

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554**

In the Matter of)
)
Amendment of Parts 2 and 25 of the Commission's Rules to) RM-_____
Enable Primary Fixed-Satellite Service (Space-to-Earth))
Operations in the 17.3-17.7 GHz Band)

PETITION FOR RULEMAKING OF SES AMERICOM, INC.

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SES Americom, Inc. (“SES”), by its attorneys and pursuant to Section 1.401 of the Commission’s rules, 47 C.F.R. § 1.401, hereby requests that the Commission promptly initiate a rulemaking to amend Parts 2 and 25 of the rules to authorize fixed-satellite service (“FSS”) operations in the space-to-Earth direction using the 17.3-17.7 GHz frequencies (“17 GHz band”) on a protected basis. Adoption of the rule changes proposed herein will serve the public interest by facilitating more efficient, intensive, and flexible use of spectrum by FSS networks that are fully compatible with existing operations in the 17 GHz band.

I. INTRODUCTION AND SUMMARY

SES and its affiliates serve the United States using geostationary orbit (“GSO”) and non-geostationary orbit satellites and associated earth stations that provide communications capacity for broadcast and cable video distribution, broadband to aircraft in flight and ships at sea, VSAT networks, service to remote areas, and support for military and civilian government agencies. One such affiliate, SES-17 S.à r.l., is developing a next generation Ka-band high-throughput satellite (“HTS”), SES-17, which will serve the aeronautical, maritime and high-speed data markets in North, Central and South America. SES-17 S.à r.l. has requested U.S. market access

for the Luxembourg-licensed SES-17 spacecraft, which will operate at 67.1° W.L.¹ The anticipated launch date for SES-17 is the first quarter of 2021.

As discussed in the SES-17 Petition, SES-17 will have 16 gateway beams, two of which are currently planned to be served by gateway facilities located in the United States – specifically in Laredo, Texas and Brewster, Washington. SES is preparing to file for earth station authority for these gateway facilities. Additional U.S. locations may be added if more gateway capacity is required.

The SES-17 satellite design includes the use of the 17 GHz band for downlink communications with U.S. gateway earth stations. This spectrum is currently allocated on a co-primary basis to FSS in the Earth-to-space direction and to the broadcasting-satellite service (“BSS”) (by definition, in the space-to-Earth direction), but there is no allocation for FSS downlinks. As a result, under the existing rules any earth station authority granted to SES for U.S. gateway operations with SES-17 in the 17 GHz band would be on an unprotected basis. Such status would place at risk the significant investment required for SES-17 gateway facilities in the U.S.

SES requests modification of the Commission’s rules to accord protected, co-primary status to FSS downlink signals in the 17 GHz band. The rule revisions would not adversely affect existing users of the 17 GHz frequencies. To the contrary, FSS downlinks in the 17 GHz band will be fully compatible with both satellite services authorized in the spectrum: feeder links for direct broadcast satellite (“DBS”) networks and “Reverse Band” use for the downlink portion of 17/24 GHz BSS operations.²

¹ See *SES-17 S.à r.l.*, File No. SAT-PPL-20190305-00014 (the “SES-17 Petition”).

² *Establishment of Policies and Service Rules for the Broadcasting-Satellite Service at the 17.3-17.7 GHz Frequency Band and at the 17.7-17.8 GHz Frequency Band Internationally, and at the*

Moreover, adoption of the requested changes is consistent with Commission policies that favor enhanced flexibility in the use of scarce spectrum resources. By extending to FSS downlinks a regulatory framework similar to what applies today for the downlink portion of 17/24 GHz BSS, the Commission can take advantage of the work it performed in the Reverse Band proceeding to permit even more intensive use of the 17 GHz band. This approach will help the Commission fulfill its statutory obligation to make available to all the people of the United States “a rapid, efficient, Nation-wide, and world-wide wire and radio communication service with adequate facilities at reasonable charges.”³

II. ADDITIONAL FSS SPECTRUM IS NEEDED TO SUPPORT KA-BAND HTS OPERATIONS

In a speech last year at the Satellite Industry Association’s leadership dinner, Chairman Pai recognized the enormous potential of high-throughput satellites, which “use spot-beam technology and frequency re-use to dramatically increase capacity.”⁴ Such advances in the bandwidth available to users cannot be achieved, however, without access to sufficient gateway spectrum to support multiple spot beams.

SES-17 is a case in point. The SES-17 satellite will have a total Ka-band capacity of 73 GHz, with 55 GHz of bandwidth in the forward link direction and 18 GHz of bandwidth in the return link direction. The satellite is designed with 152 user spot beams, as well as larger

24.75-25.25 GHz Frequency Band for Fixed Satellite Services Providing Feeder Links to the Broadcasting-Satellite Service and for the Satellite Services Operating Bi-directionally in the 17.3-17.8 GHz Frequency Band, IB Dkt No. 06-123 (“Reverse Band Proceeding”), Second Report and Order, 26 FCC Rcd 8927 (2011) (“Second Reverse Band Order”), Third Report and Order 32 FCC Rcd 3705 (2017) (“Third Reverse Band Order”).

³ 47 U.S. Code § 151.

⁴ Remarks of FCC Chairman Ajit Pai at the Satellite Industry Association’s 21st Annual Leadership Dinner, March 12, 2018.

Atlantic beams and ten field-of-view beams for broadcast and lighter traffic routes, and 16 gateway beams. Given the roughly ten-to-one ratio between spot beams and gateway beams, maximizing the available gateway spectrum is critical. In the space-to-Earth direction, the satellite design uses all the Ka-band spectrum allocated for FSS. Given the extensive forward link spectrum requirements, the satellite's design prioritizes use of available Ka-band FSS spectrum (particularly spectrum ideal for ubiquitous user terminal operation) for the forward links in a given geographic area, resulting in the need to expand into additional frequencies for gateway operations. Supplementing this capacity with 17 GHz frequencies for communications with U.S. gateway facilities will enable enhanced spacecraft performance.

The rule changes SES seeks will benefit other operators seeking to deploy Ka-band HTS assets as well. As a result, U.S. consumers will enjoy greater access to innovative satellite services both at home and during their travels by air and sea.

III. FSS DOWNLINKS ARE COMPATIBLE WITH OTHER USES OF THE 17 GHz BAND

Allowing use of the 17 GHz band for FSS downlinks will help meet this spectrum demand without adversely affecting other services in the band. As discussed above, two satellite services have co-primary status in the 17 GHz band under the U.S. Table of Frequency Allocations. The FSS allocation in the Earth-to-space direction is limited to use for BSS feeder links and supports U.S. DBS operations. The allocation for BSS in the downlink direction was added more recently in the Reverse Band proceeding, and the Commission established a framework to implement the BSS allocation in a manner that preserves continued, protected operations for DBS systems. Downlinks for FSS networks in the 17 GHz band fit seamlessly within this framework, enabling expanded use of the spectrum while preserving ongoing, protected use for existing satellite operations.

The Reverse Band proceeding addresses two potential interference scenarios raised by permitting downlink operations in the spectrum used to transmit programming to DBS satellites. Space path interference would occur if a BSS satellite transmitting in the 17 GHz band disrupts reception of DBS feeder links at the receive antenna onboard the DBS satellite.⁵ Ground path interference would result if transmissions from a DBS feeder link earth station impair reception of the 17 GHz downlink signal at consumer terminals in the vicinity of the feeder link facility.⁶

The Commission implemented measures designed to address both these types of potential interference. To prevent space path interference, the Commission imposed a minimum orbital separation distance of 0.2 degrees between a BSS satellite transmitting in the 17 GHz band and the nearest DBS satellite⁷ and adopted an off-axis power flux density (“pfd”) limit measured at the receiving DBS space station that cannot be exceeded unless the DBS operator agrees.⁸ The Commission specified how the pfd levels were to be calculated and presented by applicants for satellites proposing to transmit in the 17 GHz band.⁹ The Commission also imposed inclination and eccentricity limits for both 17 GHz space stations and DBS space stations seeking protection from space path interference.¹⁰

To avoid ground path interference concerns, the Commission developed rules establishing a first-in-time prioritization of earth station operations. All existing DBS feeder link facilities were grandfathered, allowing continuing use of the sites – as well as modest changes at

⁵ Second Reverse Band Order, 26 FCC Rcd at 8930-8936.

⁶ Third Reverse Band Order, 32 FCC Rcd at 3705-06.

⁷ 47 C.F.R. § 25.264(g).

⁸ 47 C.F.R. § 25.264(b).

⁹ 47 C.F.R. § 25.264(a), (c), and (d).

¹⁰ 47 C.F.R. § 25.264(h) and (i).

those locations – without the need to accommodate future 17 GHz band receive terminals.¹¹ For new proposed DBS feeder link antennas, the Commission adopted coordination procedures to ensure that transmissions from the new sites would not interfere with nearby 17 GHz receivers.¹²

No modification of these procedures is required to enable FSS downlinks in the 17 GHz band. Transmissions from FSS space stations in the 17 GHz band to U.S. gateway-type earth stations are no more interfering to DBS space stations than are transmissions by 17/24 GHz BSS satellites. The lower EIRP needed for transmissions to larger gateway earth stations facilitates compliance with the space path pfd levels in Section 25.264 of the Commission's rules. Moreover, the rules adopted in the Reverse Band proceeding require the submission of information sufficient to demonstrate that received pfd levels at the DBS satellite do not exceed the limit established for protection of DBS operations. As a result, application of the space path interference framework developed for 17/24 GHz BSS will ensure that DBS satellites do not receive unacceptable interference from 17 GHz FSS space station transmissions.

Similarly, deployment of 17 GHz BSS downlink earth stations on a protected basis will not require alteration of existing DBS feeder link operations or significantly constrain the placement of any additional future DBS feeder link facilities. Under the Commission's rules addressing ground path interference, all existing DBS feeder link sites are grandfathered and permitted to make modest changes. As a result, SES or other entities seeking to establish protected 17 GHz FSS earth stations would select locations well away from current DBS feeder link facilities. Furthermore, gateway-type FSS earth stations receiving in the 17 GHz band would be fewer in number and more resistant to interference than the widely-dispersed consumer

¹¹ Third Reverse Band Order, 32 FCC Rcd at 3707-09.

¹² *Id.* at 3709-13.

receive terminals already permitted for deployment in the 17 GHz band under the BSS allocation.

Thus, the use of the 17 GHz band for FSS downlinks readily fits within the regulatory structure the Commission put into place for 17/24 GHz BSS networks. Including FSS downlinks within that framework will permit expanded use of the frequencies without burdening existing satellite operations in the spectrum.

As discussed below, SES proposes that the Commission apply its existing FSS policy framework, including compatibility requirements for operation in a two-degree spacing environment, as between adjacent satellites using the 17 GHz band for FSS. In contrast, in cases where a 17 GHz FSS space station is adjacent to a 17/24 GHz BSS satellite, the four-degree spacing regime applicable to 17/24 GHz BSS would apply to ensure that BSS operations are adequately protected.

IV. COMMISSION PRECEDENT SUPPORTS FLEXIBLE SPECTRUM USE

Revising Part 25 to permit 17 GHz FSS downlinks on a co-primary basis conforms to Commission policies and international precedent emphasizing the value of allowing flexible spectrum use when such flexibility does not adversely affect existing users.

For example, the Commission has expressly permitted operators to provide FSS in DBS frequencies. In a 2002 decision, the Commission affirmed and broadened operators' flexibility to use the DBS spectrum for a full range of services, finding that:

allowing non-conforming satellite use of DBS spectrum is consistent with the Commission's spectrum management policies, which favor greater options and choices for consumers. We

conclude that the relaxation of use restrictions will encourage development of new telecommunications products and services.¹³

The Commission determined that granting such operating flexibility did not raise interference concerns and accordingly decided not to “adopt different interference criteria for non-conforming uses of DBS spectrum.”¹⁴

The Commission emphasized that its action allowing flexible use of DBS spectrum complied with international spectrum regulation, citing footnote 5.492 to the international allocations table.¹⁵ That footnote expressly allows FSS use of Ku-band BSS frequencies:

Assignments to stations of the broadcasting-satellite service which are in conformity with the appropriate regional Plan or included in the Regions 1 and 3 List in Appendix 30 may also be used for transmissions in the fixed-satellite service (space-to-Earth), provided that such transmissions do not cause more interference, or require more protection from interference, than the broadcasting-satellite service transmissions operating in conformity with the Plan or the List, as appropriate.¹⁶

Making the 17 GHz band available for FSS downlinks is also consistent with Commission actions regarding the uplink spectrum used for 17/24 GHz BSS. In its Spectrum Frontiers proceeding, the Commission responded to requests by SES and other satellite industry interests for revision of the rules governing the 24.75-25.25 GHz frequencies.¹⁷ The Commission noted that:

¹³ *Policies and Rules for the Direct Broadcast Satellite Service*, Report and Order, 17 FCC Rcd 11331, 11401 (2002).

¹⁴ *Id.* at 11402.

¹⁵ *Id.* at 11401 & n.509.

¹⁶ 47 C.F.R. § 2.106, footnote 5.492.

¹⁷ *See Use of Spectrum Bands Above 24 GHz For Mobile Radio Services*, Second Report and Order, Second Further Notice of Proposed Rulemaking, Order on Reconsideration, and Memorandum Opinion and Order, 32 FCC Rcd 10988, 11017-20 (2017).

Given the very light use of the 24.75-25.25 GHz band for BSS feeder links, the earth station two-degree spacing rules that would protect BSS feeder links from other FSS earth stations in the band, and the power limits placed on BSS feeder link earth stations, it does not appear necessary to give BSS feeder link earth station transmissions priority over other uses of the FSS for earth stations located within the United States, or to preclude other FSS stations from claiming protection from feeder link earth station transmissions located within the United States.¹⁸

Accordingly, the Commission proposed rule changes to “accommodate more diverse FSS operations in the band and to further increase flexibility for all FSS uses.”¹⁹

The Commission subsequently adopted its proposed changes, concluding that adjusting the rules to place FSS on the same footing as BSS feeder links was consistent with the Commission’s goals: “increasing flexibility of use and spectrum efficiency.”²⁰ The Commission implemented rule changes to “ensure that all FSS transmissions in the 24.75-25.25 GHz band, including BSS feeder link transmissions, are subject to our two-degree spacing requirements.”²¹ The Commission stated that it would retain four-degree spacing for BSS operations in the 17/24 GHz frequencies,²² but it eliminated the restrictions that had previously been in place with respect to the orbital locations at which 17/24 GHz BSS spacecraft could be positioned to “give 17/24 GHz BSS feeder link operators the same flexibility as other FSS operators in the band.”²³

¹⁸ *Id.* at 11019 (footnotes omitted).

¹⁹ *Id.*

²⁰ *Use of Spectrum Bands Above 24 GHz For Mobile Radio Services*, Third Report and Order, Memorandum Opinion and Order, and Third Further Notice of Proposed Rulemaking, 33 FCC Rcd 5576, 5586 (2018).

²¹ *Id.*

²² *Id.*

²³ *Id.* at 5585-86.

Modifying Commission rules to permit protected FSS downlinks in the 17 GHz band will achieve the same objectives, promoting more robust use of spectrum and providing flexibility for satellite networks to respond to customer demand. Moreover, as in the 24.75-25.25 GHz band, these changes will not impair existing authorized use of the spectrum.

V. THE COMMISSION SHOULD REVISE THE U.S. TABLE OF ALLOCATIONS AND PART 25 RULES TO MAKE 17 GHz FSS DOWNLINKS CO-PRIMARY

Given the inherent compatibility between 17 GHz FSS downlinks and other satellite uses of the band and the strong public policy interest in facilitating robust use of spectrum, the Commission should revise its regulatory structure to accommodate co-primary FSS operations. A comprehensive set of proposed changes to the U.S. Table of Allocations and Part 25 rules is presented in the attached annex. The changes would explicitly allow co-primary FSS use of the 17 GHz band by modifying footnote NG163 to the U.S. table of allocations with the addition of language similar to international footnote 5.492.

The Part 25 changes would treat 17 GHz FSS downlinks as primary provided that they comply with the standards set forth in the regulatory regime established for 17/24 GHz BSS, including, for example, the pfd limits under Sections 25.114(d)(15) and 25.208(w), the specifications regarding operation at or near incumbent 17/24 GHz BSS space stations in Section 25.262, the interference showing and satellite compatibility requirements in Section 25.140, and the information and coordination obligations relevant to reverse-band sharing in Section 25.264. As discussed above, 17 GHz FSS downlink operations can readily conform to these existing requirements. Except as needed to protect BSS networks, the FSS downlink operations would be subject to standard rules for FSS, including requirements for compatibility with adjacent FSS spacecraft in a two-degree spacing environment.

The absence of an international allocation for FSS downlinks in the 17.3-17.7 GHz frequencies is not an obstacle to the rule revisions requested herein, as their effect would be limited to space stations serving the U.S. and earth stations located in the U.S. Further, the operations would be under the umbrella of the existing, international and domestic BSS allocation, a technically similar satellite service in the same direction of transmission. The Commission has previously acted to authorize domestic operations not expressly sanctioned internationally. For example, when it adopted rules to authorize Vehicle-Mounted Earth Stations (“VMES”) as an FSS application, the Commission observed that there was no international recognition of VMES as an FSS service in the relevant frequency band.²⁴ The Commission went on to note, however, that it was acting to permit VMES licensing and operations only within the U.S.:

The new Part 2 allocation status and Part 25 technical and licensing rules for VMES do not authorize operations outside of the United States. We find that the rules we adopt today will ensure that VMES systems licensed by the Commission and operating under these rules within the United States will cause no more interference than other types of FSS earth stations. Based on our review of the record, we conclude that the lack of international recognition for VMES as an FSS application is not a critical factor in allocating VMES as an FSS application solely within the United States.²⁵

The same rationale applies here. SES is seeking allocation and rule changes that would allow primary 17 GHz FSS downlink operations only in the U.S., and such operations will not

²⁴ *Amendment of Parts 2 and 25 of the Commission’s Rules to Allocate Spectrum and Adopt Service Rules and Procedures to Govern the Use of Vehicle-Mounted Earth Stations in Certain Frequency Bands Allocated to the Fixed-Satellite Service*, Report and Order, 24 FCC Rcd 10414, 10424 (2009).

²⁵ *Id.* at 10425.

create any interference issues. Under these circumstances, the Commission has discretion to act notwithstanding the lack of an international FSS downlink allocation in this band.

VI. CONCLUSION

For the foregoing reasons, SES respectfully requests that the Commission expeditiously begin a rulemaking proceeding to amend the U.S. Table of Frequency Allocations and Part 25 of the rules to authorize primary use of the 17 GHz band for FSS downlinks.

Respectfully submitted,

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Rule Appendix

§ 2.106 Table of Frequency Allocations.

US402 In the band 17.3-17.7 GHz, existing Federal satellites and associated earth stations in the fixed-satellite service (Earth-to-space) are authorized to operate on a primary basis in the frequency bands and areas listed below. Receiving earth stations in the broadcasting-satellite service and the non-Federal fixed-satellite service within the bands and areas listed below shall not claim protection from Federal earth stations in the fixed-satellite service.

(a) 17.600-17.700 GHz for stations within a 120 km radius of 38°49' N latitude and 76°52' W longitude.

(b) 17.375-17.475 GHz for stations within a 160 km radius of 39°42' N latitude and 104°45' W longitude

NG163 The use of the band 17.3-17.7 GHz by the broadcasting-satellite service is limited to geostationary satellites. Space stations in this band may transmit in the fixed-satellite service (space-to-Earth) on a primary basis, provided that such transmissions do not cause more interference, or require more protection from interference, than broadcasting-satellite service transmissions operating in accordance with the Commission's rules.

§ 25.103 Definitions.

Two-degree-compliant space station. A GSO FSS space station operating in the conventional or extended C-bands, the conventional or extended Ku-bands, the 17.3-17.8 GHz band, the 24.75-25.25 GHz band, or the conventional Ka-band within the limits on downlink EIRP density or PFD specified in §25.140(a)(3) and communicating only with earth stations operating in conformance with routine uplink parameters specified in §25.138(a), §25.211(d), §25.212(c), (d), or (f), §25.218, §25.221(a)(1) or (a)(3), or §25.222(a)(1) or (a)(3), §25.226(a)(1) or (a)(3), or §25.227(a)(1) or (a)(3).

§ 25.114 Applications for space station authorizations.

(d) The following information in narrative form shall be contained in each application:

(7) Applicants for authorizations for space stations in the Fixed-Satellite Service, including applicants proposing feeder links for space stations operating in the 17/24 GHz Broadcasting-Satellite Service, must also include the information specified in §25.140(a). Applicants for authorizations for space stations transmitting in the 17.3-17.8 GHz band must also include the information specified in §25.140(b);

(15) Each applicant for a space station license in the 17.3-17.8/24 GHz band ~~broadcasting-satellite service~~ shall include the following information as an attachment to its application:

(ii) In cases where the proposed space station will not comply with the power flux density limits set forth in §25.208(w) of this part, the applicant will be required to provide a

certification that all potentially affected parties acknowledge and do not object to the use of the applicant's higher power flux densities. The affected parties with whom the applicant must coordinate are those GSO ~~17/24 GHz BSS~~ satellite networks operating in the 17.3-17.7 GHz band located up to $\pm 6^\circ$ away, ~~for excesses greater than of up to~~ 3 dB above the power flux-density levels specified in §25.208(w) of this part must also be coordinated with 17/24 GHz BSS satellite networks, and up to $\pm 10^\circ$ away ~~greater for excesses greater than 3 dB above those levels~~.

(18) For space stations in the Direct Broadcast Satellite service or transmitting in the 17.3-17.7 GHz band, ~~the 17/24 GHz broadcasting satellite service~~, maximum orbital eccentricity.

§ 25.117 Modification of station license.

(d)(2)(vi) Any ~~17/24 GHz BSS space station~~ operator of a space station transmitting in the 17.3-17.8 GHz band whose license is conditioned to operate at less than the power level otherwise permitted by §25.208(c) and/or (w) of this part, and is conditioned to accept interference from a neighboring 17/24 GHz BSS space station, may file a modification application to remove those two conditions in the event that the license for that neighboring space station is cancelled or surrendered. In the event that two or more such modification applications are filed, and those applications are mutually exclusive, the modification applications will be considered on a first-come, first-served basis pursuant to the procedure set forth in §25.158 of this part.

§ 25.140 Further requirements for license applications for GSO space station operation in the FSS and the 17/24 GHz BSS.

(a)(3) In addition to the information required by §25.114, an applicant for a GSO FSS space station, including applicants proposing feeder links for space stations operating in the 17/24 GHz BSS, must provide the following for operation other than analog video operation:

(iii) With respect to proposed operation in the conventional Ka-band or for FSS space-to-Earth operations in the 17.3-17.8 GHz band, a certification that the proposed space station will not generate power flux-density at the Earth's surface in excess of -118 dBW/m²/MHz and that associated uplink operation will not exceed applicable EIRP density envelopes in §25.138(a) unless the non-routine uplink and/or downlink operation is coordinated with operators of authorized co-frequency space stations at assigned locations within six degrees of the orbital location and except as provided in paragraph (d) of this section.

(b) Each applicant for a license to operate a space station transmitting in the 17.3-17.8 GHz band must provide the following information, in addition to that required by §25.114:

(4) An applicant for a license to operate a space station transmitting in the 17.3-17.8 GHz band to be located less than four degrees from a previously licensed or proposed BSS space station transmitting in the 17.3-17.8 GHz band, must either certify that the proposed operation has been coordinated with the operator of the co-frequency BSS space station or provide an

interference analysis of the kind described in paragraph (a) of this section, except that the applicant must demonstrate that its proposed network will not cause more interference to the adjacent space station transmitting in the 17.3-17.8 GHz band operating in compliance with the technical requirements of this part, than if the applicant were located at an orbital separation of four degrees from the previously licensed or proposed **BSS** space station.

(d) An operator of a GSO FSS space station in the conventional or extended C-bands, conventional or extended Ku-bands, **17.3-17.8 GHz band (space-to-Earth)**, 24.75-25.25 GHz band (Earth-to-space), or conventional Ka-band may notify the Commission of its non-routine transmission levels and be relieved of the obligation to coordinate such levels with later applicants and petitioners.

§ 25.203 Choice of sites and frequencies.

(m)(3) Each applicant for such new or modified feeder-link earth stations shall file with its application memoranda of coordination with each licensee authorized to construct **BSS** or FSS receive earth stations within the coordination zone.

§ 25.208 Power flux-density limits.

(w) The power flux density at the Earth's surface produced by emissions from a **17/24 GHz BSS** space station **operating transmitting** in the 17.3-17.7 GHz band for all conditions and all methods of modulation must not exceed the regional power flux density levels prescribed in paragraphs (w)(1) through (4) of this section.

(1) In the region of the contiguous United States, located south of 38° North Latitude and east of 100 West Longitude: $-115 \text{ dBW/m}^2/\text{MHz}$ for 17/24 GHz BSS operations and $-118 \text{ dBW/m}^2/\text{MHz}$ for FSS operations.

(2) In the region of the contiguous United States, located north of 38° North Latitude and east of 100° West Longitude: $-118 \text{ dBW/m}^2/\text{MHz}$.

(3) In the region of the contiguous United States, located west of 100 West Longitude: $-121 \text{ dBW/m}^2/\text{MHz}$.

(4) For all regions outside of the contiguous United States including Alaska and Hawaii: $-115 \text{ dBW/m}^2/\text{MHz}$ for 17/24 GHz BSS operations and $-118 \text{ dBW/m}^2/\text{MHz}$ for FSS operations.

§ 25.210 Technical requirements for space stations.

(i) ~~17/24 GHz BSS space~~ **Space** station antennas transmitting in the 17.3-17.8 GHz band must be designed to provide a cross-polarization isolation such that the ratio of the on axis co-polar gain to the cross-polar gain of the antenna in the assigned frequency band is at least 25 dB within its primary coverage area.

§ 25.262 Licensing and domestic coordination requirements for ~~17/24 GHz BSS~~ space stations transmitting in the 17.3-17.8 GHz band.

(a) An applicant may be authorized to operate a space station transmitting in the 17.3-17.8 GHz band at levels up to the maximum power flux density limits defined in §25.208(c) and/or §25.208(w), without coordinating its power flux density levels with adjacent licensed or permitted operators, only if there is no licensed BSS space station, or prior-filed application for a BSS space station transmitting in the 17.3-17.8 GHz band at a location less than four degrees from the orbital location at which the applicant proposes to operate and no licensed FSS space station, or prior filed application for an FSS space station, transmitting in the 17.3-17.8 GHz band at a location less than two degrees from the orbital location at which the applicant proposes to operate.

(b) Any U.S. licensee or permittee authorized to transmit in the 17.3-17.8 GHz band that does not comply with the power flux-density limits set forth in §25.208(c) and/or §25.208(w) shall bear the burden of coordinating with any future co-frequency licensees and permittees of a space station transmitting in the 17.3-17.8 GHz band as required in §25.114(d)(15)(ii), under the following circumstances:

~~—————(1) If the operator's space to Earth power flux density levels exceed the power flux-density limits set forth in §25.208(c) and/or §25.208(w) by 3 dB or less, the operator shall bear the burden of coordinating with any future operators proposing a space station transmitting in the 17.3-17.8 GHz band in compliance with power flux-density limits set forth in §25.208(c) and/or §25.208(w) and located within ± 6 degrees of the operator's 17/24 GHz BSS space station.~~

~~—————(2) If the operator's space to Earth power flux density levels exceed the power flux-density limits set forth in §25.208(c) and/or §25.208(w) by more than 3 dB, the operator shall bear the burden of coordinating with any future operators proposing a space station transmitting in the 17.3-17.8 GHz band in compliance with power flux-density limits set forth in §25.208(c) and/or §25.208(w) and located within ± 10 degrees of the operator's space station.~~

~~—————(3) If no good faith agreement can be reached, the operator of the space station transmitting in the 17.3-17.8 GHz band that does not comply with §25.208(c) and/or §25.208(w) shall reduce its space-to-Earth power flux-density levels to be compliant with those specified in §25.208(c) and/or §25.208(w).~~

§25.264 Requirements to facilitate reverse-band operation in the 17.3-17.8 GHz band ~~of 17/24 GHz BSS and DBS Service space stations.~~

(a) Each ~~17/24 GHz BSS space station~~ applicant or licensee for a space station transmitting in the 17.3-17.8 GHz band must submit a series of tables or graphs containing predicted off-axis gain data for each antenna that will transmit in the 17.3-17.8 GHz frequency band, in accordance with the following specifications. Using a Cartesian coordinate system wherein the X axis is tangent to the geostationary orbital arc with the positive direction pointing east, *i.e.*, in the direction of travel of the satellite; the Y axis is parallel to a line passing through the geographic north and south poles of the Earth, with the positive direction pointing south; and the Z axis passes through

the satellite and the center of the Earth, with the positive direction pointing toward the Earth, the applicant or licensee must provide the predicted transmitting antenna off-axis antenna gain information:

(6) The predictive gain information must be submitted to the Commission when a license application is filed for a ~~17/24 GHz BSS~~ space station transmitting in the 17.3-17.8 GHz band or within 60 days after completion of critical design review for the space station, whichever occurs later.

(b) An ~~17/24 GHz BSS space station~~ applicant or licensee for a space station transmitting in the 17.3-17.8 GHz band must submit power flux density (pfd) calculations based on the predicted gain data submitted in accordance with paragraph (a) of this section, as follows:

(2) The pfd calculations must take into account the maximum permitted longitudinal station-keeping tolerance, orbital inclination and orbital eccentricity of both the ~~17/24 GHz BSS space station transmitting in the 17.3-17.8 GHz band~~ and the DBS space stations, and must:

(ii) Indicate the extent to which the calculated pfd of the ~~17/24 GHz~~ space station's transmissions in the 17.3-17.8 GHz band exceed the threshold pfd level of $-117 \text{ dBW/m}^2/100 \text{ kHz}$ at those prior-filed U.S. DBS space station locations.

(3) If the calculated pfd exceeds the threshold level of $-117 \text{ dBW/m}^2/100 \text{ kHz}$ at the location of any prior-filed U.S. DBS space station, the applicant or licensee must also provide with the pfd calculations a certification that all affected DBS operators acknowledge and do not object to such higher off-axis pfd levels. No such certification is required in cases where there is no overlap in the frequencies assigned to the DBS space station and the space station transmitting in the 17.3-17.8 GHz band ~~17/24 GHz BSS assigned operating frequencies do not overlap.~~

(4) The information and any certification required by paragraph (b) of this section must be submitted to the Commission when a license application is filed for a ~~17/24 GHz BSS~~ space station transmitting in the 17.3-17.8 GHz band or within 60 days after completion of critical design review for the space station, whichever occurs later. ~~Otherwise, such information and certifications must be submitted to the Commission within 24 months after the grant of an operating license for a 17/24 GHz BSS space station or when the applicant or licensee certifies completion of critical design review, whichever occurs first.~~

(c) No later than 2 months prior to launch, each ~~17/24 GHz BSS space station~~ licensee of a space station transmitting in the 17.3-17.8 GHz band must update the predicted transmitting antenna off-axis gain information provided in accordance with paragraph (a) of this section by submitting measured transmitting antenna off-axis gain information over the angular ranges, measurement frequencies and polarizations specified in paragraphs (a)(1) through (5) of this section. The transmitting antenna off-axis gain information should be measured under conditions as close to flight configuration as possible.

(d) No later than 2 months prior to launch, or when applying for authority to change the location of a ~~17/24 GHz BSS~~ space station transmitting in the 17.3-17.8 GHz band that is already in orbit,

each ~~17/24 GHz BSS space station~~ licensee of a space station transmitting in the 17.3-17.8 GHz band must provide pfd calculations based on the measured off-axis gain data submitted in accordance with paragraph (c) of this section, as follows:

(1) The pfd calculations must be provided:

(ii) At the location of any subsequently filed U.S. DBS space station where the pfd level in the 17.3-17.8 GHz band calculated on the basis of measured gain data exceeds -117 dBW/m²/100 kHz. In this rule, the term subsequently filed U.S. DBS space station refers to any co-frequency Direct Broadcast Satellite service space station proposed in a license application filed with the Commission after the ~~17/24 GHz BSS~~ operator of a space station transmitting in the 17.3-17.8 GHz band submitted the predicted data required by paragraphs (a) through (b) of this section but before submission of the measured data required by this paragraph. Subsequently-filed U.S. DBS space stations may include foreign-licensed DBS space stations seeking authority to serve the United States market. The term does not include any applications (or authorizations) that have been denied, dismissed, or are otherwise no longer valid, nor does it include foreign-licensed DBS space stations that have not filed applications with the Commission for market access in the United States.

(2) The pfd calculations must take into account the maximum permitted longitudinal station-keeping tolerance, orbital inclination and orbital eccentricity of both the ~~17/24 GHz BSS space station transmitting in the 17.3-17.8 GHz band~~ and the DBS space stations, and must:

(e) If the pfd level calculated from the measured data submitted in accordance with paragraph (d) of this section is in excess of the threshold pfd level of -117 dBW/m²/100 kHz:

(1) At the location of any prior-filed U.S. DBS space station as defined in paragraph (b)(1) of this section, then the ~~17/24 GHz broadcasting-satellite~~ operator of the space station transmitting in the 17.3-17.8 GHz band must either:

(2) At the location of any subsequently-filed U.S. DBS space station as defined in paragraph (d)(1) of this section, where the pfd level submitted in accordance with paragraph (d) of this section, is also in excess of the pfd level calculated on the basis of the predicted data submitted in accordance with paragraph (a) of this section that were on file with the Commission at the time the DBS space station application was filed, then the ~~17/24 GHz broadcasting-satellite~~ operator of the space station transmitting in the 17.3-17.8 GHz band must either:

(3) No coordination or adjustment of operating parameters is required in cases where there is no overlap in the frequencies assigned to the DBS space station and the space station transmitting in the 17.3-17.8 GHz band ~~17/24 GHz BSS operating frequencies do not overlap.~~

(f) The ~~17/24 GHz BSS~~ applicant or licensee for the space station transmitting in the 17.3-17.8 GHz band must modify its license, or amend its application, as appropriate, based upon new information:

(2) If the ~~17/24 GHz BSS~~ operator of the space station transmitting in the 17.3-17.8 GHz band adjusts its operating parameters in accordance with paragraphs (e)(1)(ii) or (e)(2)(ii) or this section.

(g) Absent an explicit agreement between operators to permit more closely spaced operations, U.S. authorized ~~17/24 GHz BSS~~ space stations transmitting in the 17.3-17.8 GHz band and U.S. authorized DBS space stations with co-frequency assignments may not be licensed to operate at locations separated by less than 0.2 degrees in orbital longitude.

(h) All operational ~~17/24 GHz BSS~~ space stations transmitting in the 17.3-17.8 GHz band must be maintained in geostationary orbits that:

(i) U.S. authorized DBS networks may claim protection from space path interference arising from the reverse-band operations of U.S. authorized ~~17/24 GHz BSS networks~~ space stations transmitting in the 17.3-17.8 GHz band to the extent that the DBS space station operates within the bounds of inclination and eccentricity listed below. When the geostationary orbit of the DBS space station exceeds these bounds on inclination and eccentricity, it may not claim protection from any additional space path interference arising as a result of its inclined or eccentric operations and may only claim protection as if it were operating within the bounds listed below: