

maintain sufficient telecommand link margin in the presence of the interfering BSS signal.

- Require 17/24 GHz BSS applicants seeking to operate within [TBD] degrees of a geostationary orbital location where a space station has already been authorized to operate in the DBS service in the 17.3-17.8 GHz band (Earth-to-space) to submit a technical showing demonstrating their ability to avoid causing harmful interference to the existing DBS telecommand link.
- Require applicants proposing to co-locate DBS feeder link earth stations at sites where they are already authorized to operate earth stations receiving telemetry signals from space stations operating in the 17/24 GHz BSS service to submit a technical showing demonstrating their ability to maintain sufficient margin in their 17 GHz band telemetry links in the presence of the interfering DBS signal.
- Require applicants proposing to co-locate 17/24 GHz BSS TT&C earth stations at sites where they are already authorized to operate DBS feeder link earth stations to submit a technical showing demonstrating their ability to maintain sufficient margin in their 17 GHz band telemetry links in the presence of the interfering DBS signal.
- Require applicants for feeder-link earth station licenses that propose to transmit with e.i.r.p. spectral density levels in excess of 5.6 dBW/Hz, under clear sky conditions, to submit a showing demonstrating that their higher power levels will not cause harmful interference to nearby satellites.

Establishing service rules for the 17/24 GHz BSS bands will facilitate the delivery of a new generation of satellite services to the public, thus stimulating competition in the communications marketplace. The delivery of these services is anticipated to include standard-definition and high-definition formats and may complement existing DBS service offered by applicants. Operation in the 17/24 GHz BSS band is anticipated to provide a mix of local and national video, audio, data, and video-on-demand to residential and business subscribers in the United States.

B. Legal Basis

This *NPRM* is adopted pursuant to Sections 1, 4(i), 4(j), 7(a), 301, 303(c), 303(f), 303(g), 303(r), 303(y), and 308 of the Communications Act of 1934, as amended, 47 U.S.C. Sections 151, 154(i), 154(j), 157(a), 301, 303(c), 303(f), 303(g), 303(r), 303(y), 308.

C. Description and Estimate of the Number of Small Entities to Which the Proposals will Apply

The RFA directs agencies to provide a description of and, where feasible, an estimate of the number of small entities that may be affected by the proposed rules, if adopted.²⁴² The RFA generally defines the term "small entity" as having the same meaning as the terms "small business," "small organization," and "small governmental jurisdiction."²⁴³ In addition, the term "small business" has the same meaning as the term "small business concern" under the Small Business Act.²⁴⁴ A small business

²⁴² 5 U.S.C. § 603(b)(3).

²⁴³ *Id.* § 601(6).

²⁴⁴ 5 U.S.C. § 601(3) (incorporating by reference the definition of "small business concern" in 15 U.S.C. § 632). Pursuant to the RFA, the statutory definition of a small business applies "unless an agency, after consultation with

(continued...)

concern is one which: (1) is independently owned and operated; (2) is not dominant in its field of operation; and (3) satisfies any additional criteria established by the Small Business Administration (SBA).²⁴⁵ Below, we further describe and estimate the number of small entity licensees that may be affected by the adopted rules.

Satellite Telecommunications. The SBA has developed a small business size standard for Satellite Telecommunications, which consists of all such companies having \$13.5 million or less in annual receipts.²⁴⁶ According to Census Bureau data for 2002, there were 536 firms in the category Satellite Telecommunications, total that operated for the entire year.²⁴⁷ Of this total, 49 firms had annual receipts of \$5 million to \$9,999,999 and an additional 99 firms had annual receipts of \$10 million or more.²⁴⁸ Thus, under this size standard, the majority of firms can be considered small.

Space Stations (Geostationary). Commission records reveal that there are 44 space station licensees. We do not request nor collect annual revenue information concerning such licensees, and thus are unable to estimate the number of geostationary space stations that would constitute a small business under the SBA definition cited above, or apply any rules providing special consideration for Space Station (Geostationary) licensees that are small businesses.

Fixed Satellite Transmit/Receive Earth Stations. Currently there are approximately 1142 operational fixed-satellite transmit/receive earth stations authorized for use in the Ku-bands. The Commission does not request or collect annual revenue information, and thus is unable to estimate the number of earth stations that would constitute a small business under the SBA definition.²⁴⁹

Cellular and Other Wireless Telecommunications. The SBA has developed a small business size standard for Cellular and Other Wireless Telecommunications, which consists of all such firms having 1,500 or fewer employees.²⁵⁰ According to Census Bureau data for 2002, in this category there was a total of 8,863 firms that operated for the entire year.²⁵¹ Of this total, 401 firms had 100 or more employees, and the remainder had fewer than 100 employees.²⁵²

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the Office of Advocacy of the Small Business Administration and after the opportunity for public comment, establishes one or more definitions of such term which are appropriate to the activities of the agency and publishes such definition(s) in the Federal Register." 5 U.S.C. § 601(3).

²⁴⁵ Small Business Act, 15 U.S.C. § 632 (1996).

²⁴⁶ 13 C.F.R. § 121.201, NAICS code 517410.

²⁴⁷ U.S. Census Bureau, 2002 Economic Census, Subject Series: Information, "Receipt Size of Firms Subject to Federal Income Tax: 2002," Table 1, NAICS code 517410 (issued Nov. 2005).

²⁴⁸ *Id.*

²⁴⁹ The SBA has developed a small business size standard for Satellite Telecommunications, which consists of all such companies having \$13.5 million or less in annual receipts. 13 C.F.R. § 121.201, NAICS code 517410.

²⁵⁰ 13 C.F.R. § 121.201, NAICS code 517212.

²⁵¹ U.S. Census Bureau, 2002 Economic Census, Subject Series: Information, "Employment Size of Establishments for the United States: 2002," Table 2, NAICS code 517212 (issued Nov. 2005).

²⁵² *Id.*

D. Description of Projected Reporting, Recordkeeping, and Other Compliance Requirements

The proposed rules would, if adopted, require a Direct Broadcast Satellite (DBS) service applicant seeking to operate within [TBD] degrees of a geostationary orbital location where a space station has already been authorized to operate in the broadcasting-satellite service in the 17.3-17.8 GHz band (space-to-Earth) to submit a technical showing which demonstrates its ability to maintain sufficient telecommand link margin in the presence of the interfering Broadcasting-Satellite Service (BSS) signal. This requirement will aid in ensuring that DBS operators seeking to operate in these locations will be able to maintain their telecommand link in order to maintain control of their satellites.

Also, a 17/24 GHz BSS applicant seeking to operate within [TBD] degrees of a geostationary orbital location where a space station has already been authorized to operate in the DBS service in the 17.3-17.8 GHz band (Earth-to-space), will be required, under the proposed rules, to submit a technical showing which demonstrates its ability to maintain sufficient telecommand link margin in the presence of the interfering DBS service signal. This requirement will aid in ensuring that BSS operators seeking to operate in these locations will be able to maintain their telecommand link in order to maintain control of their satellites

The proposed rules would also require that applicants proposing to co-locate DBS feeder link earth stations at sites where they are already authorized to operate earth stations receiving telemetry signals from space stations operating in the 17/24 GHz BSS service, must submit a technical showing demonstrating their ability to maintain sufficient margin in the 17 GHz band telemetry links in the presence of an interfering DBS signal. This requirement will aid in ensuring that DBS earth station operators can monitor the health and status of their satellites in the presence of an interfering signal from the DBS feeder link.

The proposed rules would also require that applicants proposing to co-locate 17/24 GHz BSS TT&C earth stations at sites where they are already authorized to operate DBS feeder link earth stations must submit to the Commission a technical showing which demonstrates their ability to maintain sufficient margin in their 17 GHz band telemetry links in the presence of an interfering DBS signal. This requirement will aid in ensuring that the BSS TT&C earth station operators will be able to maintain their telecommand link in order to maintain control of their satellites.

Finally, the proposed rules would require that each applicant for a feeder-link earth station license that proposes to transmit with e.i.r.p. spectral density levels in excess of 5.6 dBW/Hz, under clear sky conditions, shall submit (1) link budget analyses of its proposed operations, along with a detailed written explanation of how each uplink and each transmitted satellite carrier density figure is derived, and (2) a narrative summary which indicates whether there are margin shortfalls in any of the current baseline services as a result of the addition of the applicant's higher power service. If there are such shortfalls, each applicant must submit an explanation of how the applicant intends to resolve the margin shortfalls. In addition, such applicants shall certify that all potentially affected parties acknowledge, and do not object to, the applicant's use of the higher power densities. This requirement will aid in ensuring that earth station operators proposing to operate in excess of the level described above will not cause harmful interference to adjacent co-frequency satellites.

The Commission does not expect significant costs to be associated with these proposals, if adopted. Therefore, we do not anticipate that the burden of compliance would be greater for smaller entities.

E. Steps Taken to Minimize Significant Economic Impact on Small Entities, and Significant Alternatives Considered

The RFA requires that, to the extent consistent with the objectives of applicable statutes, the analysis shall discuss significant alternatives such as: (1) the establishment of differing compliance or reporting requirements or timetables that take into account the resources available to small entities; (2) the clarification, consolidation, or simplification of compliance and reporting requirements under the rule for small entities; (3) the use of performance, rather than design, standards; and (4) an exemption from coverage of the rule, or any part thereof, for small entities.²⁵³

The proposed rules are necessary for the efficient operation of the 17/24 GHz BSS band, which is expected to introduce a new generation of broadband services to the public. We are provisionally considering rules and procedures for operation in the 17/24 GHz BSS band, including requirements for a licensing framework, service obligations, license terms, non-U.S.-licensed satellite operators, public interest obligations, equal employment opportunity requirements, geographic service requirements, tracking, telemetry and command operations, and orbital spacing requirements. We seek comment on alternatives to these provisionally considered rules and procedures that would minimize the economic impact on small entities. We also seek comment on the establishment of differing compliance or reporting requirements that take into account the resources available to small entities.

In addition, the Commission is provisionally considering the adoption of rules that would facilitate adjacent band operations, reverse band operations, and shared band operations. We believe that these proposed rules, which may require a technical showing demonstrating the licensee's ability to operate without causing interference to other satellites, are necessary for the efficient administration of bandwidth because they will ensure that operators in the 17/24 GHz BSS band and the DBS service can operate compatibly. We have considered alternatives and believe these are the most equitable solutions to the potential interference problems posed by the operation of the 17/24 GHz BSS service. For example, one alternative is to require that technical showings be made after operation has begun. We rejected this alternative because we concluded that it would not be as efficient as requiring that technical showings be made before operation. This is because, in many instances, harmful interference will invariably occur, which will lead to disruptions in service. By requiring that technical showings be made prior to operation, we anticipate that there will be far fewer instances of harmful interference. We seek comment on viable alternatives to these rules or their reporting requirements that would lessen the economic impact on small entities. We also seek comment on the establishment of differing compliance or reporting requirements that take into account the resources available to small entities.

The *NPRM* seeks comment on these proposals, including the effectiveness and utility of the proposals, and also seeks comment on how to minimize undue burdens on small business.

F. Federal Rules that May Duplicate, Overlap, or Conflict With the Proposed Rules

None.

²⁵³ 5 U.S.C. § 603(c)(1), (c)(4).

**APPENDIX B
PROPOSED RULES**

a. § 2.106 Table of Frequency Allocations.

International Table			United States Table		FCC Rule Part(s)
Region 1	Region 2	Region 3	Federal Government	Non-Federal Government	
17.3-17.7 FIXED SATELLITE (Earth-to-Space) 5.516 Radiolocation 5.514	17.3-17.7 FIXED SATELLITE (Earth-to-Space) 5.516 BROADCASTING-SATELLITE Radiolocation 5.514 5.515 5.517	17.3-17.7 FIXED SATELLITE (Earth-to-Space) 5.516 Radiolocation 5.514	17.3-17.7 Radiolocation US259 G59	17.3-17.7 FIXED-SATELLITE (Earth-to-Space) US271 BROADCASTING-SATELLITE NG163 US259	Satellite Communications (25)
17.7-18.1 FIXED FIXED-SATELLITE (Space-to-Earth) 5.484A (Earth-to-Space) 5.516 MOBILE	17.7-17.8 FIXED FIXED-SATELLITE (Space-to-Earth) (Earth-to-Space) 5.516 BROADCASTING-SATELLITE Mobile 5.515 5.517 17.8-18.1 FIXED FIXED-SATELLITE (Space-to-Earth) 5.484A (Earth-to-Space) 5.516 MOBILE	17.7-18.1 FIXED FIXED-SATELLITE (Space-to-Earth) 5.484A (Earth-to-Space) 5.516 MOBILE	17.7-17.8 17.8-18.3 FIXED-SATELLITE (Space-to-Earth) G117	17.7-17.8 FIXED FIXED-SATELLITE (Earth-to-Space) US271 NG144 17.8-18.3 FIXED	Satellite Communications (25) Auxiliary Broadcasting (74) Cable TV Relay (78) Fixed Microwave (101) Auxiliary Broadcasting (74) Cable TV Relay (78) Fixed Microwave (101)
			5.519 US334	5.519 US334 US271	

International Table			United States Table		FCC Rule Part(s)
Region 1	Region 2	Region 3	Federal Government	Non-Federal Government	
24.75-25.25 FIXED	24.75-25.25 FIXED SATELLITE (Earth-to-Space) 5.535	24.75-25.25 FIXED FIXED SATELLITE (Earth-to-Space) 5.535 Mobile 5.534	24.75-25.05 RADIONAVIGATION 25.05-25.25	24.75-25.05 FIXED-SATELLITE (Earth-to-Space) NG167 RADIONAVIGATION 25.05-25.25 24.75-25.05 FIXED-SATELLITE (Earth-to-Space) NG167 FIXED	Satellite Communications (25) Aviation (87) Satellite Communications (25) Fixed Microwave (101)

NG163 The allocation to the broadcasting-satellite service in the band 17.3–17.7 GHz shall come into effect on 1 April 2007. Use of the 17.3-17.7 GHz band by the broadcasting-satellite service is limited to geostationary satellite orbit systems.

NG167 The use of the fixed-satellite service (Earth-to-space) in the band 24.75-25.25 GHz is limited to feeder links for the broadcasting-satellite service. The allocation to the fixed-satellite service (Earth-to-space) in the band 24.75-25.25 GHz shall come into effect on 1 April 2007.

§ 25.114 Applications for space station authorizations.

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

(15) For satellite applications in the Direct Broadcast Satellite service seeking to operate within [TBD] degrees of a geostationary orbital location where a space station has already been authorized to operate in the broadcasting-satellite service in the 17.3-17.7 GHz band (space-to-Earth), a technical showing with regard to its telecommand link margin in accordance with 25.148(g).

(16) For satellite applications in the 17/24 GHz broadcasting-satellite service seeking to operate within [TBD] degrees of a geostationary orbital location where a direct broadcast satellite (DBS) space

station has already been authorized to operate that has feeder links in the in the 17.3-17.8 GHz band (Earth-to-space), a technical showing with regard to the DBS system's telecommand link margin as in accordance with 25.xxx(1).

(17) A description of the design and operational strategies that will be used to mitigate orbital debris, including the following information:

Revise § 25.121(a) to read as follows:

§ 25.121 License term and renewals.

(a) *License Term.* Except for licenses for DBS and 17/24 GHz facilities, licenses for facilities governed by this part will be issued for a period 15 years. Licenses for DBS and 17/24 GHz space stations licensed as broadcast facilities will be issued for a period of 8 years. Licenses for DBS and 17/24 GHz space stations not licensed as broadcast facilities will be issued for a period of 10 years.

§ 25.148 Licensing Provisions for the Direct Broadcast Satellite Service

(g) *Co-location with 17/24 GHz BSS space stations.* A DBS applicant seeking to operate within [TBD] degrees of a geostationary orbital location where a space station has already been authorized to operate in the broadcasting-satellite service in the 17.3-17.7 GHz band (space-to-Earth), must submit to the Commission a technical showing demonstrating its ability to maintain sufficient telecommand link margin in the presence of the interfering BSS signal.

(h) *Co-location of DBS feeder links and 17/24 GHz BSS TT&C earth stations.* Applicants proposing to co-locate their DBS feeder link earth stations at sites where they are already authorized to operate earth stations receiving telemetry signals from space stations operating in the 17/24 GHz BSS service, must submit to the Commission a technical showing demonstrating their ability to maintain sufficient margin in their 17 GHz band telemetry links in the presence of the interfering DBS feeder-link signal.

§ 25.2xx Licensing requirements for 24 GHz band feeder link earth stations transmitting to space stations in the broadcasting-satellite service

[new rule for subpart B – Applications and Licenses, Earth Stations]

(a) All applications for an FSS feeder-link earth station license in the 24.75-25.25 GHz, band shall meet the following requirements:

(1) The feeder link earth station antenna shall not transmit with e.i.r.p. spectral density levels in excess of 5.6 dBW/Hz, under clear sky conditions, except as otherwise provided by this part.

(2) Each applicant for feeder-link earth station license(s) that proposes levels in excess of those defined in paragraph (a)(1) of this section shall submit link budget analyses of the operations proposed along with a detailed written explanation of how each uplink and each transmitted satellite carrier density figure is derived. Applicants shall also submit a narrative summary which must indicate whether there are margin shortfalls in any of the current baseline services as a result of the addition of the applicant's higher power service, and if so, how the applicant intends to resolve those margin short falls. Applicants shall certify that all potentially affected parties (*i.e.*, those 17/24 GHz GSO BSS satellite networks that are

[TBD] degrees apart) acknowledge and do not object to the use of the applicant's higher power densities.

(3) Licensees authorized pursuant to paragraph (a)(2) of this section shall bear the burden of coordinating with any future applicants or licensees whose proposed compliant operations at [TBD] degrees or smaller orbital spacing, as defined by paragraph (a)(1) of this section, is potentially or actually adversely affected by the operation of the non-compliant licensee. If no good faith agreement can be reached, however, the non-compliant licensee shall reduce its earth station power density levels to be compliant with those specified in paragraph (a)(1) of this section.

(b) Applicants proposing to co-locate their 17/24 GHz BSS TT&C earth stations at sites where they are already authorized to operate DBS feeder link earth stations, must submit to the Commission a technical showing demonstrating their ability to maintain sufficient margin in their 17 GHz band telemetry links in the presence of the interfering DBS signal.

§ 25.1xx Licensing Provisions for the 17/24 GHz Broadcasting Satellite Service *[new rule for subpart B – Applications and Licenses, Space Stations]*

- (a) *License terms.* License terms for 17/24 GHz facilities are specified in § 25.121(a).
- (b) *Due Diligence.*
- (c) *Geographic service requirements.*
- (d) *Bond Requirement.*
- (e) *Co-location with DBS space stations.* A 17/24 GHz BSS applicant seeking to operate within [TBD] degrees of a geostationary orbital location where a space station has already been authorized to operate in the direct broadcast satellite (DBS) service in the 12.2-12.7 GHz band that is authorized to use feeder links in the 17.3-17.8 GHz band (Earth-to-space), must submit to the Commission a technical showing demonstrating its ability to avoid causing harmful interference to the DBS operator, such that the DBS system is able to maintain sufficient margin in its telecommand link in the presence of the interfering BSS signal.
- (f) *Limit on pending applications.*
- (g) *Milestone requirements.*
- (h) *Replacement satellites.*
- (i) *Non-U.S.-licensed satellites.*
- (j) *Public interest.*
- (k) *Equal employment opportunity.*

§ 25.201 Definitions

Broadcasting-Satellite Service. A radiocommunication service in which signals transmitted or retransmitted by space stations are intended for direct reception by the general public.

Note: In the broadcasting-satellite service, the term *direct reception* shall encompass both individual reception and community reception.

§. 25.202 Frequencies, frequency tolerance and emission limitations.

(a)(1) Frequency band. The following frequencies are available for use by the fixed-satellite service. Precise frequencies and bandwidths of emission shall be assigned on a case-by-case basis. The Table follows:

Space-to-Earth (GHz)	Earth-to-space (GHz)
3.7-4.2 ¹¹	5.925-6.425 ¹¹
10.7-10.95 ^{11,12}	12.75-13.25 ^{11,12,14}
10.95-11.2 ^{11,12,12}	13.75-14 ^{11,12}
11.2-11.45 ^{11,12}	14-14.2 ¹⁵
11.45-11.7 ^{11,12,12}	14.2-14.5
11.7-12.2 ¹³	17.3-17.8 ⁹
12.2-12.7 ¹³	24.75-25.25 ¹⁷
18.3-18.58 ^{11,10}	27.5-29.5 ¹¹
18.58-18.8 ^{16,10,11}	29.5-30
18.8-19.3 ^{17,10}	¹¹ 47.2-50.2
19.3-19.7 ^{18,10}	
19.7-20.2 ¹⁰	
37.5-40 ^{15,16}	
37.6-38.6	
40-42 ¹⁶	

¹⁷ Use of the band 24.75-25.25 GHz by the fixed-satellite service (Earth-to-space) is limited to feeder links for space stations in the broadcasting-satellite service. The allocation to the fixed-satellite service (Earth-to-space) in the band 24.75-25.25 GHz shall come into effect on 1 April 2007.

(8) The following frequencies are available for use by the Broadcasting-Satellite Service after 1 April 2007:

17.3-17.7 GHz (space-to-Earth) ¹¹
 17.7-17.8 GHz (space-to-Earth) ¹²

¹¹ Use of the 17.3-17.7 GHz band by the broadcasting-satellite service is limited to geostationary satellite orbit systems.

¹² Use of the 17.7-17.8 GHz band (space-to-Earth) by the broadcasting-satellite service is limited to transmissions from geostationary satellite orbit systems to receiving earth stations located outside of the United States and its Possessions.

§ 25.208 Power flux density limits.

(c) In the [17.7-17.8 GHz], 18.3-18.8 GHz, 19.3-19.7 GHz, 22.55-23.00 GHz, 23.00-23.55 GHz, and 24.45-24.75 GHz frequency bands, the power flux-density at the Earth's surface produced by emissions from a space station for all conditions for all methods of modulation shall not exceed the following values:

(1) -115 dB (W/m²) in any 1 MHz band for angles of arrival between 0 and 5 degrees above the horizontal plane.

(2) -115 + 0.5 (d-5) dB (W/m²) in any 1 MHz band for angles of arrival d (in degrees) between 5 and 25 degrees above the horizontal plane.

(3) -105 dB (W/m²) in any 1 MHz band for angles of arrival between 25 and 90 degrees above the horizontal plane.

§25.2xx Technical requirements for space stations operating in the 17/24 GHz broadcasting-

satellite service***[new requirement for Subpart C – Technical Standards]***

(a) All space stations operating in the 17/24 GHz broadcasting-satellite service shall employ state-of-the-art full frequency re-use either through the use of orthogonal polarizations within the same beam and/or the use of spatially independent beams

§ 25.2xx Special coordination requirements for DBS feeder link earth stations to protect 17/24 GHz BSS receiving earth stations***[new requirement for Subpart C – Technical Standards]***

(a) *Coordination with 17/24 GHz BSS receiving earth stations.* Feeder-link earth station applicant planning to operate in the 17.3-17.8 GHz band shall coordinate the proposed frequency usage with 17/24 GHz BSS receiving earth stations, including 17/24 GHz BSS TT&C earth stations, in accordance with the procedures set forth in Sec. 25.251.

(b) In computing the coordination distance for the transmitting DBS feeder-link earth station, the applicant shall use the following technical parameters:

Parameter(s)	Value	Description	
Orbit	GSO	Orbit in which the space service in which receiving earth station operates (GSO or NGSO)	
Modulation at receiving earth station	[TBD]	Analog or digital	
Receiving earth station interference parameters and criteria	p_o (%)	[TBD]	Percentage of the time during which interference from all sources may exceed the threshold value
	n	[TBD]	Number of equivalent, equal level, equal probability entries of interference, assumed to be uncorrelated for small percentages of the time
	p (%)	[TBD]	Percentage of the time during which the interference from one source may exceed the permissible interference power value; since the entries of interference are not likely to occur simultaneously, $p = p_o/n$
	N_L (dB)	[TBD]	Link noise contribution
	M_s (dB)	[TBD]	Link performance margin
	W (dB)	[TBD]	A thermal noise equivalence factor for interfering emissions in the reference bandwidth; it is positive when the interfering emissions would cause more degradation than thermal noise
Receiving earth station parameters	G_m (dBi)	[TBD]	On-axis gain of the receive earth station antenna
	G_r	[TBD]	Horizon antenna gain for the receive earth station
	ϵ_{min}	[TBD]	Minimum elevation angle of operation in degrees
	T_e (K)	[TBD]	The thermal noise temperature of the receiving system at the terminal of the receiving antenna
Reference Bandwidth	B (Hz)	[TBD]	Reference bandwidth (Hz), <i>i.e.</i> , the bandwidth in the receiving station that is subject to the interference and over which the power of the interfering emission can be averaged
Permissible interference power	$P_r(p)$ (dBW) in B	[TBD]	Permissible interference power of the interfering emission (dBW) in the reference bandwidth to be exceeded no more than $p\%$ of the time at the receiving antenna terminal of a station subject to interference, from a single source of interference, using the general formula: $P_r(p) = 10 \log(k T_e B) + N_L + 10 \log(10^{M_s/10} - 1) - W$

(c) The feeder-link earth station applicant shall provide each such 17/24 GHz BSS licensee, and prior-filed applicant with the technical details of the proposed earth station and the relevant coordination distance calculations that were made. At a minimum, the earth station applicant shall provide the 17/24 GHz BSS licensee, and/or prior filed applicants with the following technical information:

- (i) The geographical coordinates of the proposed earth station antenna(s);
- (ii) Proposed operating frequency band(s) and emission(s);
- (iii) Antenna center height above ground and ground elevation above mean sea level;
- (iv) Antenna gain pattern(s) in the plane of the main beam;
- (v) Longitude range of geostationary satellite orbit (GSO) satellites at which antenna may be pointed, for proposed earth station antenna(s) accessing GSO satellites;
- (vi) Horizon elevation plot;
- (vii) Antenna horizon gain plot(s) determined in accordance with the procedure in Section 2.1

of Annex 5 to Appendix 7;

- (viii) Minimum elevation angle;
- (ix) Maximum equivalent isotropically radiated power (e.i.r.p.) density in the main beam in any [TBD] Hz band;
- (x) Maximum available RF transmit power density in any [TBD] Hz band at the input terminals of the antenna(s);
- (xi) Maximum permissible RF interference power level as determined in accordance with Annex 7 to Appendix 7 for all applicable percentages of time; and
- (xii) A plot of the coordination distance contour(s) and rain scatter coordination distance contour(s) as determined by Table 2 of Section 3 to Appendix 7.

§ 25.251 Special requirements for coordination.

(a) The administrative aspects of the coordination process are set forth in Sec. 101.103 of this chapter in the case of coordination of terrestrial stations with earth stations, and in Sec. 25.203 in the case of coordination of earth stations with terrestrial stations.

(b) The administrative aspects of the coordination process in the case of coordination of DBS feeder-link earth stations with 17/24 GHz BSS receiving earth stations are set forth in Section 25.xxx of this chapter in combination with the additional technical parameters set forth in [TBD]

(c) The technical aspects of coordination are based on Appendix 7 of the International Telecommunication Union Radio Regulations and certain recommendations of the ITU Radiocommunication Sector (available at the FCC's Reference Information Center, Room CY-A257, 445 12th Street, SW., Washington, DC 20554).

APPENDIX C

**TECHNICAL CHARACTERISTICS OF RADIOLOCATION SYSTEMS
IN THE 15.7-17.3 GHZ BAND**

Table C-1 shows technical characteristics of radar systems that will likely impact the BSS earth station receivers, namely, the airborne ground-mapping radars. The lower power radars of "System 1" are included because of wider antenna beamwidths (e.g., mainbeam and sidelobe), which could increase the potential for interference. These systems currently tend to operate in the sub-band 16.2-17.3 GHz by provision of National Telecommunications and Information Administration Manual of Regulations and Procedures for Federal Radio Frequency Management Section 8.2.46, but this could change at any time to also allow ground-based radars. The airborne radar systems tend to have antenna pointing capabilities such that mainbeam-to-mainbeam coupling can occur with BSS subscriber earth station antennas. The information provided in Table C-1 should be sufficient for general calculation to assess the compatibility between these radars and BSS systems.

**Table C-1. Characteristics of Radar Systems Operating in the
16.2-17.3 GHz Frequency Range**

Characteristics	System 1	System 2
Function	Search, track and ground-mapping radar (multi-function)	Search, track and ground-mapping radar (multi-function)
Platform type	Airborne, low power	Airborne, high power
Tuning range (GHz)	16.2-17.3	16.29-17.21
Modulation	Linear FM pulse	Linear and non-Linear FM pulse
Transmit peak power (W)	< 80	< 3260
Pulse width (μ s)	18.2; 49	120-443
Pulse rise/fall time (ns)	20	4
Pulse repetition rate (pps)	2041; 5495	900-1600
Duty Cycle	4-25%	< 50%
Output device	Travelling wave tube	Travelling wave tube
Antenna pattern type	Fan/pencil	Fan
Antenna type	Slotted waveguide	Phased array
Antenna polarization	Linear vertical	Linear vertical
Mainbeam Antenna gain (dBi)	25.6	38.0
Antenna elevation beamwidth (deg)	9.7	2.5
Antenna azimuthal beamwidth (deg)	6.2	2.2

Characteristics	System 1	System 2
Antenna horizontal scan rate	0-30 deg/s	0-5 deg/s
Antenna horizontal scan type (continuous, random, sector, etc.)	±45 deg to ±135 deg (mechanical)	±30 deg (electronic, conical)
Antenna vertical scan rate	0-30 deg/s	0-5 deg/s
Antenna vertical scan type.(*)	-10 to -50 deg (mechanical)	0 to -90 deg (electronic, conical)
Antenna 1st side-lobe gain level	10 dBi @ 31 deg	18 dBi @ 1.7 deg
Antenna height	Aircraft altitude	Aircraft altitude
Chirp bandwidth (MHz)	< 640	< 1200
Transmitter RF emission bandwidth (MHz).(**)		
-3 dB	< 622	< 1200
-20 dB	< 725	< 1220
-40 dB	< 868	< 1300
-60 dB	< 1040	< 1400

(*) 0 degrees represents a horizontal orientation. Angles below horizontal are negative.

(**) The radar center frequency is lowered if necessary to ensure that the -20 dB bandwidth is contained below 17.3 GHz. This may cause radar emissions to fall below 16.2 GHz, but they will still be within the allocated band.