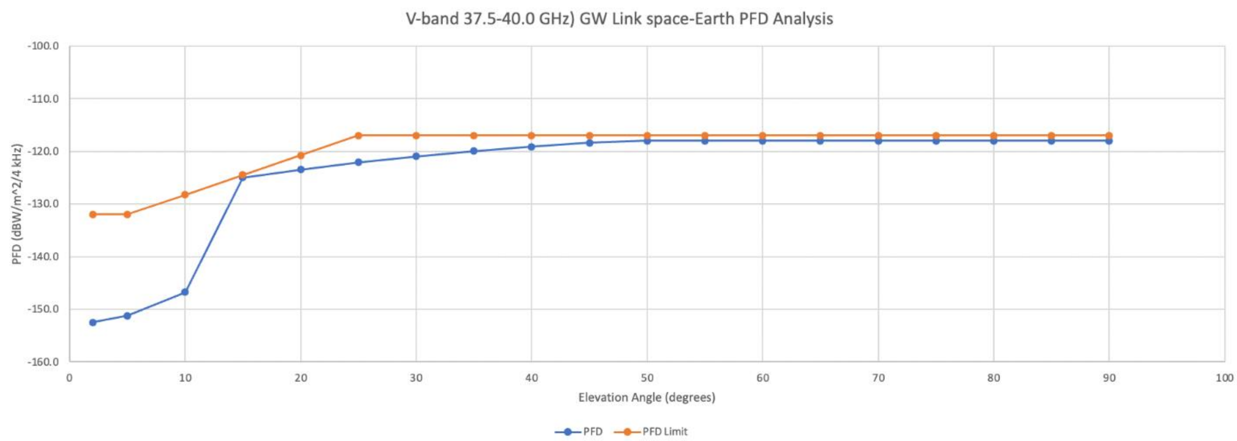

Figure 18: V 37.5-40.0 GHz PFD from 400 km altitude.

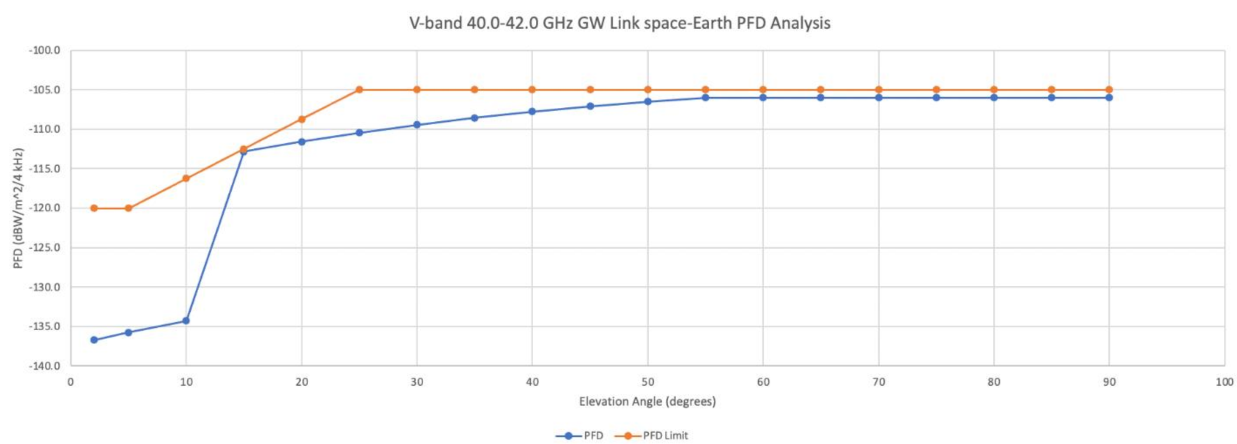

Figure 19: V 40.0-42.0 GHz PFD from 700 km altitude.

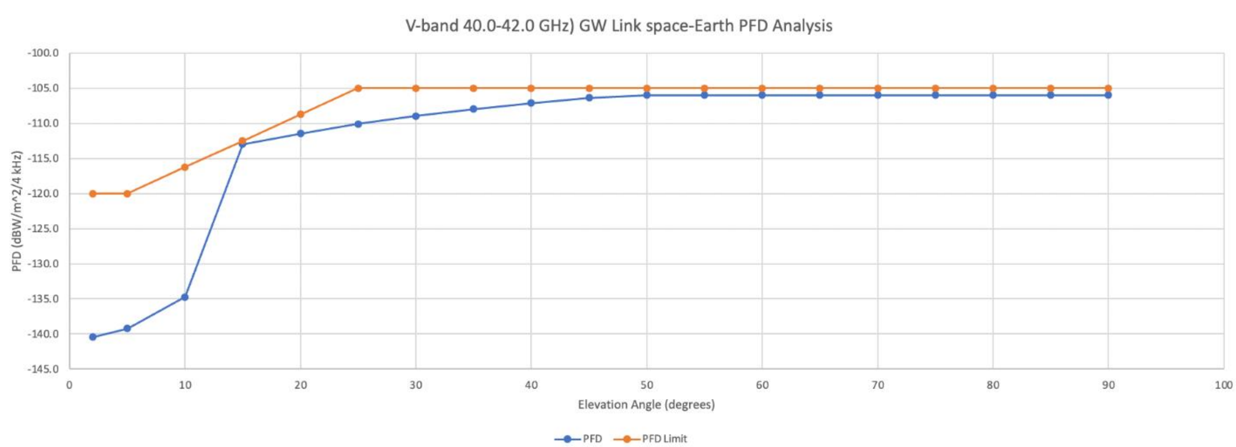

Figure 20: 40.0-42.0 GHz PFD from 400 km altitude.

V. INTERFERENCE ANALYSES

A. Interference Protection for GSO Satellite Networks

Astra protects GSO networks through GSO-arc avoidance and by operating within the ITU Article 22 EPFD limits — the limit No. 22.5L in the V-band and the limits (Nos. 22.5C/22.5D) in the Ka/Ku bands. Astra has conducted EPFD simulations to demonstrate that its constellation and system can meet requirements, though Astra is continuing to refine and optimize EPFD analysis in preparation for the ITU filing that will occur shortly after the present filing. The results from these prior simulations are shown below for Ka and Ku bands.

1. Ku-Band Simulations

The Ku FSS and BSS band downlink as well as uplink simulation results are shown below:

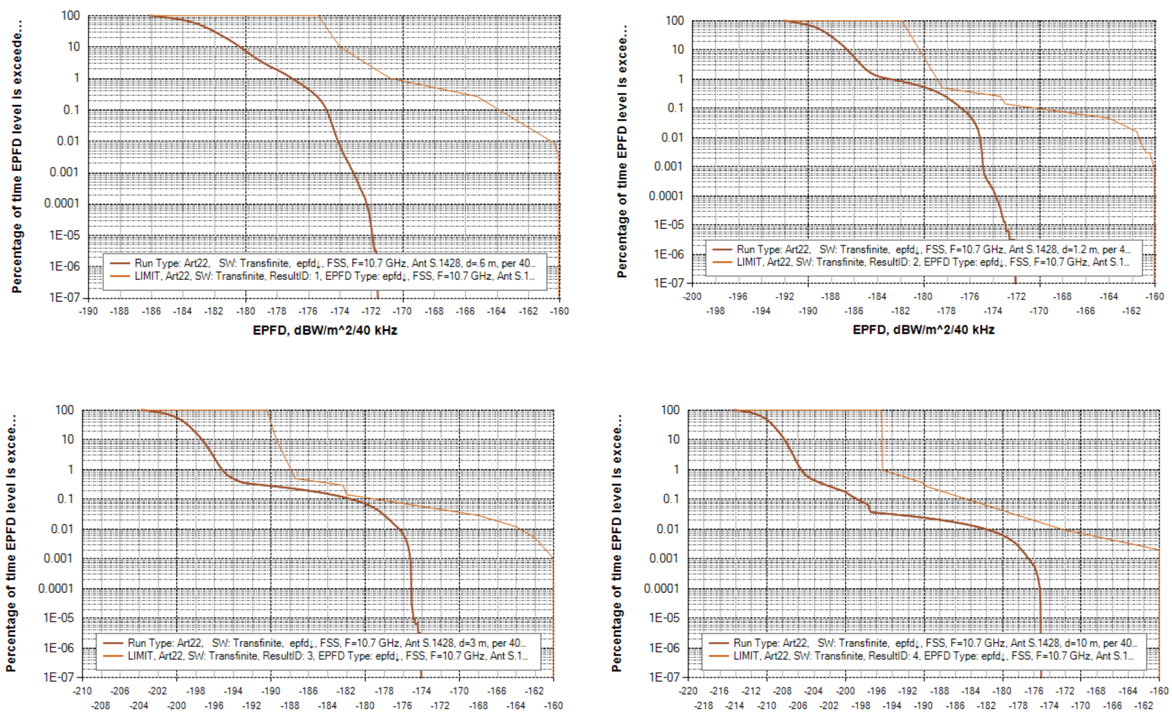

Figure 21. Ku (10.7 GHz) EPFD simulation — FSS User downlink, 0.6, 1.2, 3, 10-meter victims.

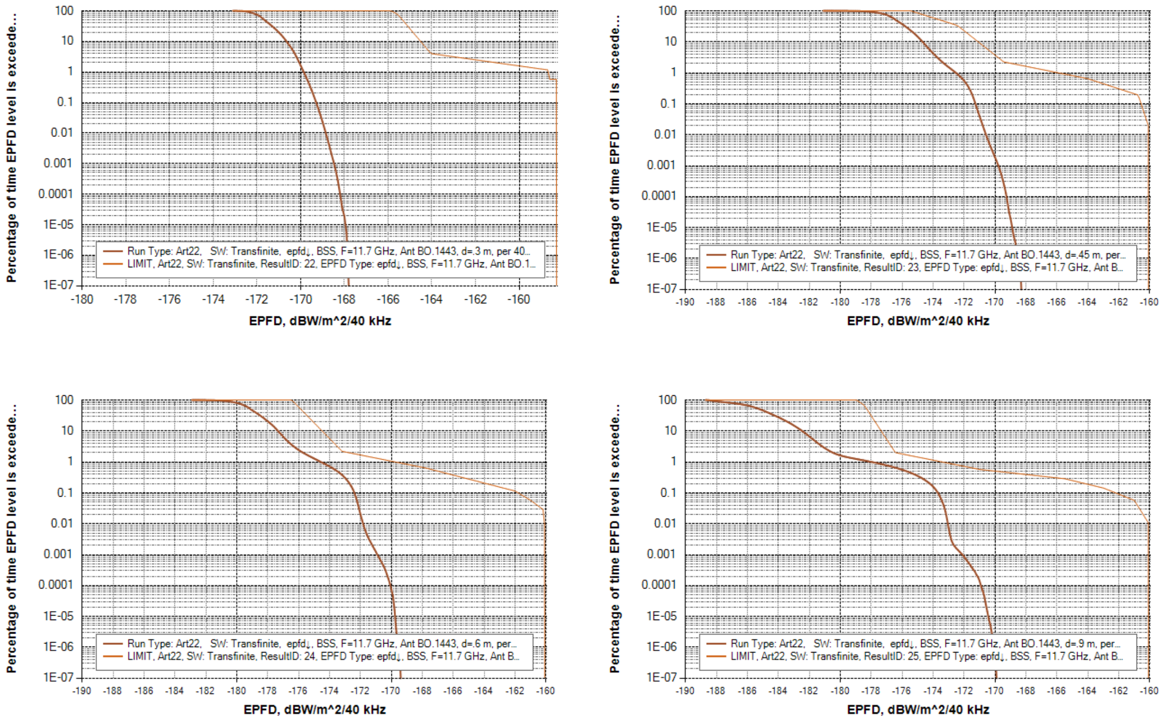

Figure 22. Ku (11.7 GHz) EPFD simulation — BSS User downlink, 0.3, 0.45, 0.6, 0.9-meter victims.

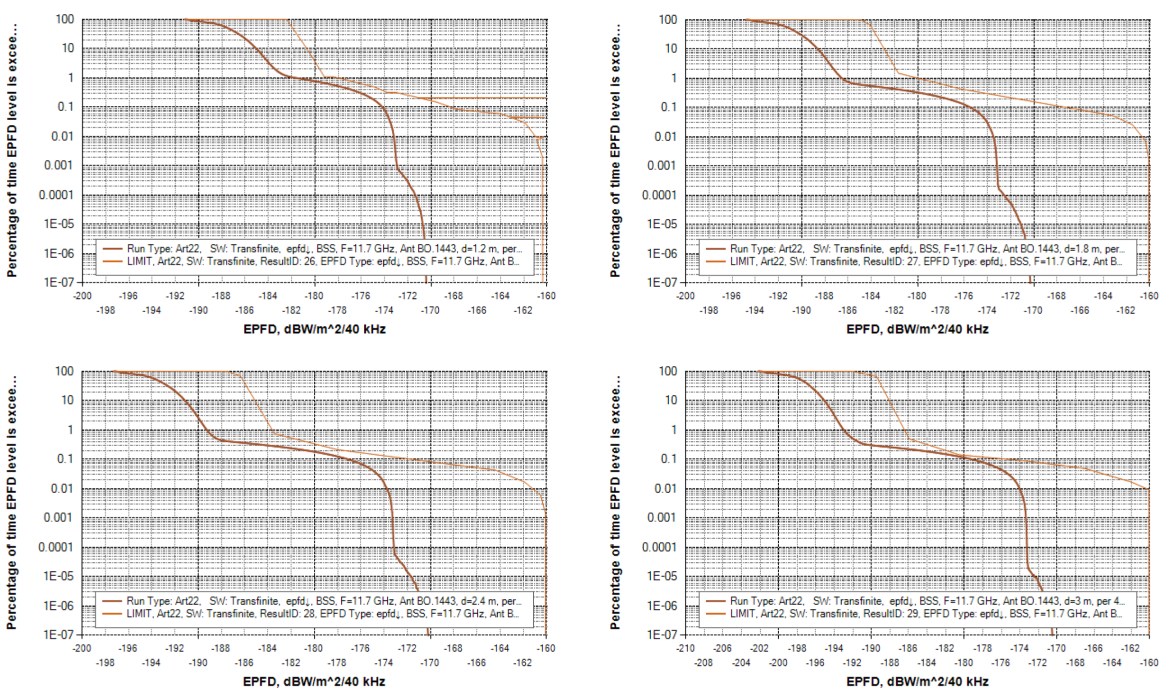

Figure 23. Ku (11.7 GHz) EPFD simulation — BSS User downlink, 1.2, 1.8, 2.4, 3.0-meter victims.

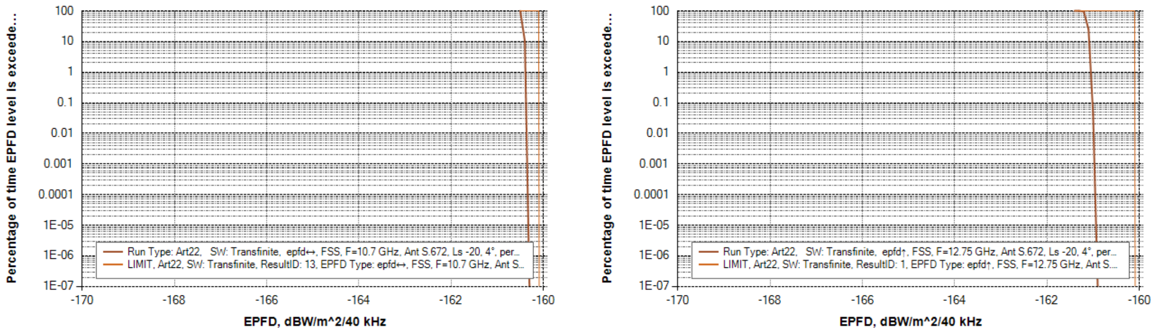

Figure 24. Ku (10.7 and 12.75 GHz) EPFD simulation — FSS Intersatellite and User uplink.

2. Ka Band Simulations

The Ka lower and upper band downlink and uplink simulation results are shown below:

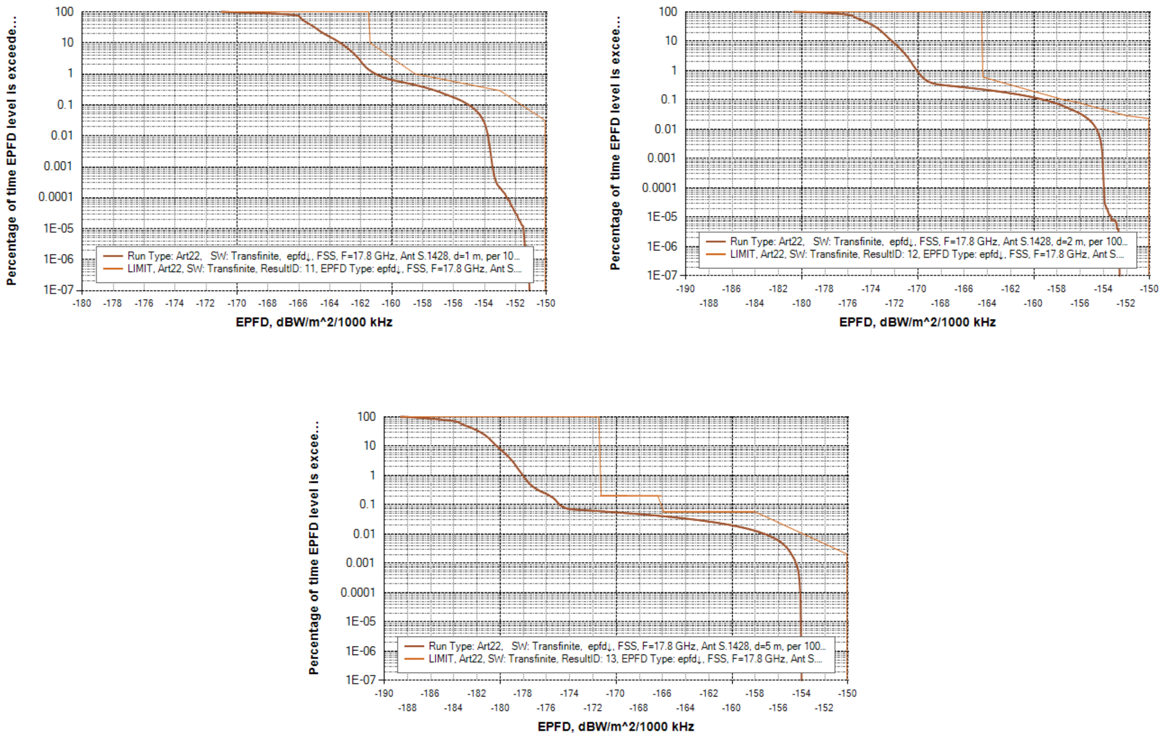

Figure 25. Ka (17.8 GHz) EPFD simulation — FSS User downlink, 1, 2, 5-meter victims.

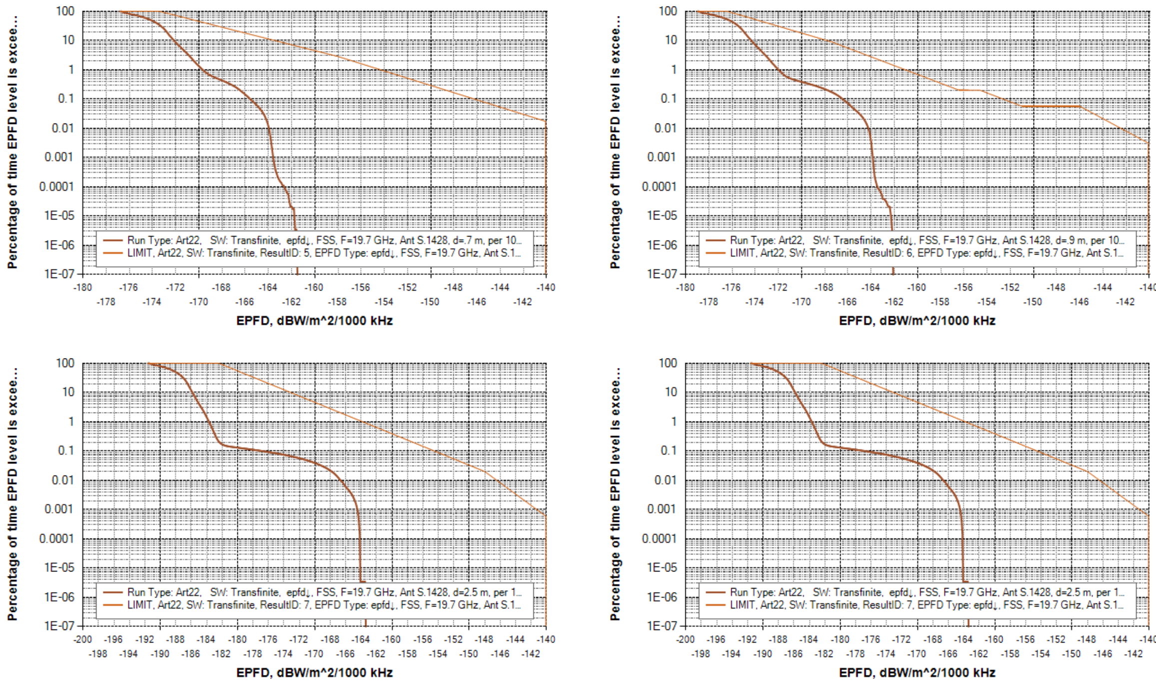

Figure 26. Ka (19.7 GHz) EPFD simulation — FSS User downlink, 0.7, 0.9, 2.5, 5-meter victims.

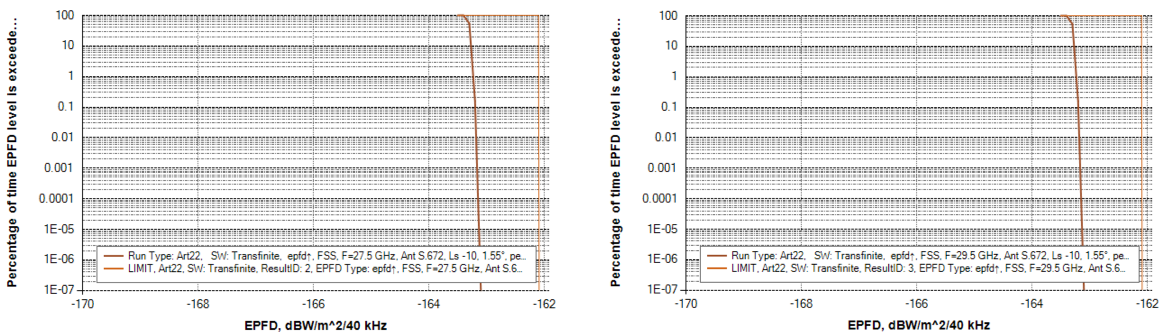

Figure 27. Ka (27.5 and 29.5 GHz) EPFD simulation — FSS User uplink.

B. Interference with Respect to Other NGSO Satellite Systems

Astra will undertake good faith coordination with other NGSO networks and will exchange the technical parameters necessary to avoid harmful interference and maximize spectral efficiency.[1]

[1] *See* 47 C.F.R. § 25.261.

V-band. Astra commits to operating consistent with applicable Commission rules including the long-term throughput-degradation and short-term unavailability thresholds specified in §25.261 and to coordinate in good faith. The Astra design includes significant multiplicative coverage, utilizes narrow beams, and incorporates the ability to predict and avoid inline interference events when necessary. Astra anticipates this will enable NGSO-NGSO sharing in these bands sufficiently to meet protection criteria.

Ka- and Ku-bands. In the conventional Ka/Ku bands, NGSO FSS is secondary to GSO,[2] and several bands carry prior-round NGSO incumbents (SpaceX/Starlink, OneWeb/Eutelsat, Amazon Leo/Kuiper, Telesat Lightspeed, O3b/SES) to which Astra is secondary. Astra will protect or coordinate with these systems pursuant to Section 25.261 of the Commission's rules.[3]

C. Interference with Respect to Terrestrial Networks

Certain of Astra's earth-station bands are shared with terrestrial services, so Astra's earth-station deployment is designed for compatibility. Astra is not at this time applying for individually licensed earth stations; it commits to satisfying the applicable earth-station coordination and siting obligations when it seeks those licenses.

V-band (37.5-40.0, 47.2-48.2, 50.4-51.4 GHz). These bands are shared with the Upper Microwave Flexible Use Service ("UMFUS") and other terrestrial operations. Astra has designed its gateway network with geographic site selection, protection zones, and UMFUS coordination in mind, consistent with Sections 25.136(c)(1), (d), (e) and 25.202 of the Commission's rules.[4]

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[2] *See* 47 C.F.R. § 25.289.

[3] *See* 47 C.F.R. § 25.261.

[4] *See* 47 C.F.R. § 25.136(c)(1), (d), (e) and 25.202.

Individual gateway and TT&C earth stations, when licensed, will meet the applicable PFD/aggregate-interference criteria and siting limits for the FSS earth stations in these bands.

Ka-band earth-station coordination. For the Ka uplink earth-station bands, Astra will provide earth-station coordination information and design gateway siting with protection zones and terrestrial (UMFUS / fixed-service) coordination in mind.[5] Gateway earth stations will be engineered to meet or exceed minimum elevation requirements. For the net-new 24.75-25.75 GHz gateway uplink, Astra will coordinate to address GSO and terrestrial compatibility.

Fixed-service and adjacent-band compatibility. Astra will observe the applicable out-of-band and spurious-emission limits and coordinate as required to protect terrestrial fixed and mobile services in and adjacent to its bands.[6]

VI. INTERFERENCE WITH RESPECT TO THE RADIO ASTRONOMY SERVICE

Astra has designed its emissions and coordination approach to protect the Radio Astronomy Service ("RAS"). Two RAS allocations lie in or immediately adjacent to Astra's V-band operations, and Astra applies out-of-band/spurious control and geographic coordination accordingly.

A. RAS bands in proximity to Astra's operations

42.5-43.5 GHz (RAS). This band is allocated to radio astronomy. Astra's highest downlink emission is 42.0 GHz, 500 MHz below the 42.5-43.5 GHz RAS allocation — meaning that a 500 MHz guard band separates Astra's V-band space-to-Earth operations from the RAS band. The ITU Radio Regulations urge administrations to afford this band protection (*see* RR No. 5.149).

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[5] *See* 47 C.F.R. § 25.136.

[6] *See* 47 C.F.R. § 25.202(f).

48.94-49.04 GHz (RAS). This narrow RAS allocation falls within Astra's V-band Earth-to-space (uplink) range (47.2-50.2 GHz). Earth-to-space emissions are ground-originated and localized, so the primary protection mechanism is geographic coordination around radio-astronomy sites rather than a space-station PFD limit.

B. Protection approach

Out-of-band and spurious emissions. Astra's space stations comply with the applicable out-of-band and spurious-emission limits, which constrain unwanted V-band downlink energy falling into the adjacent 42.5-43.5 GHz RAS band.[7] The regenerative payload and per-beam power control allow Astra to hold emissions within these limits at the band edge.

Geographic coordination. For earth stations (gateways and, where applicable, user terminals) operating near radio-astronomy observatories, Astra will observe the applicable site-based coordination and quiet-zone procedures—including coordination around the U.S. National Radio Quiet Zone and other protected observatory sites—when it seeks earth-station licenses.

Operational cooperation. Astra is aware of the impact of satellite constellations on optical and radio astronomy and will work with the scientific community to mitigate that impact, consistent with the operational commitments in the System Description.

VII. COORDINATION WITH U.S. GOVERNMENT NETWORKS

Several of Astra's requested bands are shared with, or adjacent to, U.S. Government (federal) allocations. Where federal coordination applies, it is conducted between the Commission and the National Telecommunications and Information Administration ("NTIA") through the

[7] *See* 47 C.F.R. § 25.202(f).

Interdepartment Radio Advisory Committee ("IRAC") process. Astra will support that coordination and will comply with any conditions the Commission adopts as a result.

A. Shared and adjacent federal allocations in Astra's plan

The bands below carry federal allocations or protected federal/scientific uses that bear on Astra's operations. This is a framework identification; the authoritative allocation status is confirmed against the U.S. Table of Frequency Allocations at filing.

Ka-band 17.8-20.2 GHz (space-to-Earth). Portions are shared with the federal Fixed and Fixed-Satellite (space-to-Earth) services; Astra's downlink PFD masks and earth-station siting are designed for compatibility.

18.6-18.8 GHz (EESS-passive). Astra adopted this net-new downlink band subject to the Earth Exploration-Satellite Service (passive) PFD limit, which protects federal/scientific passive sensors; a single-entry PFD showing suffices. Astra commits to the applicable passive-band PFD limit.

Ka-band 27.5-30.0 GHz (Earth-to-space). Portions are adjacent to or shared with federal services and Astra will coordinate as required to address earth-station compatibility.

V-band 37.5-38.0 and 47.2-50.2 GHz. These spans are adjacent to or shared with federal Fixed/Mobile and space-science uses; Astra observes the applicable PFD and out-of-band limits and will coordinate as required.

B. Coordination posture

Astra will (i) support Commission-NTIA coordination for any band or earth-station siting that triggers federal coordination; (ii) comply with the applicable PFD, EPFD, and out-of-band/spurious limits that protect federal operations; and (iii) enter into and abide by any operator-level coordination arrangements the process produces.

VIII. ITU FILINGS FOR ASTRA

Astra has not yet submitted system information for ITU publication and will submit this information at the appropriate time and will accept all consequent ITU cost-recovery responsibility for the filing.

IX. ORBITAL DEBRIS MITIGATION PLAN

A. Astra Constellation Orbital Debris Mitigation

The Astra Constellation is being designed to prioritize space safety. Astra plans to work with U.S. government space-tracking organizations as well as multiple commercial Space Situational Awareness providers, to jointly conduct analyses and studies to determine safety levels, elements of constellation design, and maneuver plans and to monitor and mitigate collision risk, including with all tracked spacecraft and crewed platforms. Astra's system design and operational concept are expected to result in a low risk of collision and debris generation and will incorporate appropriate measures to support safe space operations. The following sections provide an overview of how the design of and operational strategies for the Astra Constellation will mitigate orbital debris risks, as required by Section 25.114(d)(14) of the Commission's rules.[8] Because certain technical aspects of the Astra Constellation remain under development, Astra is continuing to refine the full details of its orbital debris mitigation program and will supplement the record with a complete orbital debris mitigation plan once the outstanding technical details are resolved. Astra will not commence operations until it has provided the Commission with the final plan.

[8] 47 C.F.R. § 25.114(d)(14).

1. Debris Release

Astra is designing the Astra Constellation and associated deployment and operational processes to avoid debris release during normal deployment. The operations and will assess and incorporate appropriate design and operational measures to limit the risk that any Astra satellite becomes a source of debris, including from impacts with small debris or meteoroids.

2. Accidental Explosion

Astra will design and operate its satellites to limit the risk of accidental explosions during and after mission operations, including by evaluating propulsion, power, and energy-storage systems for potential failure modes and by implementing appropriate passivation and decommissioning procedures at end of mission.

3. Collision Risks with Large Debris and Other Space Stations

Astra will assess and limit the probability that Astra satellites become a source of debris through collision with large debris or other space stations, including through conjunction assessment, coordination with U.S. government and commercial space situational awareness resources, and appropriate collision-avoidance procedures throughout operations and disposal.

B. Astra Constellation Post-Mission Disposal

Astra will design and operate the Astra Constellation to comply with the Commission’s post-mission disposal requirements, including by implementing procedures for end-of-life decommissioning, passivation, and timely disposal of satellites following completion of mission operations. Because the constellation remains in preliminary design, additional information on this topic will be provided once available.

ENGINEERING CERTIFICATION

I hereby certify that I am the technically qualified person responsible for preparation of the engineering information contained in this application, that I am familiar with Part 25 of the Commission's rules, that I have either prepared or reviewed the engineering information submitted in this application, and that it is complete and accurate to the best of my knowledge and belief.

/s/ Adam London

Adam London
Chief Technology Officer