**Before the**
**Federal Communications Commission**
**Washington, D.C. 20554**

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| In the Matter of | ) | |
| | ) | |
| Comprehensive Review of Licensing and | ) | IB Docket No. 12-267 |
| Operating Rules for Satellite Services | ) | |

**FURTHER NOTICE OF PROPOSED RULEMAKING**

**Adopted: September 30, 2014** **Released: September 30, 2014**

By the Commission: Chairman Wheeler and Commissioners Clyburn, Rosenworcel, Pai and O'Reilly issuing separate statements.

**Comment Date: (45 days after date of publication in the Federal Register).**
**Reply Comment Date: (75 days after date of publication in the Federal Register).**

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## I. INTRODUCTION

1. In this Further Notice of Proposed Rulemaking, we propose changes in Part 25 of the Commission's rules, which governs licensing and operation of space stations and earth stations for the provision of satellite communication services.[1] Adoption of these proposed changes would, among other things, facilitate international coordination of proposed satellite networks; eliminate the need to assess compliance with interim milestone requirements; revise bond requirements to more effectively deter spectrum warehousing; clarify requirements for routine earth station licensing; and expand applicability of routine licensing standards.

## II. BACKGROUND

2. In the initial Notice of Proposed Rulemaking in this proceeding, the Commission proposed extensive changes in Part 25 with the overall objectives of affording licensees as much operational flexibility as possible consistent with minimizing harmful interference and easing administrative burdens on licensees, applicants, and the Commission.[2] The Satellite Industry Association (SIA) and fifteen other parties filed comments in response to the *2012 NPRM*, and ten parties filed reply comments. In a Report and Order released in August 2013, the Commission adopted most of the changes that it had proposed in the *2012 NPRM* and also adopted a number of non-substantive rule changes that it had not proposed previously.[3] In all, the amendments adopted in the *2013 Report and Order* revised more

[1] 47 C.F.R. Part 25, Satellite Communications.

[2] *Comprehensive Review of Licensing and Operating Rules for Satellite Services*, IB Docket No. 12-267, Notice of Proposed Rulemaking, 27 FCC Rcd 11619 (2012) (*2012 NPRM*).

[3] *Comprehensive Review of Licensing and Operating Rules for Satellite Services*, IB Docket No. 12-267, Report and Order, 28 FCC Rcd 12403 (2013) (*2013 Report and Order*).

than 150 provisions in Part 25. The Commission declined to rule, however, on a number of recommendations from commenters for rule changes that had not been proposed previously in this proceeding and could not properly be adopted without affording further opportunity for public comment. Some of the rule changes proposed below are based on such previous recommendations.

3. In February 2014, an FCC staff working group issued recommendations for improving the Commission's procedures and management practices and eliminating or streamlining outdated rules.[4] These recommendations were wide-ranging and were based on internal input and public comments. Some of the recommendations concerned satellite-service regulation and licensing and are considered in this *Further Notice*.

## III. DISCUSSION

4. In this section we propose rule changes in response to public comments filed in this proceeding and recommendations in the *Process Reform Report*. We also propose additional rule changes on our own initiative. We invite comment on the proposals below and on any alternative proposals that would improve the efficiency of the satellite licensing or operating rules and make them less burdensome.

### A. ITU Filings for GSO FSS Space Stations

5. In this section we propose to revise the Commission's rules to establish a procedure for the Commission to submit filings for GSO FSS space stations to the International Telecommunication Union before the prospective satellite operators file corresponding license applications with the Commission.

#### 1. Current Practice

6. Obtaining international recognition in accordance with the International Telecommunication Union's (ITU's) regulations is generally a critical prerequisite for successful satellite network operation. The procedure for obtaining international recognition of satellite operation in non-planned Fixed-Satellite Service (FSS) bands[5] under the Radio Regulations of the ITU includes several steps. First, an Advance Publication of Information (API) must be filed with the ITU. An API filing requires only a very general description of a proposed satellite network. Next, a Coordination Request must be filed. A Coordination Request is "receivable" between six months and two years after the associated API filing but may be submitted to the ITU simultaneously with an API filing. The date of receipt of the Coordination Request establishes the "protection date" of a satellite network, which is the basis of international coordination priority. A proposed satellite network must be coordinated with any co-frequency satellite network with an earlier ITU protection date that, according to certain criteria, is deemed to be "affected" by the proposed network. Administrations are expected to coordinate in good faith to accommodate, to the extent possible, networks with later protection dates, but an earlier protection date gives an Administration substantial leverage in coordination discussions.

7. Currently, the Commission's International Bureau submits an API filing or Coordination Request to the ITU for space station operation in specified frequency bands at a specified orbital location only after a license application for the proposed space station operation has been filed with the

[4] *Report on FCC Process Reform*, GN Docket No. 14-25 (Staff Working Group, Feb. 14, 2014) (*Process Reform Report*).

[5] That is, allocated FSS bands other than the 4500-4800 MHz, 6725-7025 MHz, 10.70-10.95 GHz, 11.20-11.45 GHz, and 12.75-13.25 GHz, which are known as the "planned" FSS bands. FSS operation in planned bands is subject to a Plan in Appendix 30B of the ITU Radio Regulations that specifies the necessary characteristics of FSS stations and the procedures under which these characteristics can be modified and frequency assignments brought into use in those bands. These procedures are different from those that apply to operations in non-planned FSS bands.

Commission and the applicant has certified unconditional acceptance of cost recovery responsibility.[6] The information required for a Commission space station license application is far more specific than that required for an API or Coordination Request and includes technical data that would not be definitely known until significant progress has been made in the design of a proposed satellite. Consequently, an operator who decides to apply for authority for space station operation in a new band and/or orbital location might not be prepared to submit a license application for such operation until many months afterward. During the intervening time between the decision to request operating authority for a new space station and the filing of a license application, another Administration might file an API and Coordination Request for another satellite using the same frequencies at the same orbital location, thus establishing ITU coordination priority for the other satellite. The possibility of such an outcome may deter interested parties from filing space station applications with the Commission, who could apply instead to other Administrations that are willing to file APIs and Coordination Requests based on less information.

### 2. Background: Recommendations in the *Process Reform Report* and Associated Comments

8. In view of this, the *Process Reform Report* includes a recommendation for the Commission to consider adopting a procedure for filing satellite-network APIs and Coordination Requests prior to the filing of full license applications.[7] Several parties address this issue in comments on the *Process Reform Report*,[8] and all of them support this recommendation (Recommendation 5.8). Boeing, Intelsat, and ViaSat assert that an early ITU notification procedure would reduce the risk that U.S. space station applicants will be preempted by parties requesting operating authority from other Administrations.[9]

9. DIRECTV asserts that the International Bureau's current ITU filing practice disadvantages U.S. operators in two ways. First, it effectively requires them to apply to the Commission for authority for operation in particular frequency bands at particular orbital locations before developments that could affect the availability of those frequencies at those locations have fully unfolded. Second, it requires U.S. operators to disclose their plans publicly before an API is filed.[10] DIRECTV

[6] *See Implementation of ITU Cost Recovery Charges for Satellite Network Filings*, Public Notice, 16 FCC Rcd 18732 (IB 2001). In the *2013 Report and Order*, the Commission amended 47 C.F.R. § 25.111(d) to state that it will submit certain types of filings, including an API or Coordination Request, to the ITU for a space station only after the applicant or licensee submits a signed declaration of unconditional acceptance of responsibility for payment of a consequent fee charged by the ITU for recovery of administrative costs associated with the processing of satellite filings. As amended, Section 25.111(d) also states that a license granted in reliance on such a commitment will be conditioned on discharge of the payment obligation and that if an applicant or licensee fails to pay the fee by the original due date or upon resolution of a timely appeal any application associated with the satellite system in question will be dismissed.

[7] *See* Recommendation 5.8 in *Process Reform Report*.

[8] *See* Comments of the Boeing Company in GN Docket 14-25, filed March 31, 2014 (Boeing Comments in Docket 14-25); Comments of DIRECTV, LLC in GN Docket 14-25, filed March 31, 2014 (DIRECTV Comments in Docket 14-25); Comments of EchoStar Satellite Operating Company & Hughes Networks Systems, LLC (filing jointly) in GN Docket No. 14-25, filed April 1, 2014 (EchoStar/Hughes Comments in Docket 14-25); Comments of Intelsat License LLC in GN Docket No. 14-25, filed March 31, 2014 (Intelsat Comments in Docket 14-25); Comments of SES Americom, Inc. in GN Docket No. 14-25, filed March 31, 2014 (SES Comments in Docket 14-25); and Comments of ViaSat, Inc. in GN Docket No. 14-25, filed March 31, 2014.

[9] Boeing Comments in Docket 14-25; Intelsat Comments in Docket 14-25; ViaSat Comments in Docket 14-25.

[10] DIRECTV Comments in Docket 14-25.

maintains that this prior disclosure enables competitors to "claim jump" by submitting conflicting filings to the ITU through other administrations before the U.S. files an API on an applicant's behalf.[11]

10. EchoStar and Hughes identify Recommendation 5.8 as one of three "critical satellite policy and regulatory reforms" that the Commission should quickly adopt. They contend that, because the design and completion of a satellite network proposal is a complex undertaking that follows the identification of available orbital/spectrum resources, it is appropriate to adopt a procedure for initiating the ITU registration process prior to the submission of a completed FCC space station application with detailed technical data and descriptive narrative.[12]

11. Two commenters address related questions of application priority and warehousing.[13] EchoStar, assuming that a party submitting an advance request for ITU filing would have "first-come first-served" priority over subsequently filed FCC space station applications,[14] contends that to protect against warehousing, such "pre-application registrants" should be required to file a complete FCC application within three months after either: (i) submission of a Coordination Request to the ITU; or (ii) the filing of an alternative expression of interest for the same orbital location with the Commission, whichever occurs later. EchoStar also contends that such "registrants" should be permitted to shift a proposed orbital location by up to six degrees in either direction when a Coordination Request is filed with the ITU, as permitted by ITU regulations.

12. Intelsat recommends that the Commission require parties that submit requests for ITU filings to include a letter of intent to operate the space station described in the filings and assume ITU cost recovery obligations, and to treat such a request comparably to a satellite license application for purposes of securing a position in the U.S. space station licensing queue. In order to prevent warehousing, Intelsat contends that operators that gain a queue position in this way should be required to submit a complete satellite application within two years.[15]

### 3. Discussion

13. We tentatively agree that it would serve the public interest for the Commission to adopt an optional procedure in which submission of APIs and Coordination Requests to the Commission for filing with the ITU for GSO space station operation in non-planned FSS bands would be a first step in an optional two-step license application process. More detailed information of the kind included currently in license applications would be due later. Given the specificity of the ITU's regulations pertaining to operation in FSS planned bands, we are not proposing to follow this procedure with respect to planned-band operation.[16] We invite comment, however, as to whether the procedure should be available for other types of proposed space station operation. We contemplate that such requests would be electronically filed and considered in order of receipt and would be treated as confidential until the Commission submits

[11] DIRECTV Comments in Docket 14-25 at 8.

[12] EchoStar/Hughes Comments in Docket 14-25.

[13] "Warehousing" is a term that the Commission has used to refer to retention of preemptive rights to use spectrum and orbital resources by a licensee that does not intend to bear the cost and risk of constructing, launching, and operating an authorized space station or is not fully committed to doing so. The Commission has adopted milestone and surety bond requirements to discourage warehousing. *See* ¶¶ 19-21, *infra*.

[14] *Cf.* 47 C.F.R. § 25.158(b) (applications for "GSO-like" space stations are considered in the order of receipt, and such an application will be denied if it proposes operations that would harmfully interfere with previously authorized space-station operations).

[15] Intelsat Comments in Docket 14-25 at 4-5.

[16] *See* n.5, *supra*.

the filings to the ITU.[17] We invite comment as to whether the filing of such a request would be subject to the requirements in Part 1, Subpart G of the Commission's rules pertaining to filing fees.

14. We propose to adopt a two-year deadline for submitting the technical information needed to complete a satellite license application, as recommended by Intelsat.[18] We note that the information included in a request for filing of an API and Coordination Request would not enable the Commission to determine whether a proposed satellite system would be mutually exclusive with respect to a previously licensed space station, previously filed space station license application or U.S. market access application, or previously filed request for filing of an API and Coordination Request. Such a determination can only be made after submission of the information and certifications required by Sections 25.114 and 25.140. It would be the responsibility of the party requesting the ITU filing to ensure that there are no mutual exclusivity issues. Failure to do so could result in denial of the application.

15. We seek comment on whether submission of a letter request for filing of an API and Coordination Request with a simplified description of the satellite network and a cost-recovery declaration, as suggested by Intelsat, should suffice to secure a position in a first-come, first-served space station application queue.[19] If we adopt this queuing proposal, we would allow a party that has submitted a preliminary API and Coordination Request to shift the proposed orbital location by up to six degrees in either direction, as provided for in the ITU's Radio Regulations, by filing a modified API and Coordination Request. In that event, the position in the FCC space station licensing queue secured by the original filing would be nullified, and a position in the queue for the changed orbital location would be established as of the time and date of the electronic filing of the modified API and Coordination Request with the Commission.

16. If we adopt the queuing proposal, we share commenters' concern about the need to prevent warehousing. A party that secures a place at the head of an application queue for space station operation in particular FSS frequency bands at a particular location in the GSO arc should not be free to walk away at some later time without any consequence, despite having preempted co-frequency applications for the same or a nearby orbital location in the meanwhile. In that case, we would propose a surety bond requirement, separate from the current post-licensing bond requirement in Section 25.165.[20] Such a bond would be payable if a party who has secured a spot in the first-come, first-served queue

[17] We believe that publication of such requests would be within the scope of the note to 47 C.F.R. § 0.457(d)(1)(vii), which indicates that the content of communications between the Commission and the ITU related to the international coordination process may be separately available through the ITU publication process or through records available in connection with the Commission's licensing procedures.

[18] Intelsat Comments in Docket 14-25 at 4-5.

[19] 47 C.F.R. § 25.158(b) prescribes a first-come, first-served procedure for licensing GSO space stations designed to communicate with earth stations with directional antennas. Under this framework, the Commission places applications seeking authority to operate such space stations in the same frequency bands at a given orbit location in a processing queue in the order in which they are filed. The Commission will grant the first-in-line application if the space station it proposes will not cause harmful interference to a space station already licensed and the applicant is otherwise qualified and will deny subsequently filed space station applications proposing operation that would cause harmful interference to the newly licensed space station.

[20] We believe that adoption of such a bond requirement for those filing such preliminary requests, which would effectively constitute the initial step in an optional two-step licensing process, is within the Commission's statutory authority under Sections 4(i) and 308(b) of the Communications Act of 1934, 47 USC §§ 154(i) and 308(b), for essentially the same reasons that the Commission concluded that adopting the post-grant bond requirement in 47 C.F.R. § 25.165 was within its authority. *See Amendment of the Commission's Space Station Licensing Rules and Policies*, IB Docket No. 02-34, First Order on Reconsideration and Fifth Report and Order, 19 FCC Rcd 12637, 12642-44 ¶¶ 12-14 (2004) (*Space Station Fifth Report and Order*).

defaults by failing to complete an acceptable license application[21] on schedule or its license application is denied. We invite comment on this bond proposal and as to whether a surety bond created in connection with a request for an ITU filing should be released when the party in interest files a post-grant surety bond pursuant to Section 25.165 or whether it would better serve the public interest to require an "ITU filing bond" to be maintained pending satisfaction of all milestone requirements.[22] Finally, we invite comment as to whether a bond requirement would be the most effective way of deterring warehousing in this connection.

17. We note three possibilities for a party that prefers to avoid the ITU filing bond and associated payment risk of the queuing proposal. First, such a party would still have the option of following the current procedure of filing a full license application concurrently with a request for submission of an API and Coordination Request. Second, we seek comment on whether a party should have the option to file an API and Coordination request without securing a spot in the first-come, first-served queue. Under this option, such a party would not need to file an ITU filing bond but would not secure a place in the first-come, first-served queue until it filed a license application. Third, we could simply allow early filing of an API and Coordination Request without adopting the queuing proposal. We seek comment on these options.

18. We also invite comment as to whether failure to meet the proposed application-filing deadline should count as a missed milestone for purposes of the "three-strikes" rule in Section 25.159(d).[23]

### B. Milestones and Bonds

19. In this section we propose revision of the milestone and bond requirements that the Commission has established to deter warehousing by satellite licensees.[24] Warehousing refers to the retention of preemptive rights to use spectrum and orbital resources by a licensee that does not intend to bear the cost and risk of constructing, launching, and operating an authorized space station or is not fully committed to doing so.[25] Warehousing may be harmful if it is sufficient to create undue scarcity and increase prices above competitive levels. As orbital locations and spectrum may not be interchangeable in providing satellite service, it may be unduly easy for a licensee to acquire and warehouse orbital locations and spectrum to preclude the availability of these resources to new competitors, reducing output of satellite services in the near term and discouraging innovation over the longer term. Moreover, since Congress has prohibited the Commission from assigning "orbital locations or spectrum used for the

[21] *See* acceptability criteria in 47 C.F.R. § 25.112.

[22] *See* discussion in ¶ 32, *infra*.

[23] 47 C.F.R. § 25.159(d) provides that a licensee that misses three or more milestone requirements within any three-year period may not apply for another space-station license if it has more than one space station application already pending or more than one outstanding license for an unbuilt satellite system, unless the licensee rebuts a presumption that it filed applications for speculative purposes or demonstrates that it would be "very likely" to construct the licensed facilities if allowed to file more applications.

[24] It has been a longstanding Commission policy to impose milestone schedules for system implementation in satellite licenses. *See Inquiry into the Development of Regulatory Policy in Regard to Direct Broadcast Satellites*, Report and Order, 90 FCC 2d 676, 719 ¶ 114 (1982); *MCI Communications Corp.*, Memorandum Opinion and Order, 2 FCC Rcd 233, 233 ¶ 5 (Com. Car. Bur. 1987); *Norris Satellite Communications, Inc.*, Memorandum Opinion and Order, 12 FCC Rcd 22299 (1997); *Morning Star Satellite Company, L.L.C.*, Memorandum Opinion and Order, 15 FCC Rcd 11350 (Int'l Bur. 2000), *aff'd*, 16 FCC Rcd 11550 (2001).

[25] *See, e.g.*, *TMI Communications and Company*, Memorandum Opinion and Order, 19 FCC Rcd 12603, 12604 ¶ 2 (2004); *PanAmSat Licensee Corp., Application for Authority to Construct, Launch, and Operate a Ka-Band Communications Satellite System in the Fixed-Satellite Service at Orbital Locations 58° W.L. and 125° W.L.*, Memorandum Opinion and Order, 16 FCC Rcd 11534, 11537-38 ¶ 12 (2001).

provision of international or global satellite communications services" by competitive bidding,[26] and with resale difficult under existing rules, satellite operators do not bear the opportunity cost of using such resources. As a consequence, licensees may lack incentives to put geostationary slots and spectrum to their most valuable use. The Commission's existing policy and rules concerning satellite construction milestones and bond requirements and the reforms proposed here are intended to offset the incentives for inefficient warehousing behavior that are harmful to both competition and consumers and to encourage the rapid deployment of new spacecraft and the optimal utilization of scarce orbital and spectrum resources.

### 1. Current Requirements

20. In order to prevent recipients of space station licenses from "warehousing" scarce orbital and spectrum resources, the Commission requires space station licensees to adhere to standard milestone schedules and file surety bonds. The milestone requirements for most space station licensees[27] are codified in Section 25.164 and are incorporated as conditions in license grants. Recipients of new licenses for geostationary-orbit (GSO) space stations, other than Direct Broadcast Satellite (DBS) and Satellite Digital Audio Radio Service (SDARS) space stations, are required to meet the following schedule:

- Enter into a binding contract for construction of the authorized satellite(s) by one year after the grant of the space station license;
- Complete critical design review for the satellite(s) by two years after the license grant;
- Begin construction of the satellite(s) by three years after the license grant;
- Launch and commence operation of the satellite(s) in the assigned orbital location(s) by five years after the license grant.

Recipients of new licenses for non-geostationary-orbit (NGSO) space stations are required to meet the following schedule:

- Enter into a binding contract for construction of the authorized satellite(s) by one year after the grant of the space station license;
- Complete critical design review for the satellite(s) by two years after the license grant;
- Begin construction of one satellite by two years and six months after the license grant;
- Launch and commence operation of the first satellite in the authorized orbit by three years and six months after the license grant.
- Bring all authorized satellites into operation by six years after the license grant.

A licensee must submit a copy of its construction contract to show compliance with the first milestone requirement and submit "information sufficient to demonstrate" that it has met each subsequent milestone requirement.[28] These milestone schedules also apply to construction and launch of non-U.S.-licensed space stations approved for U.S. market access.

21. Under Section 25.165, the recipient of a new license for a GSO space station of any type other than DBS and SDARS must file a surety bond in the amount of $3 million, payable to the U.S. Treasury in the event of a milestone default, and the recipient of a new license for an NGSO constellation

[26] 47 U.S.C. § 765(f). *See also Northpoint Technology, LTD. and Compass Systems, Inc. v. FCC*, 412 F.3d 145 (D.C. Circuit 2005).

[27] SDARS and DBS licensees are subject to similar requirements in 47 C.F.R. §§ 25.144(b) and 25.148(b). Operators of non-U.S.-licensed space stations that have been granted market access in the United States are also subject to the milestone requirements in Section 25.164. *See* 47 C.F.R. § 25.137(d)(1).

[28] 47 C.F.R. § 25.164(c)-(f).

must file a surety bond in the amount of $5 million.[29] The Commission adopted the bond requirement to establish a market-based mechanism for ensuring that licensees are willing and able to proceed with satellite construction and to discourage warehousing of scarce resources.[30] The bond amount is successively reduced when the Commission finds that the licensee has met interim milestone requirements. Specifically, the amount of a GSO licensee's bond is reduced in increments of $750,000 for each milestone met, and the amount of an NGSO licensee's bond is reduced in increments of $1 million.[31] In the event that a licensee fails to meet a milestone deadline and the Commission does not find good cause for granting an extension of time, the license becomes void and the remaining bond amount is paid to the U.S. Treasury.[32]

### 2. Background: the *2013 Report and Order* and the *Process Reform Report* and Associated Comments

22. In the *2012 NPRM*, the Commission invited comment as to whether it should amend Section 25.164 to specifically state what types of evidence should be submitted to demonstrate compliance with the critical design review (CDR) and begin-construction milestones.[33] In comments in response to the *2012 NPRM*, Boeing noted that when the Commission adopted Section 25.164 it mentioned the following three types of evidence as relevant for demonstrating completion of CDR: (i) evidence of payment of the large sum of money that satellite construction contracts typically require at the time of CDR; (ii) affidavits from independent satellite manufacturers; and (iii) evidence that all long-lead items needed for commencing spacecraft assembly have been ordered.[34] Boeing asserted that instead of relying on these criteria the Commission's staff routinely asks licensees to submit CDR document packages. Boeing contended that this staff practice is undesirable for two reasons. First, it entails a risk of compromising the confidentiality of proprietary technical information and trade secrets. Second, basing CDR compliance determinations on evaluation of CDR document packages has resulted in unduly protracted review that defeats the CDR requirement's ostensible purpose of providing a readily verifiable interim indicator of construction progress.[35] Boeing stressed in this regard that in the two previous cases in which the International Bureau had cancelled satellite licenses because the licensees' document submissions had not shown that CDR had actually been completed, the Bureau issued the decisions more than two years after the CDR milestone deadline.[36] In conclusion, Boeing urged the Commission to declare that the objectives of the milestone rules would best be served by accepting the types of evidence mentioned in the *Space Station Licensing Reform Order* as proof of CDR completion.[37]

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[29] Operators of non-U.S.-licensed space stations that have been granted U.S. market access are also subject to the bond requirement. 47 C.F.R. § 25.137(d).

[30] *Space Station Fifth Report and Order*, 19 FCC Rcd at 12645-46, ¶¶ 17 and 19.

[31] 47 C.F.R. § 25.165(d).

[32] *See* 47 C.F.R. §§ 25.161(a)(1) and 25.165(c).

[33] 27 FCC Rcd at 11630, ¶ 30.

[34] Comments of the Boeing Company filed Jan. 14, 2013 (Boeing 2013 Comments) at 4, citing *Amendment of the Commission's Space Station Licensing Rules and Policies*, IB Docket No. 02-34, First Report and Order and Further Notice of Proposed Rulemaking, 18 FCC Rcd 10760, 10833, ¶ 191 (2003) (*Space Station Licensing Reform Order*). As Boeing acknowledged, the Commission also said in this regard that in some instances it might be necessary to require licensees to provide further information. *Id*.

[35] Boeing 2013 Comments at 6-10.

[36] *Id*. at 7-9, citing *EchoStar Corporation, Certifications of Milestone Compliance*, Memorandum Opinion and Order, 26 FCC Rcd 10442 (Int'l Bur. 2011) and *Spectrum Five LLC, Petition for Declaratory Ruling to Extend or Waiver Construction Milestone*, Memorandum Opinion and Order, 26 FCC Rcd 10448 (Int'l Bur. 2011).

[37] Boeing 2013 Comments at 12-13.

23. Other commenters agreed with Boeing that licensees should not have to submit CDR document packages to prove compliance with the CDR milestone requirement.[38] ORBCOMM contended that it made little sense for the Commission and licensees to expend significant time and effort preparing and reviewing detailed evidentiary showings regarding compliance with interim milestone requirements and therefore recommended amending Section 25.164 to simply require licensees to certify compliance with milestones, rather than requiring submission of information "sufficient to demonstrate" compliance.[39] EchoStar urged the Commission to adopt a policy that submission of any of the three types of evidence mentioned in the *Space Station Licensing Reform Order* will suffice to demonstrate CDR completion.[40] SIA and Inmarsat maintained that protracted review of CDR implementation showings results in uncertainty for licensees and potential customers and prolongs the expense of maintaining surety bonds at higher dollar amounts.[41] Inmarsat contended that affidavits from satellite manufacturers should be accepted as sufficient proof of CDR completion.[42] SIA concurred with Inmarsat's recommendation and suggested, in the alternative, that the Commission consider eliminating the CDR milestone requirement.[43]

24. The Commission considered these recommendations in the *2013 Report and Order* but did not adopt any of them.[44] Noting that in several cases the International Bureau had found that a licensee's certification of compliance with a milestone requirement was incorrect, the Commission said that it would not accept certifications or affidavits in lieu of "concrete evidence" of milestone compliance.[45] The Commission also said that it was reluctant to amend the rules to indicate which types of evidence would be deemed sufficient to demonstrate performance of CDR and disagreed with contentions that requesting submission of CDR documents results in unnecessary risk of disclosure of confidential information or that reviewing such submissions results in undue delay.[46]

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[38] Reply Comments of the Satellite Industry Association filed Feb. 13, 2013 (SIA 2013 Reply Comments) at 9; Reply Comments of Intelsat Licensee LLC filed Feb. 13, 2013 (Intelsat 2013 Reply Comments) at 4-5; Reply Comments of Inmarsat filed Feb. 13, 2013 (Inmarsat 2013 Reply Comments) at 2-3; Reply Comments of EchoStar Corporation filed Feb. 13, 2013 (EchoStar 2013 Reply Comments) at 5; Comments of ORBCOMM Inc. filed Jan. 14, 2013 (ORBCOMM 2013 Comments) at 12.

[39] ORBCOMM 2013 Comments at 12.

[40] EchoStar 2013 Reply Comments at 6. EchoStar contended that the discussion on point in the *Space Station Licensing Reform Order* and in a subsequent Public Notice issued by the International Bureau, 19 FCC Rcd 5364 (2004), is unsatisfactory because it merely identifies relevant types of evidence without saying what kind of showing will be deemed sufficient.

[41] Comments of the Satellite Industry Association filed Jan. 14, 2013 (SIA 2013 Comments) at 15; Intelsat 2013 Reply Comments at 4-5. More generally, Intelsat asserted that the practice of requesting submission of CDR packages is one aspect of a trend toward "seemingly limitless" requests for information not required by rule, which create *de facto* disclosure obligations with resulting delay and added cost. Intelsat 2013 Reply Comments at 6.

[42] Inmarsat 2013 Reply Comments at 5.

[43] SIA 2013 Comments at 15 and n.33.

[44] 28 FCC Rcd at 12421-22, ¶¶ 47-50.

[45] *Id.* at ¶ 47, citing *ATCONTACT Communications, LLC, Petition for Reconsideration and Motion for Stay*, Order, 25 FCC Rcd 7567, 7574 ¶ 18, 7576 ¶ 26 (2010) (*ATCONTACT Communications*); *Mobile Communications Holdings, Inc., Authority to Construct, Launch, and Operate an Elliptical Low-Earth-Orbit Mobile-Satellite Service System*, Memorandum Opinion and Order, 16 FCC Rcd 11766 (Int'l Bur. 2001), *rev. denied*, 18 FCC Rcd 11650 (2003); *Spectrum Five LLC*, Opinion and Order, 26 FCC Rcd 10448, 10455 (Int'l Bur. 2011); *EchoStar Corp.*, Memorandum Opinion and Order, 26 FCC Rcd 10442, 10444 (Int'l Bur. 2011); and *Globalstar, L.P.*, Memorandum Opinion and Order, 18 FCC Rcd 1249 (Int'l Bur. 2003), *aff'd* 19 FCC Rcd 11548 (2004).

[46] 28 FCC Rcd at12421-22 ¶¶ 48-49.

25. The *Process Reform Report* suggests that the Commission take a fresh look at this issue; it includes a recommendation to consider replacing some or all of the current requirements for demonstrating compliance with the milestone requirements for space station licensees with requirements for "legally binding" certification by executives with appropriate responsibility.[47] The *Process Reform Report* also recommends considering increasing the financial disincentives for milestone default.[48]

26. In comments on the *Process Reform Report* and in a petition for reconsideration of the *2013 Report and Order*, Boeing urges the Commission to confirm that affidavits from independent satellite manufacturers should generally be deemed sufficient to demonstrate compliance with a CDR milestone requirement.[49] While conceding that a licensee's own certification of compliance with the CDR milestone requirement might not provide sufficient assurance, Boeing contends that a corroborating affidavit from an independent satellite manufacturer attesting CDR completion is reliable evidence and that none of the milestone decisions cited in the *2013 Report and Order* indicates otherwise.[50] Boeing acknowledges that the Commission has a procedure for handling confidential information but still maintains that the risk of improper disclosure of proprietary information militates for limiting requests for CDR documents to cases where other information submitted to demonstrate CDR completion has been found inadequate.[51]

27. In another response to the *Process Reform Report*, SES Americom suggests that the Commission consider accepting licensees' certifications as sufficient evidence of milestone compliance.[52] EchoStar and Hughes recommend adoption of a rule that would set a 60-day time limit on adverse milestone rulings. Under this proposed rule, a space station licensee that certifies compliance with a milestone requirement would be deemed to have met the requirement unless the International Bureau were to issue an adverse determination within 60 days after the certification.[53] These commenters assert that delayed issuance of favorable milestone rulings creates unnecessary uncertainty that inhibits commitment of additional resources to satellite design and construction. They also support Boeing's recommendation that the Commission rely on affidavits from satellite manufacturers as proof of CDR completion, rather than routinely requiring submission of CDR documents.[54]

### 3. Discussion

28. Commenting parties have raised questions regarding whether the milestone policy can be administered through less burdensome means, and we believe it is appropriate to explore these issues. We acknowledge that a considerable amount of time may ensue after a licensee certifies that it has met an interim milestone requirement before the Commission's staff issues a ruling on the merits of the matter and believe it is worthwhile to consider whether alternative approaches might shorten review periods, reduce administrative burdens, and increase certainty for licensees.

29. One possible approach is to accept corroborative affidavits from satellite manufacturers and evidence of appropriate payment, in addition to certifications from licensees, as *prima facie* proof of

[47] *Process Reform Report*, Recommendation 5.29.

[48] *Id.*

[49] Boeing Comments in Docket 14-25 at 7; Petition for Reconsideration of the Boeing Company filed in this proceeding on March 14, 2014 (Boeing Reconsideration Petition), at 5-10.

[50] Boeing Comments in Docket 14-25 at 7; Boeing Reconsideration Petition at 6.

[51] Boeing Reconsideration Petition at 9.

[52] SES Comments in Docket 14-25 at 3-4.

[53] EchoStar/Hughes Comments in Docket 14-25, at 6.

[54] *Id.* at 7.

compliance with the contracting and CDR milestone requirements. This would eliminate any need for submission and assessment of confidential contractual and design documents in cases where such *prima facie* evidence is presented. Deciding, on a case-by-case basis, how much payment is appropriate at contract signing and upon completion of CDR could entail some adjudicatory difficulty, however.[55] We invite further comment on this proposal. We also invite comment on whether it would be useful to specify more detailed certification requirements. For instance, rather than simply certifying that "CDR had been completed," should licensees be required to explicitly certify that all necessary spacecraft design work, including design verification simulation and analysis, has been completed by the satellite manufacturer and has been reviewed and approved by the licensee, and that a specified percentage of the contract price has been paid? The proposals in this paragraph regarding administration of the CDR milestone could be adopted either with the current milestone regime or with the simplified milestone schedules retaining interim CDR milestones discussed in the next paragraph.

30. We also invite comment on simplifying the milestone schedules for GSO and NGSO licensees. Specifically, we request comment on eliminating the milestone deadlines for contracting for satellite construction and commencing construction and retaining the CDR milestone requirement as the only intermediate milestone deadline prior to the deadline for launch. This would reduce paperwork burdens and afford more flexibility for licensees and significantly reduce administrative burdens for the Commission's staff. In addition, we invite comment on the advisability of eliminating *all* interim milestone requirements, which would reduce administrative burdens still further and eliminate any need for submission of confidential construction contracts or proprietary design packages. And we seek comment on making all interim milestone requirements optional, so that a party could volunteer for Commission review of any interim milestone at any time as a means of reducing its surety bond, without requiring every applicant to do the same.

31. Aside from questions pertaining to milestone requirements, we have several proposals regarding post-grant surety bonds. First, the currently prescribed bond amounts – $3 million for GSO space stations and $5 million for NGSO space stations – may be inadequate. These amounts were prescribed ten years ago[56] and have never been adjusted. We invite comment regarding whether these bond amounts should be increased and if so to what extent. As shown in Appendix A, below,[57] we propose to require bond payment amounts due in the event of default to be calculated based on the Gross Domestic Product Chain-type Price Index (GDP-CPI),[58] so that adjustment for both past and future inflation (or deflation) will be routine and will take into account time that elapses from license grant to default, which could be as much as six years. Would reevaluating the bond payment amount during the course of the term be burdensome to licensees? We invite comment on whether there is another price

[55] In 2003, the Commission considered and rejected a proposal to replace milestone requirements with a requirement for licensees to demonstrate that they have spent a certain amount of money on satellite construction each year in proportion to projected total cost, based in part on a conclusion that determining the reasonableness of licensees' prior cost projections could prove to be overly difficult. *Space Station First Report and Order*, 18 FCC Rcd at 10838, ¶ 207.

[56] *See Space Station Fifth Report and Order*.

[57] *See* proposed Section 25.165(a)(4) in Appendix A, *infra*.

[58] The GDP-CPI, which is published by the Bureau of Economic Analysis of the Department of Commerce on a quarterly basis, uses chain-type annual-weighted indices to measure real output and prices. The Commission uses the GDP-CPI for annual adjustment of carrier-classification revenue thresholds mandated by Section 402(c) of the Telecommunications Act of 1996,Pub. L. No. 104-104, § 402(c), 110 Stat. 56, 130 (1996). *See Implementation of the Telecommunications Act of 1996; Reform of Filing Requirements and Carrier Classifications*, CC Docket No. 96-193, Report and Order, 12 FCC Rcd 8071, 8089-92 ¶¶ 36-44 (1997), and *Public Notice, Wireline Competition Bureau Announces Annual Adjustment of Revenue Thresholds*, DA 13-1008 (May 7, 2013).

index that would more closely track the change in the value of satellite slots and spectrum licenses that we should employ instead of the GDP-CPI.

32. Second, from a public-interest standpoint, it is better for a satellite licensee to surrender a license soon after receiving it than to surrender it after holding it for several years – or, worse, to hold the license for five or six years and then request an unjustified extension of the milestone deadline for launch and commencement of operation. Therefore, would it be appropriate to revise the bond rule to provide that the amount to be paid in the event a licensee surrenders a space station authorization without placing the authorized facility into operation or is found in default of the deadline for commencing in-orbit operation will increase progressively, *pro rata*, in proportion to the time that has elapsed since the license was granted.[59] Rather than escalating the potential payment liability from a starting point of zero, initial liability could be set at an amount substantial enough to deter parties from filing applications for strategic motives with the intention of surrendering their licenses shortly after grant. For instance: if the initial potential payment liability for GSO licensees is an inflation-indexed baseline amount of $400,000 and the ultimate amount that would be due for defaulting after holding a GSO license for the entire five-year period up to the milestone deadline for launching and commencing operation would be an inflation-adjusted baseline amount of $4 million, the payment that would be due in a case where a party surrenders a GSO license one year after grant would be a baseline amount of $400,000 plus one fifth of $3.6 million, for a total baseline amount of $1.2 million to be adjusted for inflation. We invite comment on this possible approach and, more specifically, on the appropriate baseline amounts for determining bond payment liability for purposes of this approach.[60] Commenters proposing particular baseline amounts should articulate a principled basis for their recommendations in this regard. We also seek comment on how this approach would comport with our current policy of reducing bond liability once a party completes each given interim milestone. Should we adopt a minimum bond requirement if we adopt this approach? Should we change how much completion of interim milestones reduces the bond? And how should our decision with respect to how many milestones must (or may) be completed, as discussed in paragraph 30, affect this decision?

33. Third, if we were to adopt the approach regarding ITU filings proposed in Section III.A above, we believe that the amount to be paid pursuant to an "ITU filing bond" in the event of default should be commensurate with post-grant bond payment liability, taking into consideration the amount of time that elapses before default occurs. If $4 million would be due under a post-grant bond in the event that a licensee fails to meet the milestone deadline for launch after holding a GSO space station license for five years,[61] we believe it would be appropriate for two-fifths of that amount, $1.6 million, to be paid under an "ITU filing bond" in the event that the party in interest fails to file an application that is ultimately granted after having held a place in a licensing queue for two years. We invite comments on

[59] In the *Space Station Fifth Report and Order*, the Commission concluded that it would be more reasonable to reduce bond payment liability, rather than increase it, as interim milestone requirements are met because: i) successively increasing the bond amount as interim milestones are met would maximize the expense of maintaining a bond at the time when the main construction costs are incurred and ii) licensees that meet interim milestones are more likely to complete satellite construction. 19 FCC Rcd at 12656, ¶ 51. This rationale presupposes the existence of interim milestone requirements.

[60] *See* Appendix B, *infra*, for suggested amendments to codify each of these alternative proposals for milestone reform.

[61] Under the current rules, except in unusual circumstances, a party would not be able to hold a space station license for five years without meeting interim milestone requirements, which would substantially reduce bond payment liability. We are considering eliminating interim milestone requirements, however, and amending the bond rule to progressively escalate payment liability over the five-year period from license grant to the deadline for launch and commencement of operation. *See* ¶¶ 30-32, *supra*.

this proposal and suggestions for other approaches that could strike a balance between achieving the desired flexibility with respect to ITU filings while preventing spectrum warehousing.

34. We seek specific comment on how our options with respect to milestones and bond requirements interact. For example, we might streamline compliance with the CDR milestone, make all interim milestones optional, index bond requirements to inflation, set the bond requirement for NGSO and GSO stations at $1 million to start and increasing by $1 million each year, set a minimum bond requirement of $1 million, and set the interim-milestone bond reduction amount at $1 million. Under such a proposal, a diligent operator willing to meet all the interim milestones could reduce its bond-carrying costs by maintaining a bond of only $1–2 million until launch. A good-faith operator unable to meet an early milestone would not lose the license at that point. A speculative operator would have strong motivations to give up its license early rather than wait it out. And every operator could make the call whether the benefit of a reduced bond was worth the cost of attempting to demonstrate compliance with an interim milestone. We seek comment on this particular proposal and any variants that the Commission could adopt.

### C. The Two-Degree Spacing Policy

35. In this section we propose to streamline the requirements for space station applicants to demonstrate conformance with the Commission's two-degree spacing policy for GSO FSS satellites. We also invite comments on a broader recommendation from Intelsat to eliminate the two-degree spacing policy and instead rely on ITU filing priority as the basis for protection rights and coordination requirements as between GSO FSS systems licensed by the Commission or authorized for U.S. market access.

#### 1. Overview of the Current Policy

36. The Commission's two-degree spacing policy has been in effect since 1983.[62] "Two-degree spacing" refers to angular separation in the GSO arc between adjacent co-frequency space stations. The Commission adopted the policy in order to increase, to the maximum feasible extent, the number of orbital locations for GSO FSS space stations that can provide service in the United States in the conventional C- and Ku- bands.[63] The same policy was later adopted for 20/30 GHz GSO FSS operation, as well.[64] There are several aspects to this policy, which is embodied in Part 25 rules. Some of the rules embodying the two-degree spacing policy pertain to licensing of earth stations while others pertain to space station licensing.

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[62] *See Licensing of Space Stations in the Domestic Fixed-Satellite Service and Related Revisions*, CC Docket No. 81-704, Report and Order, 48 FR 40233 (1983). Prior to 1983, the Commission had a four-degree spacing policy for GSO satellite systems operating in the conventional C-band and a three-degree policy for systems operating in the conventional Ku-band.

[63] *Id*. at 48 FR 40233-03, ¶¶ 1-2.

[64] *See Redesignation of the 17.7-19.7 GHz Frequency Band, Blanket Licensing of Satellite Earth Stations in the 17.7-20.2GHz and 27.5-30.0 GHz Frequency Bands, and the Allocation of Additional Spectrum in the 17.3-17.8 GHz and 24.75-25.25 GHz Frequency Bands for Broadcast Satellite Service Use*, IB Docket No. 98-172, Report and Order, 15 FCC Rcd 13430 (2000) (adopting 47 C.F.R. § 25.138).

As currently defined in 47 C.F.R. § 25.103, the term "20/30 GHz bands" refers to the 18.3-20.2 GHz band, which is allocated for FSS downlink operation, and the 28.35-30.0 GHz band, which is allocated for FSS uplink operation. We are proposing to re-define the term, however, to refer only to the portions of those bands that the Commission has designated as primary for GSO-FSS operation: 18.3-18.8 GHz, 19.7-20.2 GHz, 28.35-28.6 GHz, and 29.25-30.0 GHz. *See* ¶ 121, *infra*. Our use of the term in this document is consistent with the revised definition we are proposing to adopt.

37. Under the current rules, applicants for earth station licenses authorizing transmission to GSO FSS satellites in the conventional C-band, conventional or extended Ku-band, or 20/30 GHz band must demonstrate one of two things with respect to uplink operation. One option is to show that the proposed earth stations will meet "routine" limits on off-axis EIRP density (or equivalent limits on off-axis antenna gain and input power density) designed to prevent harmful interference with co-frequency GSO space stations at orbital locations two or more degrees from the "target" satellites that the earth stations would communicate with. Alternatively, for proposed operation that would exceed the relevant routine limits, an applicant must submit certification from the operator(s) of the target satellite(s) that it has coordinated the proposed non-conforming uplink operation with operators of co-frequency GSO space stations in the vicinity of the target satellite(s), and the applicant must certify that it will operate in compliance with the coordination agreements.[65] Furthermore, in the event that another co-frequency satellite *subsequently* commences operation at a position within six degrees of a satellite with which such a non-conforming earth station is communicating, the earth station operator will have to reduce input power to the extent necessary to reduce off-axis EIRP density to levels within routine limits unless the operator of the new satellite consents to continuance of the non-conforming uplink operation in a coordination agreement with the target satellite operator.[66] Moreover, except as may be provided in coordination agreements, operators of earth stations with antennas not meeting routine limits on off-axis gain are not entitled to protection from interference from downlink operation that would not disrupt their downlink reception if their antennas' gain patterns conformed to routine limits.[67]

38. License applicants for GSO FSS space stations must demonstrate the following with a technical analysis: (i) their downlink transmissions will not harmfully interfere with reception of co-frequency downlink transmissions from any previously-licensed GSO satellite less than two degrees away or with reception of co-frequency downlinks from a current or future GSO satellite two degrees away by earth stations with gain patterns consistent with the relevant routine limits in Section 25.209 and (ii) uplink transmissions to their space stations will not harmfully interfere with uplink reception of any previously licensed GSO space station less than two degrees away or with uplink reception of a current or future satellite two degrees away.[68] Space station applicants have routinely requested permission to deviate from parameters assumed for purposes of such interference analysis when permitted under the terms of subsequent coordination agreements, however, and the Commission has routinely granted such requests.

39. Thus, under current rules and practice, operating authority may be obtained, based on coordination agreements, for a GSO FSS system that does not conform to technical limits for two-degree compatibility. In the event that a two-degree-compliant U.S.-licensed space station subsequently commences co-frequency operation at an adjacent orbital location, however, the operator(s) of the non-conforming space station and/or associated earth stations will have to curtail non-conforming transmit operation adversely affecting the newcomer's system unless the newcomer consents to it, and will have to accept any downlink interference from the newcomer resulting from the use of earth station antennas with non-conforming gain patterns.

[65] *See* 47 C.F.R. §§ 25.134(a), (b), and (g), 25.138(a) and (b), 25.218, 25.220, 25.221(b), 25.222(b), 25.226(b), and 25.227(b).

[66] *See* 47 C.F.R. §§ 25.138(c), 25.220(d)(2), 25.221(a)(2)(ii), 25.222(a)(2)(ii), 25.226(a)(2)(ii), and 25.227(a)(2)(ii).

[67] The routine gain limits are specified in 47 C.F.R. § 25.209(a) and (b). The protection rule is codified in 47 C.F.R. § 25.209(c)(1).

[68] These requirements are codified in 47 C.F.R. § 25.140(a) and (b).

### 2. Background: Recommendation 5.28 and Responsive Comments in GN Docket 14-25

40. The *FCC Process Reform Report* includes a recommendation to consider modifying the two-degree spacing rules to facilitate more efficient processing of license applications.[69] The *Process Reform Report* notes that the Commission adopted the two-degree policy to maximize the number of GSO FSS satellites and opportunity for competitive entry but acknowledges the possibility that operators may now prefer that established FCC-licensed systems always have coordination priority and protection rights against later entrants under the Commission's rules, regardless of whether an established system or a later entrant meets the technical standards for two-degree spacing compatibility. In the alternative, the *Process Reform Report* recommends that the Commission consider allowing GSO FSS space station applicants to certify that their operation, and that of associated earth stations, will comply with routine limits in the Commission's two-degree spacing rules instead of submitting an interference analysis to demonstrate two-degree spacing compatibility.

41. DIRECTV, EchoStar, and Hughes Network Systems support the suggestion to accept certification of compliance with routine limits in lieu of an interference analysis.[70] As explained below,[71] we are proposing amendments to Section 25.140 that would implement this recommendation.

42. In comments filed in response to Recommendation 5.28, SES maintains that the two-degree spacing rules could be improved by "establishing a more complete set of baseline power levels for common FSS bands and through possible refinements to the rules regarding future adjacent satellites."[72] We agree with SES with respect to specifying routine technical criteria for two-degree compatibility for operation in additional FSS bands, which we are proposing in this Further NPRM.[73]

43. DIRECTV contends that review of the continuing validity of underlying assumptions of the two-degree spacing policy is overdue.[74] EchoStar recommends that the Commission revise the rules to allow operators to enter into coordination agreements that may not be in precise alignment with the two-degree policy.[75] Intelsat contends that the two-degree spacing rules hinder U.S.-licensed satellite operators from providing innovative "broadband mobility" services and services involving use of high power output to earth stations with small antennas. Further, Intelsat contends that the two-degree spacing policy may place U.S.-licensed satellite operators at a competitive disadvantage compared with foreign-licensed operators that are granted access to the U.S. market. Intelsat proposes that instead of adhering to the two-degree spacing rules, the Commission should allow coordination between operators to control operational requirements and should resolve disputes based on ITU coordination priority.[76]

### 3. Discussion

44. We are of the view that the two-degree spacing policy continues to be useful and that eliminating it altogether would not serve the public interest. The policy of routinely licensing operation conforming to predetermined technical criteria for two-degree spacing compatibility, without requiring coordination or interference analysis, facilitates expeditious application processing and reduces cost and

[69] *Process Reform Report*, Recommendation 5.28.

[70] DIRECTV Comments in Docket 14-25 at 9-10; EchoStar/Hughes Comments in Docket 14-25 at 12.

[71] *See* ¶ 51, *infra*.

[72] SES Comments in Docket 14-25 at 4.

[73] *See* ¶¶ 49 and 91, *infra*.

[74] DIRECTV Comments in Docket 14-25 at 9.

[75] EchoStar/Hughes Comments in Docket 14-25 at 11-12.

[76] Intelsat Comments in Docket 14-25 at 5-7.

paperwork burdens for applicants willing to operate within the constraints of those criteria. We invite comment, however, on Intelsat's recommendation to eliminate the two-degree spacing policy and resolve conflicts between operators of U.S.-licensed space stations based on ITU filing dates.

45. While we tentatively favor maintaining the two-degree spacing policy, we acknowledge the possibility that a GSO FSS satellite might provide valuable service to users with very small earth station antennas that would be vulnerable to harmful interference from a co-frequency satellite two degrees away operating with routine downlink power levels. Although the current rules do not preclude operators of GSO FSS space stations from providing service to such earth stations, they afford no protection for such non-conforming operations from interference from subsequently authorized satellites operating in conformance with the two-degree spacing rules. Moreover, the radiated power of uplink transmissions from such non-conforming earth stations might have to be reduced to accommodate subsequently authorized space stations.

46. It is possible for a satellite operator to provide service to users with small, non-two-degree-compliant antennas that is compatible with operation of existing co-frequency satellites. Compatibility could be achieved through coordination agreements with other satellite operators or could occur because no other co-frequency GSO satellite in the immediate vicinity of the satellite in question provides service to the same geographic region. However, if in the future a new U.S.-authorized, two-degree-compliant satellite were deployed to an adjacent orbital location and commenced co-frequency, co-coverage operation, the licensee providing service to users with non-conforming antennas might have to cease providing such service, under the current policy, if transmissions from the non-conforming earth stations interfered with the new satellite's uplink reception or if interference from the new satellite's transmissions impaired the non-conforming earth stations' downlink reception.

47. The primary question presented by Intelsat's comments is whether the Commission should, instead, require a new entrant to coordinate co-frequency, co-coverage operation with a U.S.-licensed operator that has been providing non-two-degree-compliant GSO FSS services without causing unacceptable interference, consistently with any previous coordination required by the ITU Radio Regulations and Commission rules or policies.[77] If we were to adopt such a policy, should coordination priority and protection rights between U.S. licensees, or operators with U.S. market access, be based on ITU filing priority, as Intelsat recommends, or should it be based on FCC application filing dates? One possibility to be considered would be to require prior notification to the Commission of the details of non-conforming operation in a specific frequency range and coverage area as a prerequisite for protection of such operation from harmful interference from operation of subsequently authorized satellite systems. We invite comments in this regard.

48. *Proposed Amendment of Section 25.140(a).* Section 25.140(a) requires license applicants for GSO FSS space stations to provide an interference analysis demonstrating that the proposed system will be compatible with previously authorized GSO space stations within two angular degrees of the proposed space station. Intelsat contends that this rule should be eliminated.[78] Intelsat maintains that there is no need to require applicants to demonstrate compatibility with other space stations within two degrees because protection of adjacent satellites is ensured by rules requiring adherence to technical limits or coordination of non-conforming operation. Furthermore, Intelsat maintains that preparation of an interference analysis required by Section 25.140(a) is time-consuming and, because it must be submitted at the application stage, is often merely hypothetical, based on assumptions that may not accurately reflect the actual operational environment. The joint SES/NSS/O3b commenters oppose Intelsat's recommendation. They concede that such a change may be worth considering for operation in bands

[77] Proposed rule changes to codify such a policy are set forth in Appendix C.

[78] Intelsat Comments at 13-14. The requirement in question was in 47 C.F.R. § 25.140(b)(2) at the time when Intelsat filed its comments.

where the Commission has specified routine limits for both uplink and downlink transmission, but contend that even as regards operation in such bands the issue requires more careful analysis, since satellites are sometimes separated by less than two degrees.[79]

49. We tentatively conclude that the requirement in Section 25.140(a) should be retained with modifications. To begin with, for reasons stated below,[80] we are proposing to remove the routine limits on the power spectral density (PSD) or power flux-density (PFD) of downlink transmission in the conventional Ku-band and 20/30 GHz bands from Sections 25.134, 25.138, and 25.212 and insert them in Section 25.140 as coordination triggers for space station applicants and licensees.

50. The rules do not currently specify routine limits for downlink transmission in the conventional or extended C-band, but taking into account the capabilities of current C-band satellites and typical operational conditions, we propose to amend Section 25.140(a) to specify a 1 dBW/4 kHz coordination threshold for digital downlink transmission in the conventional or extended C-band and an 8 dBW/4kHz coordination threshold for analog downlink transmission in those bands.

51. Further, we believe it would serve the public interest to amend Section 25.140(a) to allow applicants to provide certifications in lieu of an interference analysis. Under the amended rule that we are proposing, an applicant for a GSO FSS space station at an orbital location less than two degrees from the assigned location of a co-frequency space station could either certify that the proposed operation has been coordinated with the operator of the co-frequency satellite or submit an interference analysis demonstrating the compatibility of the proposed system with the co-frequency satellite. An applicant for space station operation (other than analog video operation) in the conventional or extended C-band, the conventional or extended Ku-band, or the 20/30 GHz bands at a location two degrees or more from the nearest co-frequency satellite would not have to provide an interference analysis if it certifies that it will coordinate any uplink or downlink operation exceeding relevant routine limits with operators of co-frequency satellites within six degrees. For instance, an applicant for space station operation in the conventional Ku-band not involving analog video transmission could omit an interference analysis with respect to co-frequency satellites two or more degrees from the requested orbital location if it certifies that downlink EIRP density will not exceed 10 dBW/4kHz for digital transmissions or 17 dBW/4kHz for analog transmissions and that associated uplink operation will not exceed relevant uplink EIRP density envelopes in Section 25.218, 25.222, 25.226, or 25.227 unless the non-conforming operation is coordinated with operators of such co-frequency satellites.[81]

52. Because there is no EIRP density limit in the Commission's rules for analog video downlinks[82] and the number of satellites transmitting analog video signals is gradually diminishing, we do not propose technical criteria for routine licensing of analog video space station operation. Rather, we propose to require such operation to be coordinated with operators of co-frequency satellites within six degrees of the proposed space station that are U.S.-licensed or approved for U.S. market access.

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[79] Joint Reply Comments of SES Americom, Inc., New Skies Satellites B.V., and O3b Ltd. filed Feb. 13, 2013 (SES/NSS/O3b Joint Reply Comments) at 17-18.

[80] *See* ¶ 79, *infra*.

[81] These EIRP density limits for Ku-band downlink transmissions are currently included among the routine processing criteria in Sections 25.134 and 25.212. *See* ¶ 79, *infra*.

[82] *See 2000 Biennial Regulatory Review – Streamlining and Other Revisions of Part 25 of the Commission's Rules Governing the Licensing of, and Spectrum Usage by, Satellite Network Earth Stations and Space Stations*, IB Docket No. 00-248, Eighth Report and Order and Order on Reconsideration, 23 FCC Rcd 15099, 15114-15 ¶¶ 30-32 (2008) (*Earth Station Eighth Report and Order*).

### D. The First-Come, First-Served Procedure for GSO-Like Satellite Systems

53. The Commission adopted the first-come, first-served licensing procedure for "GSO-like" space stations – that is, GSO space stations designed for communication with earth stations with directional antennas – in 2003.[83] In Section C above, we requested comments on an Intelsat proposal to eliminate the two-degree spacing policy and instead rely on ITU filing priority, which is also based on the first-come, first-served principle. EchoStar has more broadly suggested that the Commission invite comment on whether the first-come, first-served procedure should be modified in any way or replaced with some other procedure.[84] We agree that it would be useful as part of this comprehensive review of Part 25 to consider whether modifications of the first-come-first-served procedure might be appropriate, and we request comments in this regard. As noted above,[85] Congress has prohibited the Commission from assigning "orbital locations or spectrum used for the provision of international or global satellite communications services" by competitive bidding. We seek comment on how this statutory prohibition should shape our review of the first-come, first-served licensing procedure.

### E. Codification of Replacement Satellite Policies

54. To promote service continuity and capital investment, the Commission has generally granted applications by GSO satellite operators for authority to launch and operate satellites to replace their existing satellites at the same orbital locations when existing satellites are retired from service, without considering competing applications.[86] The Commission has also granted applications for timely launch of "emergency" replacements for satellites that are lost due to launch mishaps or unexpected in-orbit failure without considering competing applications.[87] These policies are exceptions to the rules in Sections 25.156, 25.157, and 25.158 for application processing and consideration of mutually exclusive applications but are not currently mentioned in those rule sections.[88] We propose to amend those sections to codify the replacement satellite policies. We also propose to replace the phrases "NGSO-like satellite system" and "GSO-like satellite system" in Sections 25.156, 25.157, and 25.158 with "NGSO-like satellite operation" and "GSO-like satellite operation" for clarity.

[83] *Space Station Licensing Reform Order*, 18 FCC Rcd at 10881, ¶ 330.

[84] Letter to the FCC Secretary dated Sept. 22, 2014 from Jennifer Manner, Vice President, Regulatory Affairs, EchoStar Satellite Operating Corporation and Hughes Network Systems, LLC, filed in IB Docket No. 12-267.

[85] *See* ¶ 19, *supra*.

[86] *See, e.g., Assignment of Orbital Locations to Space Stations in the Domestic Fixed-Satellite Service*, 3 FCC Rcd 6872, 6976 n.31 (1988); *GE Americom Communications, Inc.*, Order and Authorization, 10 FCC Rcd 13775, ¶6 (Int'l Bur. 1995); *Hughes Communications Galaxy, Inc.*, Memorandum Opinion and Order, 11 FCC Rcd 16425, 16429, ¶14 (Int'l Bur. 1996); *Space Station Licensing Reform Order*, 18 FCC Rcd 10760, 10854-55 at ¶250; and *Intelsat Licensee LLC*, Memorandum Opinion and Order, 27 FCC Rcd 11234, 11236-37, ¶¶ 7-10 (Int'l Bur. 2012).

[87] *See, e.g., Volunteers in Technical Assistance*, Order, 12 FCC Rcd 3094 (Int'l Bur. 1997); *Hughes Communications Galaxy, Inc.*, Memorandum Opinion, Order and Authorization, 8 FCC Rcd 5089 (1993); and *GE Americom Communications, Inc.*, Order and Authorization, 7 FCC Rcd 3212 (Com. Car. Bur. 1992).

[88] Replacement satellites are currently mentioned in 47 C.F.R. § 25.113(g)(3) (exempting applications for launch and operation of ground spares as emergency replacements from the procedures in 47 C.F.R. §§ 25.157 and 25.158), 47 C.F.R. § 25.121(e) (prescribing deadlines for applying for NGSO system replacement authorizations), 47 C.F.R. §§ 25.142(a)(5), 25.143(c), 25.145(h), and 25.146(m) (allowing NGSO space station licensees to launch and operate technically identical replacement satellites within an existing license term after giving 30 days' prior notice), 47 C.F.R. § 25.165 (prescribing bond requirements for satellite licensees).

### F. Licensing Rules for Earth Stations that Transmit to GSO Space Stations in FSS Frequency Bands

#### 1. Overview of Current Routine Licensing Rules

55. Various rule sections in Part 25 specify technical criteria for "routine licensing" or "routine processing" of fixed earth stations that transmit to GSO space stations in the "conventional" C-band (5925-6425 MHz), the "conventional" Ku-band (14.0-14.5 GHz), the "extended" Ku-band (12.75-13.25 GHz and 13.75-14.0 GHz), the 28.35-28.6 GHz and 29.25-30.0 GHz FSS uplink bands, or the 24.75-25.25 GHz FSS band, which is reserved for feeder transmissions for 17/24 GHz Broadcasting-Satellite Service (BSS) systems.[89] Other rule sections specify routine licensing criteria for earth stations that transmit from ships to GSO space stations in the conventional C-band or conventional Ku-band or from land vehicles or aircraft to GSO space stations in the conventional Ku-band.[90] These criteria were devised to limit the amounts of radiofrequency energy that such earth stations may radiate in directions other than toward the space stations they communicate with, absent coordination with operators of other space stations. Earth station applicants proposing conventional C-band, conventional or extended Ku-band, 20/30 GHz, or 24.75-25.25 GHz uplink operation not meeting routine licensing criteria must demonstrate that the proposed non-conforming operation is permissible under the terms of coordination agreements between the operator(s) of the target satellite(s) and operators of other GSO space stations receiving in the same uplink band at orbital locations near the target satellite(s).

56. To be eligible for routine licensing, applications for fixed earth stations transmitting to GSO satellites in the extended Ku-band or the 20/30 GHz uplink bands and applications for earth stations transmitting from mobile platforms in the conventional C- or Ku-band must demonstrate that the proposed earth stations will operate within limits on off-axis equivalent isotropically radiated power (EIRP) density specified in Sections 25.138, 25.218, 25.221, 25.222, 25.223, 25.226, and 25.227. Applicants for licenses for fixed earth stations transmitting in the conventional C-band or Ku-band (except stations that transmit analog video signals)[91] can qualify for routine licensing either by demonstrating compliance with off-axis EIRP density criteria in Section 25.218 or by demonstrating compliance with antenna-size, off-axis gain, and input power density criteria in Section 25.134 or Section 25.212(c) or (d). Likewise, an applicant for a feeder-link earth station transmitting in the 24.75-25.25 GHz band can qualify for routine licensing either by demonstrating compliance with off-axis EIRP density criteria in Section 25.223 or by demonstrating compliance with the off-axis gain and input power density criteria in Section 25.212(f).

57. The input power-density and off-axis gain criteria in Sections 25.134 and 25.212 dovetail with the off-axis EIRP density criteria in Sections 25.218 and 25.223. Since off-axis EIRP density is a function of input power density and off-axis antenna gain, proposed earth stations that are ineligible for routine licensing under Section 25.134 or Section 25.212 because off-axis antenna gain would exceed relevant routine limits may qualify for routine licensing under Section 25.218 or Section 25.223 if input power density is reduced to compensate for the higher off-axis gain. Conversely, proposed earth stations could operate with higher input power density than the relevant level specified in Section 25.134 or 25.212 yet qualify for routine licensing under Section 25.218 or Section 25.223 if the applicants propose to use transmitting antennas with off-axis gain lower than the routine levels cross-referenced in Sections 25.134 and 25.212 to an extent sufficient to compensate for the higher input power density.

[89] *See* 47 C.F.R. §§ 25.134, 25.138, 25.211, 25.212, 25.218, and 25.223.

[90] *See* 47 C.F.R. §§ 25.221, 25.222, 25.226, and 25.227.

[91] There are different criteria in Section 25.211 for routine licensing of earth stations that transmit full-transponder analog video signals, which cannot be licensed under Section 25.218. *See* ¶ 76, *infra*.

58. In the following sections, we propose to amend the routine licensing rules to more effectively serve the general purpose of preventing harmful interference.

### 2. Definition of "theta"

59. The rules that prescribe EIRP density criteria for routine licensing specify limits on EIRP density for various angular ranges. The angles are expressed in degrees, using the Greek letter theta (θ) to represent the angle. In Sections 25.138 and 25.223, theta is defined as the angle between a given direction of emission and the axis of a transmitting antenna's main lobe – that is, the angle from the direction of peak emission. Theta is defined in a different way in Sections 25.218, 25.221, 25.222, 25.226, and 25.227. Those sections define theta as the angle from a line from the antenna's focal point to the target satellite. The latter definition is preferable because it properly places responsibility for the effects of antenna mis-pointing on applicants and licensees.[92] We therefore propose to amend Sections 25.138 and 25.223 to define theta in the same way as it is defined in Sections 25.218, 25.221, 25.222, 25.226, and 25.227.

### 3. "Plane Tangent to the GSO Arc"

60. Sections 25.218, 25.221, 25.222, 25.226, and 25.227 specify EIRP density levels for co-polarized signals in "the plane of the geostationary satellite orbit as it appears at the particular earth station location," defined in each of these rule sections as the plane "determined by the focal point of the [earth station] antenna and the line tangent to the arc of the GSO at the orbital location of the target satellite."[93] This defined plane is also referred to as "the plane of the GSO." The terms "plane of the geostationary satellite orbit" and "plane of the GSO" are not entirely appropriate, since they refer to a plane that does not coincide with the plane in which the GSO orbit lies, which passes through the equator. The definition of the plane is imprecise, moreover, as more than one line – indeed, an infinite number of lines – can be tangent to the GSO orbital arc at the position of a target satellite. We propose to delete the repetitious definitions of "the plane of the geostationary satellite orbit as it appears at the particular earth station location" and shorthand variants and replace them with the term "plane tangent to the GSO arc," which we propose to define as follows in Section 25.103: the plane defined by the location of an earth station's transmitting antenna and a line in the equatorial plane that is tangent to the GSO arc at the location of the GSO space station with which the earth station is communicating.

### 4. Emissions Outside the Plane Tangent to the GSO Arc

61. Sections 25.138(a) and 25.223(b) specify two EIRP density envelopes for co-polarized signals: one for emissions "within ±3º of the GSO arc" and another for emissions in "directions other than within ±3º of the GSO arc." Similarly, Sections 25.218, 25.221(a), 25.222(a), 25.226(a), and 25.227(a) specify separate EIRP density envelopes for co-polarized emissions in the plane tangent to the GSO arc and co-polarized emissions in all other directions. Sections 25. 221(a), 25.222(a), 25.226(a), and 25.227(a) also specify envelopes for cross-polarized emissions in all directions. The Commission has required earth station antenna gain to be measured only in two orthogonal planes, however. We do not propose to require antenna gain to be measured in all directions, which would impose additional cost burdens that would not be justified by any consequent public-interest benefit. We therefore propose to revise the routine EIRP density specifications in Sections 25.138(a), 25.218, 25.223(b), 25. 221(a), 25.222(a), 25.226(a), and 25.227(a) to apply only to emissions in the plane tangent to the GSO arc and "the plane perpendicular to the GSO arc," a term that we propose to define in Section 25.103.[94]

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[92] *See Earth Station Eighth Report and Order*, 23 FCC Rcd at 15112 n.90.

[93] *See* 47 C.F.R. §§ 25.218(c)-(h), 25.221(a)(1)(i)(A), 25.222(a)(1)(i)(A), 25.226(a)(1)(i)(A), and 25.227(a)(1)(i)(A).

[94] *See* ¶ 127, *infra*.

### 5. Sidelobe and Backlobe Allowances

62. Notes in Sections 25.218(c)-(f), 25.221(a)(1)(i)(A), 25.222(a)(1)(i)(A), 25.226(a)(1)(i)(A), and 25.227(a)(1)(i)(A) state that EIRP density may exceed the routine envelopes for emissions "in the plane of the GSO" by as much as 3 dB in up to 10% of the sidelobes at off-axis angles between 7º and 180º. Because the angular width of an antenna's sidelobes can vary, allowing 10% of the sidelobes to exceed an EIRP density envelope at theta angles from 7º to 180º might allow the envelope to be exceeded in considerably more, or considerably less, than 10% of that angular range. We therefore propose to amend these rules to provide, instead, that the envelopes for off-axis EIRP density in the plane tangent to the GSO arc may be exceeded by up to 3 dB in up to 10% of the theta angular range of 7-180º.

63. Other provisions in Sections 25.218(c)-(f), 25.221(a)(1)(i)(B), 25.222(a)(1)(i)(B), 25.226(a)(1)(i)(B), and 25.227(a)(1)(i)(B) state that EIRP density may exceed the routine envelopes for emissions outside "the plane of the GSO" by up to 6 dB in up to 10% of the sidelobes and that the region of the main reflector spillover energy is to be regarded as a single lobe for purposes of this rule. We propose to amend these provisions to state, instead, that EIRP density may exceed the routine envelopes for emissions in "the plane perpendicular to the GSO arc" by up to 6 dB in the region of main reflector spillover energy and by up to 6 dB in 10% of the range of theta angles not included in that region. We invite comment as to whether the routine off-axis EIRP density limits for emissions in the plane tangent to the GSO arc should similarly specify a separate allowance for backlobe emissions (*i.e.*, emissions in the region of main reflector spillover energy).

64. Sections 25.138(a)(3) and 25.223(b)(3), which apply to 20/30 GHz earth stations and 17/24 GHz BSS feeder-link earth stations, allow the EIRP density envelopes for co-polarized signals to be exceeded by up to 3 dB at off-axis angles greater than 10º, provided "the total angular range over which this occurs does not exceed 20º when measured along both sides of the GSO arc." Since it is not possible to measure off-axis angles along both sides of the GSO arc in directions outside the plane tangent to the GSO arc, we propose to amend these provisions to state that the EIRP density envelopes for co-polarized signals in Sections 25.138(a) and 25.223(b) may be exceeded by up to 3 dB in up to 10% of the range of theta angles from 10-180º on each side of the line from the earth station to the target satellite.

### 6. EIRP Density Specifications for Cross-Polarized Signals

65. Unlike the rule sections that specify off-axis EIRP density envelopes for 20/30 GHz earth stations, 17/24 GHz feeder-link earth stations, and earth stations on mobile platforms, Section 25.218 does not specify separate envelopes for co-polarized and cross-polarized signals. We invite comment as to whether Section 25.218 should be amended to include separate EIRP density specifications for cross-polarized signals, noting that cross-polarized emissions at off-axis angles can contribute to interference at adjacent orbital locations.

### 7. Limits on Aggregate EIRP Density

66. *The "minus 10log(N)" formula.* Even if every station in an earth station network operates within routine off-axis EIRP density limits or limits on input power density and off-axis gain, aggregate EIRP density from stations in the network toward an adjacent co-frequency satellite could exceed routine limits if multiple stations in the network can transmit simultaneously to the same target satellite in the same frequency range. In view of this, the off-axis EIRP density limits for routinely licensed earth stations in Sections 25.138, 25.218, 25.221, 25.222, 25.226, and 25.227 incorporate a formula that was devised to take aggregate EIRP density into account. As specified in these rule sections, the dB level of EIRP density that a single station may radiate at a given off-axis angle is determined by subtracting 10log(N) from a set quantity. Explanatory notes define N as the maximum number of earth stations in a blanket-licensed network that transmit simultaneously in the same frequencies "in the same satellite receiving beam." Application of the "minus 10log(N)" formula reduces the maximum EIRP density that a single station in a network may emit at a given off-axis angle in proportion to the maximum number of network earth stations that can transmit simultaneously in common frequencies in the same

satellite receive beam. If N, the maximum number of such simultaneously transmitting stations, is 2, a single station in the network may radiate only half as much EIRP density at a given off-axis angle as a single station in a network that does not permit such simultaneous transmission; if N=3, a single station in the network may radiate one-third as much EIRP density in a given off-axis angle as a single station in a network that does not permit such simultaneous transmission; and so forth. For the same reason, the "minus 10log(N)" formula, with the same definition of N, is also incorporated in the routine input-power-density limits in Section 25.134 for stations in digital networks operating in the conventional C- or Ku-band.

67. The phrase "in the same satellite receiving beam" in the definition of N is potentially ambiguous. Read by itself, it could be understood to mean either a receive beam of a target satellite (*i.e.*, a satellite that the proposed earth stations would communicate with) or a receive beam of a "victim" satellite (*i.e.*, a co-frequency GSO satellite in the vicinity of a target satellite).[95] The potential ambiguity could have a material bearing on the value of N in a case where the target satellite has multiple spot beams and one or more potential victim satellites has a single receive beam covering all or most of the area covered by the target satellite's spot beams. In such a case it would be the number of earth stations transmitting simultaneously in the same frequency channel in the victim satellite's receive beam that would determine the interference risk, not the number transmitting simultaneously in a receive beam of the target satellite. This ambiguity could be resolved by changing the phrase "same satellite receiving beam" to "same *victim* satellite receiving beam." If N were defined as the maximum number of earth stations that can transmit simultaneously on common frequencies in a victim satellite's receive beam, however, the value of N could be materially affected by future developments that neither an earth station applicant nor the Commission could anticipate with any certainty.[96] Furthermore, the phrase "satellite receiving beam" is technically imprecise, as it does not define beam boundaries in terms of a gain level relative to peak gain. All of these problems can be avoided by re-defining N as the number of earth stations that will transmit simultaneously in common frequencies to the same target satellite, which we propose.

68. In addition, rather than defining N as the "maximum" or "maximum expected" number of network stations transmitting simultaneously in the same frequencies to the same target satellite, we propose to define it simply as the actual number of simultaneous co-frequency transmissions at any given time, and to stipulate that N=1 for any station not transmitting simultaneously with others on common frequencies to the same target satellite. This would afford operational flexibility for networks that control the number of simultaneously transmitting co-frequency stations and enable them to operate more efficiently.[97]

69. The notes defining N in Sections 25.134, 25.138, 25.212, 25.218, 25.221, 25.222, 25.226, and 25.227 stipulate that N=1 for stations operating pursuant to FDMA or TDMA network protocols,

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[95] When the Commission adopted the "minus 10log(N)" term initially in 2005, it made clear that it applied to the receive beam of a target satellite. *2000 Biennial Regulatory Review -- Streamlining and Other Revisions of Part 25 of the Commission's Rules Governing the Licensing of, and Spectrum Usage by, Satellite Network Earth Stations and Space Stations*, IB Docket No. 00-248, Sixth Report and Order and Third Further Notice of Proposed Rulemaking, 20 FCC Rcd 5593, 5618 n.176 (2005), *citing 2000 Biennial Regulatory Review – Streamlining and Other Revisions of Part 25 of the Commission's Rules Governing the Licensing of, and Spectrum Usage by, Satellite Network Earth Stations and Space Stations*, IB Docket No. 00-248, Notice of Proposed Rulemaking, 15 FCC Rcd 25131, 25208 (App. E) (2000).

[96] Specifically, the value of N, so defined, could be affected by a change in the size, shape, or number of an adjacent co-frequency satellite's receive beams.

[97] In modern VSAT networks, hub earth stations typically issue time-slot and/or frequency assignments in response to requests from the remote terminals for spectrum resources, thus controlling the number of simultaneous co-frequency uplink transmissions.

which assign a separate frequency channel or time slot for each transmission. We propose to delete these stipulations, because operation with an FDMA or TDMA protocol does not necessarily preclude simultaneous co-frequency transmission by multiple earth stations to the same target satellite. Such simultaneous transmission could occur in an FDMA or TDMA network communicating via a satellite with multiple spot beams re-using the same frequency channels.

70. The "minus 10log(N)" formula is not incorporated in the routine input-power-density limits for individually licensed Ku-band earth stations in Section 25.212(c)(1) or in the routine input power-density limit for individually licensed analog C-band stations in Section 25.212(d). Because aggregate EIRP density can be generated by individually licensed earth stations transmitting to a target satellite with multiple spot beams, we propose to incorporate the "minus 10log(N)" formula in those input-power-density criteria in Sections 25.212(c)(1) and 25.212(d). For the same reason, we also propose to incorporate the "minus 10log(N)" formula in the EIRP density envelopes for analog stations in Section 25.218.

71. *The 1 dB rule for systems with selective power control*. To conform to routine off-axis EIRP density limits incorporating the "minus 10log(N)" formula, all network earth stations transmitting simultaneously in the same frequency range to the same target satellite must limit EIRP density to the same extent. Imposing such a uniform limit could impair the efficiency of a system that dynamically controls the radiated power density of individual stations (using, for example, adaptive coding and modulation techniques) to accommodate different earth station antenna sizes, different atmospheric attenuation conditions, and different satellite receive beam gain contours. Recognizing this, the Commission included provisions in the licensing and operating rules for earth stations on mobile platforms that prescribe different off-axis EIRP density requirements for networks that can manage aggregate EIRP density by controlling the EIRP density of individual earth stations. Rather than requiring each earth station in such a network to operate in accordance with the "minus 10log(N)" formula, these provisions require both off-axis EIRP density from each station in a network and aggregate EIRP density toward satellites other than the target satellite to be kept at least 1 dB below the limits for stations operating in networks that do not permit more than one earth station to transmit at the same time in the same frequency range – *i.e.*, 1 dB below the levels determined according to the "minus 10log(N)" formula with N=1.[98] In the interest of affording flexibility for more efficient operation, SIA advocates adoption of a similar provision in Section 25.138(a) for applicants proposing to manage the aggregate off-axis EIRP density generated by earth stations in a 20/30 GHz network through dynamic control of the power output of individual stations.[99] We propose to insert such a provision in Section 25.138(a) and in Section 25.218.

72. We also propose to modify the text of the existing "1 dB" rules in Sections 25.221, 25.222, 25.226, and 25.227 for clarification. These rules currently express the 1 dB limit on aggregate emissions by stating that the "effective aggregate EIRP-density" from all terminals shall be at least 1 dB below the limits determined by the "minus 10log(N)" formula with the value of N = 1 and define "effective aggregate EIRP density" as "the resultant co-polarized and cross-polarized EIRP-density experienced by any GSO or non-GSO satellite."[100] The phrase "EIRP-density experienced by any … satellite" is a contradiction in terms, since EIRP refers to radiated power at the source. We propose to revise these provisions to simply state that aggregate EIRP density from stations in a network toward any co-frequency satellite other than the target satellite(s) must be at least 1 dB below the limits determined by the "minus 10log(N)" formula if N=1.

[98] *See* 47 C.F.R. §§ 25.221(a)(3)(i) and (b)(3)(i), 25.222(a)(3)(i) and (b)(3)(i), 25.226(a)(3)(i) and (b)(3)(i), and 25.227(a)(3)(i) and (b)(3)(i).

[99] SIA 2013 Comments at 47.

[100] *See, e.g.*, 47 C.F.R. § 25.221(a)(3)(i).

### 8. Operation with Contention Protocols

73. Earth station networks typically use contention protocols for transmission of small amounts, or "packets," of data (such as the information on the magnetic stripe of a credit card and the amount and type of a transaction with the card) in bursts of very short duration. In a network using a contention protocol, multiple remote stations may transmit data bursts, or "packets," in the same frequency channel, either at random times or in time slots that are not assigned exclusively to a single transmitting station. Consequently, packet transmissions from two or more remote stations in a network operating with a contention protocol can occur simultaneously, or "collide," on a shared frequency channel. When collisions occur, the data in the colliding packets is usually lost and is subsequently re-transmitted.[101] The frequency of collisions is a function of loading, that is, the percentage of the time when at least one remote terminal in a network is transmitting. It is necessary to limit loading, and hence collision frequency, to optimize network efficiency.[102] When two or more earth stations in a contention protocol network transmit simultaneous bursts to the same target satellite, resultant aggregate EIRP density may briefly interfere with uplink reception in another GSO satellite, or satellites, in the target satellite's vicinity.

74. In a series of rulemaking orders issued over an eight-year period, the Commission considered imposing technical restrictions on use of contention protocols for operation of Ku-band Very Small Aperture Terminal (VSAT) networks in order to minimize interference from aggregate off-axis radiation resulting from colliding packet transmissions.[103] Ultimately, the Commission concluded that use of contention protocols can increase network efficiency and that their use usually tends to reduce interference risk compared to continuous single-carrier-per-channel operation at the input power-density limit that Section 25.134(g) specifies for digital VSAT stations.[104] The Commission therefore declined to adopt specific technical restrictions on contention protocol operation. Instead, it amended Section 25.134(g) to require Ku-band VSAT applicants to certify that planned use of contention protocols will be reasonable.[105] The Commission decided that questions as to the reasonableness of contention protocol operation could be appropriately addressed on a case-by-case basis when third parties present evidence that their systems have suffered harmful interference.[106]

75. In view of the findings in the *Earth Station Eighth Report and Order* noted above[107] and the subsequent absence of complaints alleging harmful interference from use of contention protocols, we propose to amend Section 25.134 to state that collisions of burst transmissions resulting from contention

[101] Upon receiving a packet, a hub station sends back an acknowledgment to the remote station that transmitted it. If remote stations that have just transmitted colliding packets do not receive acknowledgements of receipt of those packets within a short, predetermined time period, each of them will "back off" for a further time interval and then re-transmit the lost packet. The back-off intervals are randomized to minimize the odds of collision between re-transmitted packets.

[102] For instance, in a network using the slotted Aloha contention protocol, peak capacity is achieved with loading at approximately 36.8%.

[103] *See 2000 Biennial Regulatory Review – Streamlining and Other Revisions of Part 25 of the Commission's Rules Governing the Licensing of, and Spectrum Usage by, Satellite Network Earth Stations and Space Stations*, IB Docket No. 00-248, Notice of Proposed Rulemaking, 15 FCC Rcd 25131 (2000), Further Notice of Proposed Rulemaking, 17 FCC Rcd 18585 (2002), Third Notice of Proposed Rulemaking, 20 FCC Rcd 5593 (2005), and Eighth Report and Order and Order on Reconsideration, 23 FCC Rcd 15099 (2008).

[104] *Earth Station Eighth Report and Order*, 23 FCC Rcd at 15132-33, ¶¶ 77 and 79.

[105] *See* 47 C.F.R. § 25.134(g)(5).

[106] 23 FCC Rcd at 15134, ¶¶ 81-82.

[107] *See* n.104, *supra*.

protocol operation need not be taken into account when determining the value of "N" in the "minus 10log(N)" formula. We propose to include the same proviso in the definition of "N" in Sections 25.138 and 25.218 and include a similar exception for contention protocol operation in the limit on aggregate EIRP density for networks operating with variable power control that we are proposing to incorporate in Sections 25.138 and 25.218. We invite comment on the advisability of inserting analogous provisions in Sections 25.221, 25.222, 25.226, and 25.227 for stations operating with contention protocols on mobile platforms. We also invite comment as to whether the current certification requirement in Section 25.134(g)(5) should be deleted.

### 9. Routine Licensing Criteria for Stations Transmitting Full-Transponder Analog Video Signals

76. Section 25.211(d) specifies minimum antenna sizes, limits on off-axis gain (by reference to those in Section 25.209), and limits on antenna input power for routine licensing of earth stations that transmit full-transponder analog video signals in the conventional C-band or conventional Ku-band. The Commission has not prescribed alternative off-axis EIRP density criteria for routine licensing of such earth stations. Because analog video transmission entails wideband frequency modulation, the power density of such transmissions is not constant across the occupied bandwidth. In order to specify off-axis EIRP density limits for analog video transmission, it would be necessary to specify the modulation parameters and the characteristics of the modulating signal, *i.e.*, the analog video signal representing the actual scene being televised, which is infeasible.[108]

77. In the *2013 Report and Order*, the Commission said that it would invite comment, in a future order, on the possibility of expanding the scope of the routine processing criteria in Section 25.211(d) to apply to all applications for analog video operation in the 5925-6425 MHz or 14.0-14.5 GHz band, not just those proposing full-transponder transmission.[109] Upon further reflection, we conclude that further inquiry in this regard is unwarranted, in view of the rarity of less-than-full-transponder analog video transmission in those frequency bands and potential interference concerns that might arise from removal of the full-transponder limitation. Authority for transmission of two or more analog video signals within the bandwidth of a single transponder can be sought, however, based on coordination pursuant to Section 25.220.

### 10. Analog Signal Bandwidth

78. The routine licensing criteria for analog earth station operation in Section 25.212 apply only to transmission of analog signals with bandwidths of 200 kHz or less, or 1 MHz or less for command signals at a band edge. There are no such bandwidth limits in the routine licensing criteria for analog VSAT operation in Section 25.134, which are otherwise identical to the criteria for analog operation in Section 25.212. Nor do the off-axis EIRP density criteria in Section 25.218 include limits on analog signal bandwidth. The absence of analog bandwidth limits in Sections 25.134 and 25.218 appears to have been inadvertent rather than deliberate.[110] It is appropriate to exclude wideband analog earth station operation from routine licensing based on compliance with limits on power density, because the power density of wideband analog transmissions fluctuates and such transmissions are more likely to cause

[108] Hence, the Commission considered and rejected a proposal to prescribe off-axis EIRP density envelopes for analog video transmission in the *Earth Station Eighth Report and Order*. *Id*. at 15115, ¶ 31.

[109] 28 FCC Rcd at 12459, ¶ 186.

[110] *See Routine Licensing of Large Networks of Small Antenna Earth Stations Operating in the 12/14 GHz Frequency Bands*, CC Docket No. 90-219, Report and Order, 6 FCC Rcd 7372 (1991), and *2000 Biennial Regulatory Review – Streamlining and Other Revisions of Part 25 of the Commission's Rules Governing the Licensing of, and Spectrum Usage by, Satellite Network Earth Stations and Space Stations*, IB Docket No. 00-248, Eighth Report and Order and Order on Reconsideration, 23 FCC Rcd 15099 (2008) (adopting 47 C.F.R. §§ 25.134 and 25.218 without discussion on point).

interference than narrowband analog or digital transmissions of similar power.[111] We propose to amend Section 25.218 to limit the applicability of the routine licensing criteria in that section to exclude transmission of band-edge analog command signals with bandwidths greater than 1 MHz or transmission of other analog uplink signals with bandwidths greater than 200 kHz. Adopting these proposed bandwidth limits would eliminate any need for the specific exclusion of analog video operation in Section 25.218(a)(2), which we propose to delete. We also propose to amend the routine licensing rules for VSAT networks in Section 25.134 to exclude applications proposing transmission of analog uplink signals with bandwidths greater than 200 kHz, except applications proposing full-transponder analog video operation in compliance with the criteria in Section 25.211(d). There is no need to specify a limit on the bandwidth of command signals in Section 25.134, however, since VSAT earth stations are not used for telemetry, tracking, and control (TT&C) operation.

### 11. Criteria for Downlink Transmission

79. The routine licensing criteria for Ku-band earth stations in Sections 25.134 and 25.212 include limits on the EIRP density of downlink transmissions in the conventional Ku-band. Similarly, the routine licensing criteria for 20/30 GHz earth stations in Section 25.138(a) include a limit on the power flux density of downlink transmissions at the Earth's surface. The purpose of these limits is to minimize the likelihood that a space station's retransmission of signals received from routinely licensed earth stations will interfere with reception of co-frequency downlinks from adjacent satellites. Although earth station operation affects the EIRP density and power flux density of downlink transmissions, we think that space station operators should bear ultimate responsibility for controlling the interference potential of downlink transmission. We therefore propose to remove the downlink limits from Sections 25.134, 25.138, and 25.212 and insert the same limits into Section 25.140 as coordination triggers for space station applicants.

### 12. Alternative Routine Licensing Criteria for 20/30 GHz Earth Stations

80. Because it may be more convenient for some applicants to qualify for routine licensing based on certification of conformance with off-axis gain, input power density, and antenna-size criteria than to submit data to demonstrate compliance with routine off-axis EIRP density limits, we propose to incorporate alternative off-axis gain, input power density, and antenna-size criteria in Sections 25.134 and 25.212 for applicants for earth stations transmitting to GSO satellites in the 28.35-28.6 GHz and/or 29.25-30.0 GHz bands. Accordingly, we also propose to amend Section 25.132 to allow such applicants to certify compliance with relevant standards in Section 25.209(a) and (b) instead of submitting antenna gain patterns. Thus, an applicant for such earth stations could qualify for routine licensing either by demonstrating that it will meet the off-axis EIRP density criteria in Section 25.138(a) or by certifying conformance with off-axis gain standards in Section 25.209 and specifying input power density and antenna size consistent with the proposed criteria in Sections 25.134 and 25.212.

81. For this purpose, we propose to specify a routine input power density limit of 3.5 – 10log(N) dBW/MHz for earth stations transmitting in the 28.35-28.6 GHz and/or 29.25-30.0 GHz bands. With a 3.5 dBW/MHz input signal, a transmitting antenna with the gain patterns specified for both 12/14 GHz and 20/30 GHz antennas in Sections 25.209(a)(2) and (b) would generate EIRP density levels matching or nearly matching (within 0.2 dB) those that Section 25.138(a) specifies for off-axis angles from 2º to 48º. At off-axis angles between 48º and 85º, however, the EIRP density of co-polarized signals generated by an antenna with the gain pattern in Section 25.209(a)(2) and a 3.5 dBW/MHz input would be 10 dB below the corresponding limits in Section 25.138(a). We therefore propose to insert separate gain specifications for 20/30 GHz antennas in Sections 25.209(a) and (b) that will comport with the off-

[111] Section 25.211(d) specifies a limit on input power (rather than power density) and other criteria for routine licensing of full-transponder analog video earth station operation, which is subject to additional technical and coordination requirements in paragraphs (b) and (c) of that rule section.

axis EIRP density specifications in Section 25.138(a).[112] We also propose to prescribe a minimum antenna diameter of 66 centimeters for routine licensing of 20/30 GHz earth stations that comply with relevant off-axis antenna gain standards in Section 25.209 and the proposed maximum input power density of 3.5 dBW/MHz. At 28.3 GHz, the off-axis gain performance of a 66-centimeter antenna is approximately equivalent to the off-axis gain at 14 GHz of an antenna of the minimum diameter that Sections 25.134, 25.211, and 25.212 specify for routinely licensed 12/14 GHz earth stations.

### 13. Routine Gain Envelopes for 17/24 GHz BSS Feeder-link Stations

82. As an alternative to the off-axis EIRP density criteria in Section 25.223 for routine licensing of earth stations that transmit to 17/24 GHz BSS satellites in the 24.75-25.25 GHz band, Section 25.212(f) states that such earth station operation may be routinely licensed if the earth station's antenna meets gain pattern requirements in Sections 25.209(a) and (b) and the maximum power density into the antenna will not exceed 3.5 dBW/MHz. Section 25.209 does not currently specify off-axis gain standards for antennas operating in the 24.75-25.25 GHz band, but we propose to amend Section 25.209 to indicate that the off-axis gain envelopes specified for 20/30 GHz earth stations also apply to earth stations transmitting in the 24.75-25.25 GHz band.

### 14. Other Proposed Changes in Sections 25.134 and 25.212

83. The current wording of the caption for Section 25.134 implies that the term "VSAT network" refers only to earth station networks that operate in the conventional Ku-band and uses another term, "CSAT," to refer to networks operating in the conventional C-band. In common industry usage, however, "VSAT network" is used to refer not only to conventional Ku-band networks but also to networks operating in other FSS bands. In Section III.F, below, we propose to adopt a definition of "VSAT network" consistent with industry usage.[113] Accordingly, we propose to replace the term "CSAT network" or "CSAT system," in the caption of Section 25.134 and elsewhere in Part 25,[114] with the term "conventional C-band VSAT network."

84. Section 25.134(a)(2) states that applications for earth station networks operating in the 4/6 GHz frequency bands (*i.e.*, the conventional C-band) will be routinely processed provided, among other things, "the power levels are consistent with §§ 25.211(d) and 25.212(d)." We propose to amend this provision to clarify that to qualify for routine processing, a conventional C-band VSAT network application proposing full-transponder analog video operation must specify input power within the limit in Section 25.211(d) and that a conventional C-band VSAT network application proposing any other type of analog operation will be eligible for routine processing if the specifications in the application comport with the relevant antenna size, antenna gain, bandwidth, and input power density criteria in Section 25.212(d) or the applicant demonstrates that the proposed VSAT stations will operate within the relevant routine off-axis EIRP density limits in Section 25.218.

85. Sections 25.134(a)(2) and (b) specify requirements for VSAT network applications that do not meet routine licensing criteria. Section 25.134(a)(2) states that a lead application for a 4/6 GHz network that proposes operation with antennas smaller than 4.5 meters in diameter or with non-routine power levels must include a technical analysis demonstrating that the proposed non-conforming operation will not cause unacceptable interference. Section 25.134(b) states that an applicant for a 12/14 GHz (*i.e.*, conventional Ku-band) VSAT network proposing to operate "with transmitted [downlink] power spectral density and/or antenna input power in excess of the values specified in paragraph (g) of this section must comply with the requirements in § 25.220." We propose to replace both of these provisions with a general provision in Section 25.220 stating, among other things, that applications for fixed earth station

[112] *See* Appendix A, ¶ 37, *infra*.

[113] *See* ¶ 131, *infra*.

[114] There are multiple instances of "CSAT" in Section 25.115.

operation in the conventional C-band or conventional Ku-band that do not qualify for routine processing under relevant criteria in Section 25.134, 25.211, 25.212, or 25.218 must meet the coordination requirements in Section 25.220.

86. SIA suggests adding a provision in Section 25.134 that would allow a Ku-band or 20/30 GHz VSAT applicant proposing to operate within a limit of 50 dBW on peak EIRP to omit all other technical specifications and merely certify that the proposed operation will be in compliance with all applicable Commission rules.[115] We invite comment on this suggestion.[116] More specifically, we invite comment as to whether 50 dBW EIRP would be an appropriate eligibility limit if we were to adopt such a rule.

87. SIA has also suggested that the FCC look to the licensing approach that Europe has taken for VSAT terminals.[117] There, operators must test their equipment and declare conformity with the technical standards developed by the European Telecommunication Standards Institute before deploying and operating a new type of satellite earth station, but conformance with those standards exempts such stations from individual or blanket licensing requirements.[118] We do not currently have such technical standards for satellite earth stations. We seek comment on the costs and benefits of the standards-based approach. Should we consider adopting a similar approach, perhaps on a limited basis for certain types of stations in particular bands? If so, what types of stations operating in what bands should be subject to such an approach, and what should the associated technical standards be? We believe we have legal authority to adopt licensing rules similar to the standards-based approach, and seek comment on this tentative conclusion.[119]

88. We propose to amend Section 25.212(e) to make it more concise, without changing its substantive effect. The amended provision would simply state that applications for authority for fixed earth station operation in the 5925-6425 MHz or 14.0-14.5 GHz band that do not qualify for routine processing under relevant criteria in Section 25.211, 25.212, or 25.218 are subject to the requirements in Section 25.220.

### 15. Clarification of the Applicability of Section 25.218

89. The first paragraph in Section 25.218 states that the rules in that section apply to all applications for FSS earth stations transmitting to GSO space stations in the conventional C-band, conventional Ku-band, or extended Ku-band, except for applications for Earth Stations on Vessels, Vehicle-Mounted Earth Stations, Earth Stations Aboard Aircraft, or analog video earth stations. This

[115] SIA 2013 Comments, Rules Appendix at 21.

[116] Commenters who advocate adoption of this suggestion should provide supporting technical analysis, which is lacking in SIA's previous comments on point.

[117] *See, e.g.*, Comments of the Satellite Industry Association at 68, n.164, IB Docket No. 12-267 (filed Jan. 14, 2013).

[118] *See, e.g.*, Directive 2002/20/EC of the European Parliament and of the Council of 7 March 2002 on the authorisation of electronic communications networks and services (Authorisation Directive); Electronic Communications Committee, ECC Decision of 24 March 2006 on Exemption from Individual Licensing of high e.i.r.p. satellite terminals (HEST) operating within the frequency bands 10.70-12.75 GHz or 19.70-20.20 GHz space-to-Earth and 14.00-14.25 GHz or 29.50-30.00 GHz Earth-to-space, ECC/DEC/(06)03.

[119] In the analogous context of terrestrial mobile operations, the license of a commercial mobile radio service (CMRS) carrier grants it authority to deploy both uplink and downlink devices, i.e., both handsets and macro- (or micro-)sites. In the satellite context, the license to operate a space station using particular spectrum bands could carry with it the license to deploy earth stations in those bands that comply with our technical standards. We also note that the Commission has licensed Ancillary Terrestrial Component stations on this basis by modifying Mobile Satellite Service space station licenses.

implies that an application for VSAT stations that would transmit to GSO satellites in the conventional C- or Ku-band could qualify for routine licensing under off-axis EIRP density standards in Section 25.218. Nevertheless, confusion might arise in view of the fact that there are different (albeit not incompatible) routine licensing criteria in Section 25.134 that *explicitly* apply to conventional C-band and conventional Ku-band VSAT applications. To prevent such confusion, we propose to amend Section 25.218 to explicitly state what it currently implies: that an application for conventional C- or Ku-band VSAT stations not meeting the criteria in Section 25.134 can instead qualify for routine processing under EIRP density criteria in Section 25.218.

### 16. Reference Bandwidth in EIRP Density Specifications in Section 25.138

90. In the *2013 Report and Order*, the Commission amended Section 25.114(c)(4)(ii) to require space station applicants to specify EIRP density with reference bandwidths of 4 kHz for emissions in frequencies below 15 GHz and 1 MHz for emissions in frequencies above 15 GHz.[120] SIA had recommended this change to conform the Commission's practice with the ITU's.[121] For the same reason, SIA recommends re-specifying the off-axis EIRP density limits in Section 25.138(a) for routinely licensed earth stations transmitting in the 20/30 GHz band with a reference bandwidth of 1 MHz instead of the 40 kHz reference bandwidth that Section 25.138(a) currently specifies.[122] We propose to adopt this change to align our rules with the ITU Radio Regulations and provide more flexibility for applicants, as emission power would be averaged over a larger bandwidth.

### 17. Routine Licensing Criteria for Extended C-band Stations

91. There is currently no provision in the Commission's rules for routine licensing of earth stations that would transmit in the "extended" C-band uplink frequencies: that is, 5850-5925 MHz, 6425-6700 MHz, and 6700-7025 MHz, which are allocated for FSS. We propose to extend the routine licensing criteria for conventional C-band earth stations in Section 25.218 to proposed earth station operations in these other uplink bands as well.

### 18. Off-Axis Gain Standards for FSS Earth Stations

92. Sections 25.209(a) and (b) state that the off-axis gain of any antenna used for transmission from an FSS earth station must be within limits specified in sub-paragraphs in those provisions, "[e]xcept as provided in paragraph (f)." Section 25.209(f) provides, in effect, that an FSS earth station may transmit with an antenna with off-axis gain exceeding relevant limits in Section 25.209(a) or (b) if licensed based on conformance with off-axis EIRP density limits in Section 25.138, 25.218, 25.221, 25.222, 25.223, 25.226, or 25.227 or based on compliance with coordination rules in Section 25.220, 25.221, 25.222, 25.223, 25.226, or 25.227. Earth station applicants proposing to transmit in the conventional C-band, the conventional Ku-band, or the 24.75-25.25 GHz band must certify that the antennas they propose to use meet the gain limits in Sections 25.209(a) and (b) to qualify for routine licensing under Section 25.134, 25.211, or 25.212.

93. As suggested by SIA,[123] we propose to amend Sections 25.209(a) and (b) to clarify that these provisions also apply to earth stations that use allocated FSS frequencies to provide feeder links for non-FSS space stations, *e.g.*, feeder links for Mobile-Satellite Service (MSS) or BSS space stations.

[120] 28 FCC Rcd 12403 at ¶ 79.

[121] SIA 2013 Comments at 24, citing ITU Radio Regulations, Footnote 2 to Tables A-D in Appendix 4, Annex 2.

[122] *Id.* at 45.

[123] SIA 2013 Comments at 55.

94. For reasons stated above,[124] we propose to replace the phrase "plane of the geostationary satellite orbit as it appears at the particular earth station location," where used in Sections 25.209(a) and (b), with the term "plane tangent to the GSO arc."

95. As noted above,[125] the Commission has required earth station antenna gain to be measured in only two orthogonal planes. We see no reason to require it to be measured in all directions. We therefore propose to delete the phrase "in all other directions or in the plane of the horizon including any out-of-plane potential terrestrial interference paths," which currently appears in Sections 25.209(a)(3) and (4) and Section 25.209(b)(2). Instead, we propose to specify envelopes for gain in the plane tangent to the GSO arc and in the plane perpendicular to the GSO arc.

96. A note in Section 25.209(a)(1) states that the limits on off-axis gain in "the plane of the geostationary satellite orbit" for antennas transmitting in bands other than the conventional Ku-band or 20/30 GHz bands may be exceeded by up to 3 dB in up to 10% of the sidelobes at off-axis angles greater than 7 degrees. Similar provisions in Sections 25.209(a)(3) and (a)(4), which in combination apply to FSS earth station operation in any frequency band, state that the limits on gain in other directions may be exceeded by 6 dB in up to 10% of the sidelobes, counting the main reflector spillover region as a single lobe. We propose to amend these provisions in the same way that we are proposing to amend analogous provisions in the rules that specify off-axis EIRP density criteria for routine licensing.[126]

97. There is no text in Section 25.209(a)(2) regarding a sidelobe allowance or the meaning of the theta symbol and "dBi" as used in the table specifying routine gain limits in "the plane of the geostationary satellite orbit" for antennas transmitting in the conventional Ku-band or 20/30 GHz bands. We propose to include such text in the proposed provisions in Section 25.209 that would specify separate routine gain limits for antennas transmitting in the conventional Ku-band and 20/30 GHz bands.[127]

98. Section 25.209(a)(5) states that an elliptical earth station antenna may be operated only when its major axis is aligned with "the plane of the geostationary satellite orbit as it appears at the particular earth station location." We propose to eliminate this rule. Earth station operators have an incentive to align the long axis of elliptical antennas with the plane tangent to the GSO arc, insofar as possible, in order to minimize interference from operation of satellites in the vicinity of their target satellites. Instead of requiring all elliptical antennas to be aligned with the plane tangent to the GSO arc, which may be infeasible for earth station antennas on mobile platforms, we propose below to require the gain and off-axis EIRP density of antennas with axially asymmetric radiation patterns to be measured and specified at the worst-case skew angles at which the antennas will operate.[128]

99. Section 25.209(c)(1) states that earth stations "licensed for reception of transmissions" from FSS space stations "are protected" from interference caused by other space stations "only to the degree to which harmful interference would not be expected to be caused to an earth station employing an antenna conforming to the … patterns defined in [Sections 25.209(a) and (b)]" and "are protected" from interference from terrestrial stations "only to the degree to which harmful interference would not be expected to be caused" to an earth station conforming to the limits in Sections 25.209(a)(3) and (4) on gain outside the "plane of the geostationary satellite orbit." For clarification, and to maintain consistency with the registration rule in Section 25.131(b),[129] we propose to amend Section 25.209(c)(1) to state that

[124] *See* ¶ 60, *supra*.

[125] *See* ¶ 61, *supra*.

[126] *See* ¶¶ 62-63, *supra*.

[127] *See* ¶ 81, *supra*.

[128] *See* the definition of "skew angle" in ¶¶ 106 and 129, *infra*.

[129] 47 C.F.R. § 25.131(b) states that (unlicensed) receive-only FSS earth stations may be registered for protection from interference from operation of terrestrial microwave stations in shared bands.

an earth station licensed for operation with an FSS space station or registered for reception of transmissions from such a space station pursuant to Sections 25.131(b) and (d) is not entitled to protection from interference from transmissions from space stations, terrestrial stations, or other earth stations that would not cause harmful interference to that earth station if it were using an antenna conforming to the gain limits in Sections 25.209(a) and (b) in the receive band.

100. Section 25.209(e) states that earth station operation with an antenna not conforming to the standards of Sections 25.209(a) and (b) "shall impose no limitations upon the operation, location or design of any terrestrial station, any other earth station, or any space station beyond those limitations that would be expected to be imposed by an earth station employing an antenna conforming to the reference patterns defined in Sections 25.209(a) and (b)." This rule is redundant with Section 25.209(c), as we propose to amend it. We therefore propose to eliminate Section 25.209(e).

101. The gain envelope for Ku-band NGSO FSS gateway stations in Section 25.209(h) contains typographical errors, which we propose to correct. There is also an error of omission in that gain envelope. When the Commission adopted Section 25.209(h) in the First Report and Order in Docket No. 98-206, it decided that NGSO FSS gateway stations should have the same side-lobe exceedance allowance as Ku-band earth stations transmitting to GSO satellites,[130] but this decision was not reflected in the rule appendix to the Report and Order and consequently is not reflected in Section 25.209(h). We propose to amend Section 25.209(h) to correct that oversight.

### 19. Demonstrating Conformance with Limits on Off-Axis Gain and EIRP Density

102. Section 25.132(b)(1) prescribes requirements for measuring and plotting the gain of antennas to be used in FSS earth stations transmitting in bands other than the 20/30 GHz band. Section 25.138(d)(1) specifies similar requirements for measuring and plotting the gain of antennas for 20/30 GHz earth stations. The requirements in Section 25.132(b)(1) are identical to those in Section 25.138(d)(1) except for differences in the specified angular ranges for measuring and plotting co-polarization gain and cross-polarization gain. SIA contends that there is no reason to specify different measurement parameters for FSS earth station antennas operating in different frequency bands and recommends amending the specifications in Section 25.132(b)(1) to conform to those in Section 25.138(d)(1).[131] In line with the SIA's recommendation, we propose to amend Section 25.132(b)(1) to specify a measurement range of ±10 degrees from beam peak for cross-polarized gain, as the currently specified range of ± 9 degrees is insufficient for demonstrating conformance with the gain envelopes in Section 25.209(b) or with the cross-polarization EIRP density envelopes in Section 25.221, 25.222, 25.223, 25.226, or 25.227. We also propose to re-specify the angular range in Section 25.132(b)(1)(i) for narrowly-focused plotting of co-polarization gain in the azimuth plane from ± 7 degrees to ± 10 degrees from beam peak and re-specify the measurement range for co-polarization gain in the elevation plane to 0-30 degrees from beam peak. Since these proposed changes would eliminate the discrepancies between the specifications in Section 25.132(b)(1) and those in Section 25.138(d), we propose to expand the scope of the requirements in 25.132(b)(1) to apply to antennas for 20/30 GHz earth stations and delete the separate gain measurement specifications in Section 25.138(d).

103. Section 25.132(b)(1) requires gain to be measured "at the bottom, middle and top of each allocated frequency band." We propose to amend this provision to require gain to be measured, instead, at the bottom and top of each band assigned for uplink transmission. Gain in downlink (*i.e.*, receive) bands has no bearing on an earth station's interference potential, and measuring gain at the top and

[130] *Amendment of Parts 2 and 25 of the Commission's Rules to Permit Operation of NGSO FSS Systems Co-Frequency with GSO and Terrestrial Systems in the Ku-Band Frequency Range*, First Report and Order and Further Notice of Proposed Rulemaking, 16 FCC Rcd 4096, 4187, ¶ 243 (2000).

[131] SIA 2013 Comments at 40-41.

bottom of an uplink band is sufficient for purposes of assessing interference potential .

104. Section 25.132(b)(1)(i) states that co-polarized gain is to be measured "plus and minus 7 degrees and plus and minus 180 degrees from beam peak" in the azimuth plane. We propose to revise the text of this provision to clarify that co-polarized gain is to be measured across a range extending to 180 degrees on both sides of the main-lobe axis and that the measurements are to be represented in two plots: one across the entire angular range extending ±180 degrees from the main-lobe axis and the other covering a smaller range (currently ±7 degrees from the main-lobe axis or ±10 degrees from the axis as proposed herein).

105. Section 25.132(b)(1)(i) states that co-polarization gain must be measured in the E- and H-planes of linearly-polarized antennas and in two orthogonal cuts of circularly-polarized antennas. Paragraphs (A) and (B) of Section 25.132(b)(1)(i) specify angular ranges for measuring co-polarized gain in the azimuth and elevation planes. The E- and H-planes of a linearly-polarized antenna are the planes of the electric field and the magnetic field, respectively, the orientations of which depend upon the antenna's polarization angle setting, which may be at any angle with respect to the azimuth and elevation planes. Hence, the E- and H-planes of the radiation pattern of a linearly-polarized antenna may not correspond to the antenna's azimuth and elevation planes. We therefore propose to delete the phrase "in the E- and H-planes for linear-polarized antennas" from Section 25.132(b)(1)(i). Section 25.132(b)(1)(ii) similarly states that cross-polarization gain must be measured in the E- and H- planes of linearly-polarized antennas and in two orthogonal cuts of circularly-polarized antennas, without mentioning azimuth and elevation planes. Because cross-polarization gain should be measured in the same planes as co-polarization gain, we propose to delete the reference to E- and H- planes from Section 25.132(b)(1)(ii) and revise that provision to state, instead, that cross-polarization gain must be measured in the azimuth and elevation planes. We also propose to delete, as unnecessary, the statements in Sections 25.132(b)(1)(i) and (ii) that gain of circularly-polarized antennas must be measured in two orthogonal (*i.e.*, perpendicular) cuts, because requiring measurements to be made in the azimuth and elevation planes necessarily means that they must be made in orthogonal cuts, since the azimuth and elevation planes are perpendicular to one another.

106. The angle between the minor axis of a linear-polarized earth station antenna beam and the plane tangent to the GSO arc may be referred to as the "skew" angle.[132] An antenna producing a radiation pattern that is not axially symmetric around the main-lobe axis might meet the off-axis gain standards in Section 25.209 only when operating without skew, *i.e.*, only when the minor axis of the antenna beam is aligned with the plane tangent to the GSO arc. We therefore propose to adopt a new provision in Section 25.132(b)(1) that would require the gain of an antenna with an axially asymmetric radiation pattern to be measured at the worst-case skew angle at which the antenna would operate if it would not always be aligned with the plane tangent to the GSO arc.[133] We invite comment as to whether a further requirement should be adopted for measuring the gain patterns of flat-plate antennas and, if so, what requirement would be appropriate for this purpose.

107. We propose to delete the second sentence in Section 25.132(b)(2), which states that "[t]he minimum tests specified above are recognized as representative of the performance of the antenna in most planes although some increase in sidelobe levels should be expected in the spar planes and orthogonal spar planes." The statement is both unnecessary and unduly vague, since Section 25.209 specifies the extent to which gain envelopes may be exceeded in sidelobes.

[132] *See, e.g.*, Application of Center of Innovation and Excellence in IBFS File No. SES-MOD-20100903-01140 at Attachment A and Application of Row 44, Inc. in IBFS File No. SES-MOD-20121023-00963, Description of Modification at p. 2 and Attachment A.

[133] We accordingly propose to add a definition of "skew angle" in Section 25.103. *See* ¶ 129, *infra*.

108. Section 25.132(b)(3) states that applicants seeking authority to operate Fixed-Satellite Service earth stations pursuant to the requirements in Section 25.218, 25.220, 25.221, 25.222, 25.223, 25.226, or 25.227 must submit a copy of the manufacturer's range test plots of the gain patterns of antennas less than three feet in diameter. As indicated in the next paragraph, we propose to require applicants to specify off-axis EIRP density based on gain measurement, rather than specify gain patterns, in order to demonstrate conformance with the off-axis EIRP density envelopes in Section 25.138, 25.218, 25.221, 25.222, 25.223, 25.226, or 25.227 or qualify for licensing based on compliance with alternative coordination requirements. Accordingly, we propose to delete Section 25.132(b)(3) and amend Section 25.132(a) to state, instead, that applicants that specify off-axis EIRP density pursuant to requirements in Section 25.115(g)(1) are not subject to the certification requirement in Section 25.132(a)(1) and need not submit antenna gain patterns.

109. It is easier to review off-axis EIRP density specifications for conformance with a routine licensing envelope if the specifications are presented in graphic form, *i.e.*, in a chart, with the routine envelope superimposed, rather than in a table. It is difficult to determine from a chart, however, whether proposed operation would comport with provisions allowing EIRP density to exceed a routine envelope by certain amounts in 10% of a specified angular range. Therefore, instead of requiring applicants to specify off-axis EIRP density in tables, we propose to amend the rules to require them to file off-axis EIRP density charts with relevant routine envelopes superimposed and provide supplemental data in tabular form in order to demonstrate eligibility for routine licensing under EIRP density criteria in Section 25.138, 25.218, 25.221, 25.222, 25.223, 25.226, or 25.227. More specifically, we propose to require applicants to provide charts specifying EIRP density calculated based on measurement pursuant to Section 25.132(b)(1), in the plane tangent to the GSO arc and the plane perpendicular to the GSO arc, with the relevant routine envelopes superimposed. We propose to require submission of two charts for co-polarized EIRP density in the plane tangent to the GSO arc: one covering the range of off-axis angles from 0 to ±10 degrees and another covering the range from 0 to ±180 degrees off-axis. In addition, we propose to require applicants to provide a supplemental table for each off-axis angular range in which the routine EIRP density envelope is exceeded, specifying angular coordinates in degrees off-axis and corresponding calculated off-axis EIRP density at 0.2 degree increments over the angular range in which the routine envelope is exceeded and one degree on each side of that range. We propose to incorporate these requirements in Section 25.115(g)(1) and delete inconsistent or redundant requirements in Sections 25.115(g), 25.220(b), 25.221(b), 25.222(b), 25.226(b), and 25.227(b).

110. The proposed requirement to file off-axis EIRP density charts would not apply to applicants that certify conformance with antenna gain standards pursuant to Section 25.132(a)(1) and certify that input power density will not exceed the relevant limit in Section 25.134, 25.211, or 25.212.

111. There is considerable variance in the current rules regarding information requirements for applicants that rely on coordination with potentially affected satellite operators in lieu of demonstrating conformance with routine licensing criteria. Section 25.220(b) requires applicants for fixed C- or Ku-band earth stations that rely on coordination to submit gain patterns for antennas that do not conform to relevant standards in Section 25.209. Section 25.138(d) requires 20/30 GHz earth station applicants relying on coordination to provide antenna gain patterns regardless of whether their proposed antennas conform to standards in Section 25.209. Section 25.115(g) requires all 17/24 GHz earth station applicants to either certify conformance with the antenna gain standards in Section 25.209 or file off-axis EIRP density tables. Sections 25.221, 25.222, 25.226, and 25.227, however, do not require applicants for conventional C- or Ku-band earth stations on mobile platforms that rely on coordination to provide off-axis EIRP density tables or gain patterns or certify conformance with 25.209. We propose to require all applicants that rely on coordination with satellite operators to specify off-axis EIRP density pursuant to the proposed requirements in Section 25.115(g)(1) rather than provide gain patterns.

### 20. Coordination Requirements for Non-Conforming Earth Station Operation

112. Section 25.220 specifies coordination requirements for licensing proposed earth station operation that does not conform to routine limits on off-axis radiation. Section 25.220(a)(1) provides that the coordination rules in Section 25.220 apply to applications for fixed earth stations transmitting in the conventional C-band, conventional Ku-band, or extended Ku-band that would generate off-axis EIRP density exceeding relevant routine levels specified in Section 25.218 and to applications for analog video earth stations that do not meet the routine licensing criteria in Section 25.211(d).

113. Section 25.220(a)(2) states that "requirements for petitions to deny applications filed pursuant to this section are set forth in §25.154." We propose to delete this provision, as we see no need to cross-reference Section 25.154 in Section 25.220.

114. The first paragraph in Section 25.220(d)(1) provides that the operator of a non-routine earth station licensed based on coordination pursuant to Section 25.220 will be entitled to protection from harmful interference from other satellite systems only insofar as may be provided in coordination agreements between the target satellite operator and operators of adjacent satellites. The next paragraph, Section 25.220(d)(1)(i), requires the earth station applicant to submit a statement from the target satellite operator acknowledging that operation of the proposed non-routine earth station might receive unacceptable interference from operation of adjacent satellite networks. We propose to delete Section 25.220(d)(1)(i) as unnecessary, since protection for non-conforming operation is sufficiently addressed in the initial paragraph of Section 25.220(d)(1) and since Section 25.220(d)(1)(ii) requires submission of a statement from the satellite operator that it has coordinated the proposed operation with the operators of all adjacent satellites within six degrees.

115. Sections 25.220(d)(1)(ii)-(iv) require an applicant to include a statement from the target satellite operator that it has coordinated the proposed non-conforming earth station operation with the operators of satellites within six angular degrees of the target satellite; a statement from the target satellite operator that it will include the non-conforming earth station operation in future satellite-network coordinations; and a certification by the applicant that it will comply with coordination agreements negotiated by the target satellite operator. Further, Section 25.220(d)(2) states that a license granted pursuant to Section 25.220 will include a condition "that if a good faith agreement cannot be reached between the [target] satellite operator and the operator of a future 2º compliant satellite" the licensee must "accept the power density levels that would accommodate the 2° compliant satellite." For clarification, we propose to amend this provision to state that the operator of an earth station licensed pursuant to Section 25.220 must reduce power as necessary to conform to relevant routine limits on off-axis EIRP density in the direction of a future 2° compliant satellite receiving in the same uplink band at a location within 6 degrees of the target satellite, unless the non-conforming earth station operation has been coordinated with the operator of that satellite.[134]

116. SIA recommends that Section 25.220(d)(2) and an analogous rule in Section 25.138(c) be amended to require an operator of a non-conforming earth station to reduce EIRP density toward a co-frequency space station more than 6 degrees away from the target satellite to levels within relevant routine limits if operation of the co-frequency space station is adversely affected by emissions from the non-conforming earth station and the non-conforming operation is not permitted under the terms of a coordination agreement with the operator of that satellite.[135] SIA also advocates adoption of an analogous provision in Section 25.223(d) for operators of non-conforming 17/24 GHz BSS feeder-link stations.[136]

[134] Adoption of either of the suggested policy changes discussed in ¶ 47, *supra*, would obviate the need for this proposed revision of 47 C.F.R. § 25.220(d)(2). Instead, this rule would be eliminated.

[135] SIA 2013 Comments at 60.

[136] *Id.* at 61-62.

We propose to amend Sections 25.220(d)(2) and 25.223(d) as suggested by SIA. Instead of adopting a similar amendment in Section 25.138(c), however, we propose to delete the separate coordination rules in Sections 25.138(b) and (c) and expand the scope of the essentially identical coordination requirements in Section 25.220 to apply to applications for, and operation of, 20/30 GHz earth stations that do not meet the off-axis EIRP density criteria in Section 25.138(a).

117. Section 25.220(d)(4) allows an applicant to omit certification of coordination with the operator of a co-frequency satellite within six degrees if off-axis EIRP density from the proposed earth station(s) would not exceed routine levels toward any point on the geostationary arc within 1 degree of the co-frequency satellite's assigned location. SIA recommends including analogous exceptions in the coordination rules in Sections 25.138(b) and 25.223(c).[137] We propose to add this exception to Section 25.223(c). Making the coordination rules in Section 25.220(d) applicable to applications for 20/30 GHz earth stations would obviate any need for similar amendment of Section 25.138(b).

118. Sections 25.221, 25.222, 25.226, and 25.227 specify coordination requirements for applications for earth stations on mobile platforms that propose operation outside routine limits on off-axis EIRP density. The coordination requirements in those rule sections are essentially similar, though not completely identical, to the requirements in Section 25.220(d). We propose to amend Section 25.220 to apply to earth stations on mobile platforms and delete redundant or inconsistent coordination rules in Sections 25.221, 25.222, 25.226, and 25.227.

#### 21. Other Proposed Changes in Licensing Rules for Earth Stations on Vessels, Vehicle Mounted Earth Stations, and Earth Stations Aboard Aircraft

119. We propose to delete the last sentence in paragraph (a)(3)(i) in Sections 25.221, 25.222, 25.226, and 25.227, which is redundant with the last sentence in paragraph (a)(3) in each of those rule sections. We also propose to delete the last sentence in paragraph (a)(3)(ii) in Sections 25.226 and 25.227, which is redundant with provisions in paragraph (b)(3) in those rule sections.

120. For the same reasons that we have proposed analogous changes in the definition of "N" in routine licensing rules for earth stations,[138] we propose to change the phrase "simultaneously transmitting co-frequency … earth stations in the same satellite receiving beam" in paragraph (a)(3) in Sections 25.221, 25.222, 25.226, and 25.227 to "earth stations transmitting simultaneously in the same frequencies to the same target satellite."

### G. Section 25.103 "Definitions"

#### 1. "20/30 GHz bands"

121. As currently defined, "20/30 GHz bands" means the 18.3-20.2 GHz band, which is allocated for FSS downlink transmission, and the 28.35-30.0 GHz band, which is allocated for FSS uplink transmission. The Commission has designated certain portions of those bands as primary for GSO FSS operation, while designating other portions exclusively or primarily for NGSO FSS operation, MSS feeder-link operation, and/or terrestrial operation. Applications for GSO FSS earth station operation in the bands designated as primary for such operation – 18.3-18.8 GHz (space-to-Earth), 19.7-20.2 GHz (space-to-Earth), 28.35-28.6 GHz (Earth-to-space), and 29.25-30.0 GHz (Earth-to-space) – are subject to routine licensing criteria in Section 25.138. In view of this, and in the interest of convenience, we propose to revise the definition of "20/30 GHz bands" to refer only to the 18.3-18.8 GHz, 19.7-20.2 GHz, 28.35-28.6 GHz, and 29.25-30.0 GHz bands. In connection with this proposal, we also propose to replace the term "20/30 GHz" where currently used in Section 25.209 with a specification of the frequency bands mentioned in the current definition.

[137] *Id.* at 47 and 61.

[138] *See* ¶ 67, *supra*.

### 2. "Conventional C-band" "Extended C-band" "Conventional Ku-band"

122. In connection with our proposal to amend Section 25.218 to include routine licensing criteria for extended C-band earth stations,[139] we propose to define the terms "conventional C-band" and "extended C-band" in Section 25.103, delete the definition of the less-specific term "C-band" from that section and replace change "C-band" where used elsewhere in Part 25 to "conventional C-band." The term "4/6 GHz" is not separately defined but is sometimes used in Part 25 to mean the same frequency bands that are also commonly known as the conventional C-band. We propose to replace the term "4/6 GHz" where it currently appears in Part 25 with "conventional C-band."

123. We also propose to define "conventional Ku-band" in Section 25.103 as the 11.7-12.2 GHz (space-to-Earth) and 14.0-14.5 GHz (earth-to-space) FSS frequency bands, delete the definition of the synonymous term "12/14 GHz," and replace the latter where it currently appears in Part 25 with the term "conventional Ku-band," which is more commonly used.

### 3. "NGSO FSS gateway earth station"

124. The definition of "NGSO FSS gateway earth station" includes provisions to the effect that a complex of NGSO FSS gateway earth station antennas in an area confined within one second of latitude and one second of longitude will be regarded as a single station for purposes of coordination with terrestrial services. We propose to remove these provisions from the definition because they are more substantive than definitional and insert them in a new sub-paragraph in Section 25.203(c), which prescribes requirements for coordinating earth stations with terrestrial stations in shared frequency bands.

### 4. "Permitted Space Station List"

125. The Permitted Space Station List includes all U.S.-licensed GSO space stations providing Fixed-Satellite Service (FSS) in the conventional C-band,[140] the conventional Ku-band,[141] and the 20/30 GHz bands. The Permitted List also lists non-U.S.-licensed GSO space stations that have been granted U.S. market access in these frequency bands. A party applying for a license to operate an earth station in one or more of these bands may, if the application qualifies for routine processing, select "Permitted List" as a point of communication. If an application is granted with such a Permitted List designation, the earth station may communicate in its assigned bands with any space station listed or identified by reference in the Permitted List, provided the operation is otherwise consistent with the terms of the license.

126. EchoStar Corporation urges the Commission to expand the definition of Permitted Space Station List, which appears in Section 25.103 of the Commission's rules,[142] to include GSO space stations operating in the "extended" C- and Ku- bands.[143] SES Americom, Inc., New Skies Satellites B.V., and O3b Ltd support EchoStar's recommendation and advocate, moreover, expanding the definition of Permitted List to include all U.S.-licensed GSO space stations providing FSS to U.S. earth stations in any frequency band and every non-U.S.-licensed GSO FSS space station that the Commission has authorized a U.S. earth station to communicate with in any frequency band.[144] The proponents contend that expanding the Permitted List in this way would simplify processing of earth station applications and relieve service providers and the Commission from having to modify earth station licenses when GSO

[139] *See* ¶ 91, *supra*.

[140] *I.e.*, the 3700-4200 MHz downlink and 5925-6425 MHz uplink bands, which are allocated for FSS operation.

[141] *I.e.*, the 11.7-12.2 GHz FSS downlink and 14.0-14.5 GHz FSS uplink bands.

[142] 47 C.F.R. § 25.103.

[143] Comments of EchoStar Corporation filed on Jan. 14, 2013 (EchoStar Comments) at 4. *See* definitions of "extended C-band" and "extended Ku-band" in Appendix A, ¶ 4, *infra*.

[144] SES/NSS/O3b Joint Reply Comments at 3.

FSS satellites authorized to communicate with U.S. earth stations in other bands are relocated or replaced. Intelsat Licensee LLC opposes redefining the Permitted List to include satellites operating in the extended C- and Ku- bands, however, because of the coordination requirements applicable in these bands.[145] We invite further comments on these recommendations.

**5. "Plane perpendicular/tangent to the GSO arc"**

127. For reasons stated previously,[146] we propose to define the term "plane tangent to the GSO arc" in Section 25.103, as a plane defined by the location of an earth station's transmitting antenna and a line in the equatorial plane that is tangent to the GSO orbital arc at the location of a GSO space station that the earth station is communicating with and define "plane perpendicular to the GSO arc" as a plane that is perpendicular to the plane tangent to the GSO arc and includes a line between the earth station in question and the GSO space station that it is communicating with.

**6. "Protection areas"**

128. We propose to delete "20/30 GHz" from the second sentence in this definition. The use of that term is unnecessary and is inconsistent with the narrower definition of "20/30 GHz bands" that we are proposing to adopt. We also propose to delete unnecessary text and abbreviations from the preceding sentence.

**7. "Skew Angle"**

129. We propose to define the term "skew angle" as the angle between the minor axis of an axially asymmetric antenna beam and the plane tangent to the GSO arc. This term would be used in a proposed new provision in Section 25.132(b).[147]

**8. "Two-degree-compliant space station"**

130. The undefined term "2° compliant space station" is used in Section 25.220(d). We propose to define this term to mean a GSO FSS space station operating in the conventional or extended C-band, the conventional or extended Ku-band, or the 20/30 GHz bands within the routine limits on downlink PSD or PFD specified in § 25.140(a)(3) (as proposed herein) and communicating only with earth stations operating in conformance with routine uplink parameters specified in Sections 25.134; 25.138(a); 25.211(d); 25.212(c), (d), or (f); 25.218; 25.221(a)(1) or (a)(3); 25.222(a)(1) or (a)(3); 25.223(b); 25.226(a)(1) or (a)(3); or 25.227(a)(1) or (a)(3), which are the technical requirements for earth station operation compatible with two-degree satellite spacing.

**9. "VSAT network"**

131. The term "VSAT" or "VSAT network" is used in several rule sections in Part 25 but is currently undefined. We propose to define "VSAT network" in Section 25.103 as a network consisting of "remote" earth stations with small antennas that communicate via one or more FSS space stations, which usually include one or more "hub" or "gateway" earth stations that route messages to and from the remote stations and may perform other network control functions.[148]

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[145] Reply Comments of Intelsat Licensee LLC filed on Feb. 13, 2013 at 10-11 (citing *Space Station Licensing Reform Order*, 18 FCC Rcd at 10881, ¶ 329).

[146] *See* ¶ 60, *supra*.

[147] *See* ¶ 106, *supra*.

[148] *See* discussion of rules pertaining to licensing or operation of earth station networks in ¶¶ 66-75, 81, and 83-86, *supra*, and ¶ 142, *infra*. As noted previously, the acronym "VSAT" stands for Very Small Aperture Terminal.

### H. Rules Pertaining to Dismissal of Applications

132. Section 25.112 sets forth rules pertaining to dismissal of defective applications for licenses under Part 25. Two rules pertaining to dismissal of applications also appear in Section 25.152, and one of those rules is largely redundant with a provision in Section 25.112. We propose to eliminate the redundant text in Section 25.152 and move the non-redundant provisions in that section to Section 25.112, so that all rules pertaining to dismissal of Part 25 applications will be set forth in one place. The first sentence in Section 25.112(b) states that space station applications found to be defective because they request authority for operation in a band not allocated internationally for such use will not be considered. We propose to amend this provision to apply, as well, to duplicative space station applications that are subject to dismissal under Section 25.112(a)(4).

### I. Section 25.113 "Station construction, launch authority, and operation of spare satellites"

133. As an initial matter, we propose to alter the section heading and text of this rule with respect to the term "launch authority" in order to avoid any possible confusion with the licensing functions performed by the Federal Aviation Administration, which is responsible for licensing U.S. commercial launch activities, *i.e.*, the transportation operation of launch vehicles (including upper stages) to transport space stations into orbit. We propose the alternative term "deployment approval." We believe this term adequately captures the intent of the rule—that the approval process should involve a public interest review of proposed space station operation and debris mitigation plans before a space station is launched into orbit, but avoids any implication that the FCC is authorizing the launch activity.

134. Section 25.113(f) states that before commencing pre-grant spacecraft construction an applicant must notify the Commission in writing that it plans to begin such construction at its own risk. Clearly, an applicant that commences construction of a spacecraft before receiving authority for its launch and operation incurs a risk that the money and effort invested in such pre-grant construction may be wasted in the event its license application is denied.[149] We see no need to require an applicant to say so in writing, however, or to require space station applicants to notify the Commission of pre-grant construction for which no permit is necessary. We therefore propose to eliminate the notification requirement from Section 25.113(f).

135. Identical service-specific rules in Sections 25.142(a)(5), 25.143(c), 25.145(h), and 25.146(m) state that an NGSO space station licensee may launch and operate technically identical replacement satellites within an existing license term after giving the Commission 30 days' prior notice. We propose to replace these provisions with a single, generally applicable rule to the same effect in a new paragraph (i) in Section 25.113. We also propose to cross-reference the new paragraph in Section 25.113(f), as an exception to the general rule that authority must be applied for and granted before a space station may be launched and operated in orbit.

### J. Section 25.114 "Applications for space station authorizations"

136. The first sentence in Section 25.114(b) states that each application for a new or modified space station authorization "must constitute a concrete proposal for Commission evaluation." In comments filed earlier in this proceeding, Intelsat contended that this statement should be deleted as unnecessary, since Section 25.114(a) states that a space station applicant must "submit a comprehensive proposal" and since other provisions in Section 25.114 specify in detail the information that must be

[149] *See Streamlining the Commission's Rules and Regulations for Satellite Application and Licensing Procedures*, IB Docket No. 95-117, Report and Order, 11 FCC Rcd 21581, 21585, ¶ 9 (1996) ("We underscore … that any construction will be at the applicant's own risk, and we will not in any way consider the status of construction or expenditures made when acting on the underlying application.")

provided in space station applications.[150] Moreover, Intelsat contended that confusion could arise as to whether there is any material difference between the meaning of "concrete proposal" and "comprehensive proposal" in this context. We agree that the first sentence of Section 25.114(b) is unnecessary and therefore propose to delete it.

137. In response to a recommendation from SIA, in 2012 the Commission adopted a rule in Section 25.114(c)(4)(vi)(D) that requires applicants for space stations with steerable antenna beams that are not shapeable to either provide the same kind of information that Section 25.114(c)(4)(vi)(C) requires for shapeable beams or specify predicted gain contours and describe "the area that the steerable beam(s) is expected to serve."[151] Because an applicant proposing operation with steerable beams might not be sure, when filing a space station application, which areas the beams would serve, the SIA advocates replacing the phrase "expected to serve" in this provision with "proposed to cover" so that a steerable beam could be re-pointed to cover any area within a specified potential coverage area.[152] We propose to adopt this change.

138. Section 25.114(c)(13) requires space station applications to include information necessary for determining compliance with polarization requirements in Sections 25.210(a) and (i). As we are proposing to eliminate the requirements in Sections 25.210(a) and (i),[153] we also propose to eliminate the provision in Section 25.114(c)(13).

139. Section 25.114(d)(10) states that applications for 1.6/2.4 GHz MSS space station authorizations must include certain information required by Section 25.143(b). We propose to amend this provision to add that applicants for 2 GHz MSS space station authorizations must also provide information required by Section 25.143(b), which applies to applications for 2 GHz MSS space stations as well as to applications for 1.6/2.4 GHz MSS space stations.

140. Section 25.114(d)(15)(iv) requires license applications for 17/24 GHz BSS space stations to include, in an attachment, the predicted gain and PFD information required by Sections 25.264(a) and (b). We are proposing to amend Sections 25.264(a) and (b) to allow such information to be submitted after the filing of a license application under certain circumstances.[154] We are also proposing to amend Section 25.264(d) to require PFD data to be included in applications for modification of license to allow relocation of 17/24 GHz BSS space stations.[155] Accordingly, we propose to amend Section 25.114(d)(15)(iv) to require applicants to provide "any information required by [Sections] 25.264(a)(6), 25.264(b)(4), or 25.264(d)."

### K. Further Proposed Changes in Section 25.115 "Applications for earth station authorizations"

141. Section 25.115(a)(2) specifies eligibility criteria for use of Form 312EZ for earth station applications. Section 25.115(a)(3) states that unless the Commission orders otherwise, an application that meets the criteria in Section 25.115(a)(2) and is filed on Form 312EZ will be deemed granted 35 days after issuance of a public notice of its acceptance for filing if no objection is filed during the 30-day period for filing comments or petitions to deny. For applicants proposing uplink operation in the 5925-6425 MHz or 14.0-14.5 GHz band, Sections 25.115(a)(2)(iii)-(v) limit Form 312EZ and autogrant

[150] Comments of Intelsat Licensee LLC filed on Jan. 14, 2013 (Intelsat Comments) at 11.

[151] *2006 Biennial Review – Revision of Part 25*, IB Docket No. 06-154, Report and Order, 28 FCC Rcd 11585, 12424, ¶ 83 and Appendix B, ¶ 6 (2012).

[152] Request for Clarification, filed by SIA on March 14, 2014, at 2-3.

[153] *See* ¶¶ 180-181, *infra*.

[154] *See* ¶ 177, *infra*.

[155] *See* ¶ 179, *infra*.

eligibility to applications that specify input power within an applicable routine level specified in Section 25.211 or Section 25.212 and propose antennas with equivalent diameters of at least 4.5 meters for transmission in the 5925-6425 MHz band or at least 1.2 meters for transmission in the 14.0-14.5 GHz band. SIA recommends eliminating these input power and antenna size criteria and replacing them with a provision that would instead restrict eligibility to applications proposing operation with off-axis EIRP density within the relevant routine-processing limits in Section 25.218.[156] The routine processing standards in Section 25.218 do not apply to applications for analog video stations, however, because it is infeasible to measure EIRP density generated by antennas transmitting frequency-modulated analog video signals. Moreover, we see no reason to bar use of Form 312EZ for applications that demonstrate compliance with input power, antenna size, and off-axis gain criteria for routine licensing, as opposed to those demonstrating compliance with routine limits on off-axis EIRP density. We therefore propose to revise Section 25.115(a)(2) to allow use of Form 312EZ for applications that meet relevant routine licensing criteria in Section 25.134, 25.138, 25.211, 25.212, or 25.218.

142. In the *2013 Report and Order*, the Commission revised Section 25.115(a)(2)(i) to permit use of FCC Form 312EZ for applications for multiple earth stations transmitting in the 14.0-14.5 GHz band.[157] In keeping with that revision, we propose here to amend Section 25.115(c)(1) to indicate that applications for conventional Ku-band VSAT networks may be filed with Form 312 EZ if the criteria in Section 25.115(a)(2) are met.

143. Section 25.115(e) states that blanket license applications for earth stations operating in the 18.3-18.8 GHz, 19.7-20.2 GHz, 28.35-28.6 GHz or 29.25-30.0 GHz (*i.e.*, 20/30 GHz) bands may be filed on FCC Form 312, Main Form and Schedule B, specifying the number of terminals to be covered by the blanket license. Because Schedule B includes a data field for specifying station location, the requirement to use Schedule B implies that applications for earth station operation in the 20/30 GHz bands must specify the locations of user terminals, which would be unnecessarily burdensome. We therefore propose to amend this provision to clarify that an applicant may request blanket authority for operation of GSO FSS earth stations in those bands without specifying the location of user terminals but must specify the number of terminals to be covered by the license, the geographic area(s) in which they will operate, and the location of hub and/or gateway stations.

### L. Section 25.117 "Modification of station license"

144. Intelsat recommends amending Section 25.117 to provide for automatic grant of unopposed applications for certain kinds of license modifications for GSO space stations.[158] Specifically, the proposed provision would provide for automatic grant, 35 days after the date of public notification of acceptance for filing, of unopposed applications for modifications of the following kinds: 1) relocation of a GSO space station by no more than 0.20 degrees from the initially authorized orbital position; 2) repositioning of one or more of beams of a GSO space station at its initially authorized orbital location by no more than 0.3 degrees in any direction relative to the initially authorized beam position; or 3) rotation of one or more beams of a GSO space station at its initially authorized orbital location by no more than 0.3 degrees from the initially authorized orientation.

145. DIRECTV generally supports Intelsat's recommendation but maintains that applications proposing relocation of space stations by more than 0.10 degrees should be ineligible for automatic grant.[159] EchoStar agrees in principle that the Commission should adopt an autogrant procedure along the lines proposed by Intelsat but expresses concern as to how the Commission could ensure that appropriate

[156] SIA 2013 Comments at 33.

[157] *2013 Report and Order*, 28 FCC Rcd at 12423, ¶ 55.

[158] Comments of Intelsat Licensee LLC filed Jan. 14, 2013 at 9.

[159] Reply Comments of DIRECTV, LLC filed Feb. 13, 2013 (DIRECTV Reply Comments) at 4.

conditions are included in autogranted authorizations.[160] To that end, EchoStar contends that to be eligible for the autogrant procedure, an application should include certification by the licensee that any necessary new or modified coordination agreement has been obtained or will be obtained prior to commencement of operation with the modified parameters and that the change will not result in any increase in interference or increased sensitivity to interference.[161] EchoStar also contends that an application for authority to move a DBS space station should be eligible for autogrant if the proposed location would be within the orbital box contemplated by the Region 2 assignment plan, which could involve a shift of a DBS satellite's center location by as much as 0.4 degrees.[162]

146. We propose to adopt Intelsat's recommendation to amend Section 25.117 to provide for automatic grant, 35 days after the date of public notification of acceptance for filing, of unopposed applications for license modification to permit repositioning of the boresight(s) of a GSO space station antenna beam by up to 0.3 angular degrees from the initially authorized position. We also propose that the same treatment be given to unopposed applications for minimal relocations of DBS or GSO FSS space stations.[163] Regarding the limit on the extent of relocations eligible for autogrant, however, we propose an intermediate number between the 0.20 degrees suggested by Intelsat and the 0.10 degrees proposed by DIRECTV. Setting a limit of 0.15 degrees would provide enough flexibility for operation of four satellites at an orbital location (typically a location specified in integer degrees) with adjacent ±0.05 degrees station-keeping boxes. We believe that the certification requirement suggested by EchoStar may be unnecessary, as such changes would have negligible interference impact, but we invite comment on this issue. We also invite comment on how best to address satellites operating in ITU planned bands. In particular, we invite comment as to whether DBS satellites should be given greater flexibility to relocate to the extent that they are relocating between the outermost positions of an assignment cluster, which may involve changes of up to 0.4 degrees. We propose to include provisions in the autogrant rule to exclude applications proposing changes that would be inconsistent with another Commission rule[164] or require modification of the BSS plan in Appendix 30 or the associated feeder link plan in Appendix 30A of the ITU Radio Regulations. We invite comment on Intelsat's recommendation to provide for autogrant of applications proposing rotation of a satellite antenna beam by up to 0.3 degrees and on how the axis of rotation should be specified.

147. We also invite comment on whether we should specify a "safe flight profiles" certification requirement for applicants proposing relocation. Currently, applications involving GSO operations identify the steps that have been taken and will be taken to identify satellites that may operate with an overlapping station-keeping volume and to mitigate any resulting collision risk, for example through coordination of operations. An operator could provide information that is sufficient for acceptance of an application proposing relocating a GSO satellite but that raises a substantive concern regarding potential collisions. An autogrant following acceptance for filing might not serve the public interest under such circumstances. In practice, operators have routinely provided statements that address such collision concerns; in view of this, adopting a standardized certification requirement may be a useful

[160] Reply Comments of EchoStar Corporation filed Feb. 13, 2013 (EchoStar Reply Comments) at 3-4.

[161] *Id.* at 4.

[162] *Id.* The Region 2 plan is set forth in Appendices 30 and 30A of the ITU Radio Regulations.

[163] We are not convinced that it would serve the public interest to provide for autogrant of applications for relocation of 17/24 GHz BSS satellites, which are subject to special information requirements, operating rules, and coordination requirements that are location-dependent. *See* 47 C.F.R. §§ 25.140(b) and 25.262.

[164] *See, e.g.*, 47 C.F.R. § 25.262 (prescribing requirements for location of 17/24 GHz BSS space stations and location-dependent operating rules and coordination requirements for such space stations) and § 25.264(g) prescribing a minimum separation of 0.2 degrees between co-frequency DBS and 17/24 GHz BSS space stations unless the operators agree to allow closer spacing.

approach for addressing debris mitigation concerns in such cases. We invite comment on this approach and any specific suggestions for the content of a certification. Should the autogrant procedure be limited, for example, to situations in which the operator certifies that there will be no immediate or anticipated overlap in station-keeping volumes at the new location?

### M. Section 25.118 "Modifications not requiring prior authorization"

#### 1. Earth station modifications

148. Section 25.118(a)(1) states that earth station licensees may modify their authorized facilities without prior authority from the Commission, provided they have complied with applicable coordination requirements in Section 25.251 and the modification does not involve: (i) an increase in EIRP or EIRP density; (ii) an increase in transmitted power; (iii) a change in location of more than 1 second in latitude or longitude for stations operating in frequency bands shared with terrestrial systems; or (iv) a change in location of more than 10 seconds of latitude or longitude for stations operating in frequency bands not shared with terrestrial systems. We propose to delete the second item in this list, which, depending on how one interprets the term "transmitted power," is either redundant with or obviated by the exclusion of increases in EIRP or EIRP density. We propose to add other provisos to the list in Section 25.118(a)(1) to exclude changes in operating frequencies or polarization, increases in antenna height, antenna repointing, or the location of a remote control point.[165] Adding these further provisos in Section 25.118(a)(1) would render the provisions in Section 25.118(a)(2) superfluous, so we propose to delete Section 25.118(a)(2). The provision concerning coordination pursuant to Section 25.251 would also be rendered superfluous, and we propose to delete that as well. Finally, for clarity, we propose to insert the word "other" before "changes" in Section 25.118(a)(1) and move the amended provisions in Section 25.118(a)(1) to follow the other sub-paragraphs in Section 25.118(a).

149. SIA advocates amending Section 25.118(a)(3) to state that a licensee may increase the number of earth stations operating under a blanket license without prior authorization unless the license specifies a limit on the number of operating stations.[166] We invite comment on this recommendation and also invite comment as to whether Sections 25.115(e) and (f) should accordingly be amended to eliminate provisions that require all applicants for blanket licenses for 20/30 GHz VSAT networks or Ku-band NGSO FSS earth station networks to specify a maximum number of user terminals proposed for operation.

150. SIA urges the Commission to amend Section 25.118(a)(5) to allow an earth station operator to communicate, without prior authorization, with a replacement GSO satellite positioned within 0.15 degrees of the location of the originally authorized satellite, provided that there is no increase in the earth station's radiated power or power spectral density.[167] We propose to adopt this recommendation, which would relieve earth station operators from the necessity of filing applications for license modification for changes of a kind that would have negligible interference impact.

#### 2. Fleet management rule

151. Intelsat and EchoStar contend that the fleet management rule in Section 25.118(e), described in the preceding paragraph, is currently of little use because it applies only when a licensee relocates a satellite to the precise location occupied by one of its other satellites. Hence the rule is unavailable to licensees that slightly offset co-located space stations to facilitate safe station-keeping, which is common practice. To make the rule more useful, Intelsat advocates inserting the adjective

[165] Excluding changes in the location of a remote control point would codify a policy announced in Public Notice DA 06-978, 21 FCC Rcd 5045 (2006).

[166] SIA 2013 Comments at 36.

[167] SIA 2013 Comments at 36.

"nominal" in Section 25.118(e)(1), so that the provision would read as follows:

> (1) The space station licensee will relocate a Geostationary Satellite Orbit (GSO) space station to another nominal orbit location that is assigned to that licensee.

Intelsat contends that changing the rule in this way would not increase interference risk, because in an instance where operation at an offset position would result in harmful interference the licensee would be unable to meet the requirement in Section 25.118(e)(4) to certify that it will comply with all applicable coordination agreements at the new orbital location.[168]

152. SES, New Skies, and O3b contend that the proposed rule is too vague, as it does not define "nominal."[169] They also argue that the requirement for the licensee to certify that it will comply with all applicable coordination agreements at the new location would not obviate concern about interference if there is no coordination agreement in effect between the licensee and operators of satellites adjacent to that location. DIRECTV also takes issue with Intelsat's recommendation. Instead, DIRECTV recommends amending Section 25.118(e)(1) to apply to relocation to a position within 0.1 degrees of the assigned location, noting that this would afford sufficient leeway to avoid overlap between the station-keeping range of a repositioned satellite and that of an existing satellite at the same approximate location.[170] DIRECTV also contends that the revised rule should clearly preclude licensees from migrating relocated satellites away from an assigned location in successive increments of 0.1 degrees without prior Commission authorization.

153. We agree with DIRECTV, SES, New Skies, and O3b that "nominal orbital location" is too vague. Instead, for reasons stated above, we propose to amend Section 25.118(e)(1) to include relocations to within ±0.15 degrees of another orbit location assigned to the same licensee. We also seek comment, as discussed previously, concerning whether a "safe flight profile" certification would be an appropriate pre-requisite for a fleet management maneuver.

154. Section 25.118(e)(2) stipulates that a space station may be relocated without prior authorization pursuant to Section 25.118(e) only if it will operate within the authorized and coordinated technical parameters for the space station previously assigned to the location where it will be moved. We propose to amend this provision to stipulate that a space station may be relocated without prior authorization pursuant to Section 25.118(e) only if the licensee certifies, when giving advance notice of a relocation, that the space station in question will operate at the new location within the authorized and coordinated technical parameters for the space station previously assigned at that location or within 0.15 degrees of it. Section 25.118(e)(4) requires a licensee to certify that it will operate a relocated satellite in compliance with applicable coordination agreements for operation at the changed location. We propose to eliminate this provision, which is redundant with the certification requirement that we propose to include in Section 25.118(e)(2). Section 25.118(e)(5), which requires the licensee to certify that it has completed any necessary coordination with potentially affected space station operators, including coordination of station-keeping. To avoid redundancy with the proposed certification requirement in Section 25.118(e)(2), we propose to revise Section 25.118(e)(5) to simply require the licensee to certify station-keeping coordination.

155. Section 25.118(e)(8) requires a DBS licensee to certify, before implementing a fleet-management relocation under Section 25.118(e), that the relocation will not result in any increase in interference that would necessitate submission of a proposed modification of the BSS Plan in Appendix 30, or the BSS feeder link plan in Appendix 30A, of the ITU's Radio Regulations. We believe that compliance with this requirement would obviate any need for a DBS licensee to meet the requirement in

[168] Intelsat Comments at 8; EchoStar Reply Comments at 3.

[169] SES/NSS/O3b Joint Reply Comments at 20.

[170] DIRECTV Reply Comments at 3.

Section 25.118(e)(2) before re-locating a DBS space station pursuant to Section 25.118(e). We therefore propose to amend the current provision in Section 25.118(e)(8) (which would be re-numbered as Section 25.118(e)(6)) to state that a DBS licensee that files the certification required by that provision is not subject to the requirement in Section 25.118(e)(2).

156. We also propose to make non-substantive clarifying changes in the lead paragraph in Section 25.118(e) and Sections 25.118(e)(1) and (e)(3).

**N. Section 25.119 "Assignment or transfer of control of station authorization"**

157. When space and earth station licensees make pro forma changes in ownership (such as conversion of a licensee from a corporation to an LLC with no change in the ultimate control of the licensee), Section 25.119 of the Commission's rules requires them to seek prior approval from the Commission. Recommendation 5.7 in the Process Reform Report recommends elimination of this prior approval requirement. However, Section 310(d) of the Communications Act of 1934, as amended, requires that licenses such as earth station license not be assigned, or undergo a transfer of control, except "upon application to the Commission and upon finding by the Commission that the public interest will be served thereby."[171] The Commission has previously found that it could use its forbearance authority to eliminate the need for prior approval of pro forma transfers of control of certain common carrier wireless licenses, but found that "because most earth station licenses are not common carrier radio licenses, we might not be able to use our Section 10 forbearance authority to avoid the requirements of Section 310(d) with regard to assignments and transfers of control of earth station authorizations."[172] We invite comment on whether the Commission should exercise its forbearance authority to eliminate the requirement of Section 310(d) that space and earth station licensees seek prior approval from the Commission before making pro forma changes in ownership, so far as it applies to licenses authorized on a common carrier basis. Further, until legislative changes to Section 310(d) remove this prior approval requirement, we seek comment on ways that the Commission could streamline the review process for the remaining non-common carrier space and earth station licenses not subject to forbearance.

**O. Section 25.129 "Equipment authorization for portable earth-station transceivers"**

158. Section 25.129(a) requires authority to be obtained pursuant to the equipment certification procedure in Part 2 of the Commission's rules prior to importation, sale or lease in the United States, or shipment or distribution for sale or lease in the United States, of "portable" earth-station transceivers. Section 25.129(c) states that applicants for certification of such devices must provide, among other things, "any test data necessary to demonstrate compliance with pertinent performance standards in §§25.138, 25.202(f), 25.204, 25.209, and 25.216," and "the statements required by §2.1093(c)."

159. Section 2.1093(c) requires applications for equipment certification for portable transmitting devices for satellite communication to confirm compliance with the radiation exposure limits in Section 2.1093(d) and submit supporting technical information on request from the Commission. A portable earth station transceiver operating within the limits in Section 2.1093(d) would necessarily also operate within the relevant limits on radiated power in Section 25.204. We therefore propose to delete, as unnecessary, the requirement to demonstrate compliance with Section 25.204. We also propose to delete the requirement to demonstrate compliance with Section 25.209, because it is infeasible for portable

[171] 47 USC § 310(d).

[172] *1998 Biennial Regulatory Review – Review of International Common Carrier Regulations*, Report and Order, IB Docket No. 98-118, 14 FCC Rcd 4909, 4944-45 ¶ 87.

devices, as defined for purposes of Section 25.129,[173] to meet the antenna performance standards in Section 25.209.

160. We propose to amend Section 25.129(c) to include a reference to Section 25.202(d), however, which prescribes a technical requirement for transmitting earth stations licensed under Part 25, including MSS earth stations, which can be portable and may therefore be subject to certification under Section 25.129.

**P. Section 25.130 "Filing requirements for transmitting earth stations"**

161. Section 25.130(b) requires license applications for earth stations that will transmit in frequency bands shared on a co-primary basis by terrestrial and satellite services to include a frequency coordination analysis pursuant to Section 25.203. Section 25.203 also requires certain other kinds of information to be provided in applications for transmitting earth stations, regardless of whether the proposed stations will transmit in bands shared equally with terrestrial services.[174] We therefore propose to amend Section 25.130(b) to require applications for transmitting earth stations to include any information required by relevant provisions in Section 25.203, not just coordination analysis for operation in shared bands.

162. In the *2013 Report and Order*, the Commission adopted Section 25.130(g), which provides that multiple transmitting antennas that are not eligible for blanket licensing may be authorized under a single FSS earth station license if either of the following criteria is met: 1) the antennas will all be situated within an area bounded by one second of latitude and one second of longitude if they would transmit in a frequency band shared with a co-primary terrestrial service, or 2) the antennas will transmit in a frequency band allocated for FSS on a primary basis and not for co-primary terrestrial service and will all be situated within an area bounded by ten seconds of latitude and ten seconds of longitude. In a joint petition for clarification, EchoStar Satellite Operating Company and Hughes Network Systems ask the Commission to make it clear that the 1/10-second restrictions do not apply to licensing of earth stations that will operate under central network control, whether or not they may be authorized under a blanket license – *i.e.*, whether or not their locations must be specified.[175] We agree that there is a need for clarification in this regard. Section 25.130(g) includes a note to the effect that the 1/10-second restrictions do not apply to applications filed pursuant to Sections 25.134, 25.138, 25.221, 25.222, 25.226, or 25.227 or to applications for licenses for 29 GHz NGSO MSS feeder link stations in a "complex" as defined in Section 25.257. In other words, the note exempts applications for multiple earth stations in an ESV, VMES, or ESAA network and applications for multiple earth stations in a C-band, Ku-band, or 20/30 GHz earth station network that meet the routine licensing criteria in Section 25.134 or 25.138. But the note does not expressly cover applications for C-band or Ku-band network earth stations that qualify for routine licensing under the off-axis EIRP density standards in Section 25.218, applications for non-conforming network earth stations based on coordination pursuant to Section 25.220, or applications for earth stations in a Ku-band NGSO FSS network. Such applications may request operating authority for stations that are not eligible for blanket licensing, moreover, and thus come within the literal ambit of Section 25.130(g).[176] To implement the clarification, we propose to amend Section 25.130(g) to state that

[173] As defined in Section 25.129(b), an earth station transceiver is a "portable device" if its radiating structure(s) would be within 20 centimeters of the operator's body when the transceiver is in operation.

[174] See 47 C.F.R. § 25.203(f), (i)(1), and (k).

[175] Petition for Clarification of EchoStar Satellite Operating Company & Hughes Network Systems, LLC, filed on March 14, 2014.

[176] 47 C.F.R. § 25.115(c)(2)(ii) requires the location of every station in a C-band VSAT network to be specified before it is brought into operation. 47 C.F.R. § 25.115(c)(1) requires applicants for Ku-band VSAT network licenses to specify the locations of hub stations. 47 C.F.R. § 25.115(f) precludes blanket licensing of gateway earth (continued…)

the 1/10-second rule does not apply to applications for authorization of multiple stations under a network license and to amend the note to that provision to specifically exempt conventional C- or Ku-band VSAT applications filed pursuant to Section 25.115(c), 20/30 GHz network earth station applications filed pursuant to Section 25.115(e), applications for NGSO FSS gateway earth stations filed pursuant to Section 25.115(f), and VSAT applications filed pursuant to Section 25.218.

163. We also propose to amend Section 25.130(g) to make it clear that an operator may not apply for modification of an existing license to add operating authority for multiple earth stations at widely separated locations that would not operate under central network control in order to avoid paying filing fees for separate applications.

**Q. Section 25.131 "Filing requirements and registration for receive-only earth stations"**

164. Neither the Communications Act nor any Commission rule requires receive-only earth stations to be licensed to receive signals from U.S.-licensed space stations.[177] Section 25.131(j) prohibits unlicensed receive-only earth stations from receiving signals from non-U.S.-licensed space stations not on the Permitted List, however.[178] The purpose of this restriction is to bar U.S. market access for non-U.S.-licensed space stations that have not been duly approved by the Commission pursuant to the procedures outlined in Section 25.137, and to ensure that there is a "regulatory control point" for all transmissions from non-U.S.-licensed satellites to U.S. receive-only earth stations.[179] SIA advocates amending this rule to allow unlicensed receive-only earth stations to receive signals from any non-U.S.-licensed space station that has been approved for U.S. market access under Section 25.137, not just those included on the Permitted List.[180] We propose to adopt such an amendment. We tentatively conclude that this proposed change in Section 25.131(j) would not undermine the rule's underlying purpose. This is because, once a non-U.S.-licensed space station has been approved for U.S. market access, the Commission will have a regulatory control point whether or not the space station has been added to the Permitted List.[181] We invite comment on this tentative conclusion.

165. SIA similarly recommends amending Section 25.131(b) to enable operators of unlicensed receive-only earth stations to have them registered for protection of reception of signals from space stations approved for U.S. market access that are not on the Permitted List. We propose to adopt such an amendment.

(Continued from previous page)

stations in Ku-band NGSO FSS networks. And we are proposing to amend 47 C.F.R. §25.115(e) to require applicants to specify the locations of hub earth stations in 20/30 GHz networks.

[177] Examples of receive-only earth stations are customer terminals in a DBS system and C-band cable head-end earth stations.

[178] The Permitted List is discussed in Section III.F.4 of this Further Notice above.

[179] *See Amendment of the Commission's Regulatory Policies to Allow Non-U.S.-Licensed Space Stations to Provide Domestic and International Satellite Service in the United States*, CC Docket No. 96-111, Report and Order,12 FCC Rcd 24094, 24180 ¶202 (1997).

[180] SIA 2013 Comments at 39-40. A space station that has been approved for U.S. market access will be included on the Permitted List only if the space station operator so requests.

[181] For a discussion of the Commission's regulatory control point for non-U.S.-satellites that have been granted U.S. market access without being placed on the Permitted List, see *DISCO II Order*, 12 FCC Rcd at 24174, ¶ 188. For a discussion of the Commission's regulatory control point for non-U.S.-satellites that have been granted U.S. market access and have been placed on the Permitted List, see *Amendment of the Commission's Space Station Licensing Rules and Policies*, IB Docket No. 02-34, Second Report and Order, 18 FCC Rcd 12507, 12516 ¶¶ 20-21 (2003).

### R. Section 25.133 "Period of construction; certification of commencement of operation"

166. Prior to the effective date of the rule amendments adopted in the *2013 Report and Order*, the first sentence in Section 25.133(a)(2) provided that each license for mobile earth stations will specify a deadline for commencing station operation, and the next sentence stated that the networks in which the mobile stations are to operate must be brought into service within twelve months unless the Commission orders otherwise. The Commission decided in the 2013 Report and Order to amend Section 25.133(a)(2) to apply to all blanket-licensed earth stations, not just mobile earth stations.[182] It neglected to revise the second sentence in that provision, however, which continues to state that "the networks in which the *mobile* earth stations will be operated must be brought into operation within 12 months from the date of the license grant except as may be determined by the Commission for any particular application. (emphasis added). We propose to revise Section 25.133(a)(2) to simply state that operation of a network of earth stations at unspecified locations under an initial blanket license must commence within 12 months after the license is granted unless the Commission orders otherwise.

167. Section 25.133(b)(1)(v) states that initial licenses for individually licensed earth stations will include a condition requiring the licensee to certify, before commencing operation, that "each antenna has been tested and found to perform within 2 dB of the applicable pattern specified in §25.209 or other authorized pattern." The implication that a licensee may transmit with an antenna with a gain pattern as much as 2 dB above relevant limits in Section 25.209, even if the licensee certified in the license application that the antenna's gain pattern was within those limits, is contradicted by Section 25.133(c). Section 25.133(c) prohibits operation of an earth station that does not meet the "technical parameters" in Section 25.209 unless the Commission grants a waiver. This rule, in turn, is inconsistent with provisions in Sections 25.138, 25.218, 25.220, 25.221, 25.222, 25.223, 25.226, and 25.227 that provide for licensing of proposed earth station operation that will meet specified limits on off-axis EIRP density or has been coordinated with operators of potentially affected space stations, whether or not the antenna gain patterns conform to the standards in Section 25.209. We propose to amend Section 25.133(b)(1)(v) to indicate that a filing pursuant to Section 25.133(b)(1) should include a certification that each antenna has been tested and found to perform within authorized gain patterns or off-axis EIRP density levels. Adoption of this proposed amendment would eliminate the need for Section 25.133(c), which we accordingly propose to delete.

168. Section 25.133(b)(2) requires blanket earth station licensees to file the information required by Section 25.133(b)(1) when the network commences operation. Section 25.133(b)(1) includes a requirement to certify "that the facility as authorized has been completed." Because a blanket license for an earth station network permits operation with any number of remote stations up to a specified upper limit, we propose to amend Section 25.133(b)(2) to require blanket licensees to notify the Commission when their networks commence operation, rather than certify that "the facility as authorized has been completed," which could be understood to mean that a blanket licensee need not file information pursuant to Section 25.133(b)(2) unless and until it places the maximum authorized number of remote stations into operation. We also propose to amend Section 25.133(b)(2) to require blanket licensees to certify that each hub antenna, and each *type* of antenna used in remote stations in the network, has been tested and found to perform within authorized specifications, rather than requiring them to certify that the performance of every antenna in the network has been tested.

### S. Other Proposed Changes in Section 25.138

169. In connection with our proposal to redefine "20/30 GHz" to refer only to the 18.3-18.8 GHz, 19.7-20.2 GHz, 28.35-28.6 GHz, and 29.25-30.0 GHz frequency bands, we propose to replace the

[182] *2013 Report and Order*, 28 FCC Rcd at 12445, ¶ 134.

listing of those frequency bands in the caption and first paragraph of Section 25.138 with the term "20/30 GHz."

170. The first sentence in Section 25.138(e) states that a 20/30 GHz earth station licensee is entitled to protection from interference with downlink reception "based either on the antenna performance specified in § 25.209(a) and (b) or the actual receiving … antenna performance, if actual performance provides greater isolation from adjacent satellite interference." We propose to delete this provision, which is redundant with the general protection rule in Section 25.209(c)(1). The other sentence in Section 25.138(e) states that "for purposes of ensuring the correct level of protection" a 20/30 GHz earth station applicant must provide antenna performance plots (*i.e.*, gain plots) for the receive bands. We also propose to delete this provision. A 20/30 GHz earth station licensee would be free to submit receive gain plots to support a claim of protection from alleged harmful interference, but we see no need to require receive gain plots to be included in license applications.

171. Section 25.138(g) states that an application for renewal of a 20/30 GHz earth station license granted pursuant to Section 25.138 must specify the number of earth stations that have been constructed for operation under the license. SIA noted that there is no such requirement for applicants for renewal of licenses for earth stations of any other type and contended that there is no reason to treat applicants for renewal of 20/30 GHz GSO FSS earth stations differently in this regard.[183] These points are well taken. We therefore propose to delete the rule in Section 25.138(g).

### T. Service-Specific Space Station Licensing Rules

#### 1. Section 25.143 "Licensing provisions for the 1.6/2.4 GHz Mobile-Satellite Service and 2 GHz Mobile-Satellite Service"

172. Section 25.143(a) provides that applicants authorized to construct and launch a system of technically identical satellites will be awarded a single blanket license; that a blanket license for NGSO space stations will authorize operation of a specified number of space stations in a specified number of orbital planes; and that a separate license will be issued for each GSO space station, whether as part of a GSO-only system or a GSO/NGSO hybrid system. We propose to revise this rule to align it with the recent amendment of Section 25.114(a) to indicate that a single blanket license may be issued for an NGSO constellation comprised of satellites that are not all technically identical[184] and to correct syntactical inconsistency.

#### 2. Section 25.145 "Licensing provisions for the Fixed-Satellite Service in the 20/30 GHz bands"

173. As currently used in Section 25.145, the term "20/30 GHz band[s]" refers to the entire 18.3-20.2 GHz frequency range and the entire 28.35-30.0 GHz frequency range. Because we are proposing to re-define "20/30 GHz bands" to refer only to the portions of those bands that are designated as primary for GSO FSS operation, we propose to replace "20/30 GHz band[s]" in Section 25.145 with the term "18.3-20.2 GHz and 28.35-30.0 GHz band[s]."

174. Section 25.145(f)(2) requires any party with a blanket license for operation of 20/30 GHz FSS earth stations to report to the Commission on the first day of April of each year how many earth stations were brought into service under the blanket license during the preceding calendar year. SIA advocates deletion of this rule, noting that there is no such reporting requirement for other FSS earth station licensees and contending that there is no justification for continuing to impose this requirement on

[183] SIA 2013 Comments at 49.

[184] *See 2013 Report and Order* at ¶ 73.

those holding blanket licenses for operation of 20/30 GHz FSS earth stations.[185] We agree with SIA and propose to eliminate this rule.

### 3. Section 25.146 "Licensing and operating rules for the non-geostationary orbit Fixed-Satellite Service in the 10.7 GHz-14.5 GHz bands"

175. The title of ITU-R Recommendation S.1503 is inaccurately stated in the second sentence in Section 25.146(a)(1). We propose to rectify that error.

### 4. Section 25.147 "Licensing provision for NGSO MSS feeder downlinks in the band 6700-6875 MHz"

176. Section 25.147 states that if an NGSO MSS satellite transmitting in the 6700-6875 MHz band causes harmful interference to previously licensed co-frequency public safety facilities, the satellite licensee must remedy the interference complaint. Because this is an operating requirement rather than a licensing rule, we propose to move it to a new section in Subpart D ("Technical Operations").[186]

### 5. Section 25.264 "Requirements to facilitate reverse-band operation in the 17.3-17.8 GHz band of 17/24 GHz Broadcasting-Satellite Service and Direct Broadcast Satellite Service space stations"

177. Section 25.264(a) requires license applicants for 17/24 GHz BSS space stations to specify the predicted gain, at various off-axis angles, of proposed satellite antennas that would transmit in the 17.3-17.8 GHz band. Section 25.264(b) requires such applicants to calculate, based on their predicted off-axis gain data, the PFD that their proposed space stations will produce at the locations of "prior-filed U.S. DBS space stations" – *i.e.*, Direct Broadcast Satellite Service (DBS) space stations that are currently authorized or proposed in a license application pending at the Commission – and certify that the operators of all such "prior-filed" DBS space stations at locations where the calculated PFD will exceed -117 $dBW/m^2/100$ kHz have consented to the applicant's proposed operation. DIRECTV advocates amendment of these provisions to require such predictive data and associated certifications to be included in applications only in cases where the applicant specifies an anticipated launch date less than one year after the application's filing date. Otherwise, DIRECTV recommends that the rules allow such predicted off-axis gain and PFD data and certifications of coordination with affected DBS operators to be submitted up to two years after grant of a 17/24 GHz BSS space station authorization.[187] In support of this recommendation, DIRECTV maintains that such a rule change would enable 17/24 GHz BSS licensees to base gain and PFD predictions on post-grant collaboration with satellite manufacturers when spacecraft design is mature and that predictions made at that point would generally be more reliable than predictions made at the application stage. We agree with DIRECTV that an applicant or licensee should be better able to predict space station antenna performance and PFD at given orbital locations after reviewing and approving a complete spacecraft design package – *i.e.*, after critical design review occurs. We therefore propose to amend these provisions to require predictive gain data and associated certifications to be filed when a license application is filed for a 17/24 GHz BSS space station or within 60 days after completion of critical design review for the space station, whichever occurs later.

178. In connection with the changes proposed in the preceding paragraph, we also propose to revise the definition of "prior-filed U.S. DBS space station" in Section 25.264(b)(1). We propose to redefine that term to mean any co-frequency DBS space station authorized by the Commission prior to the filing of predicted gain data and certifications for the 17/24 GHz BSS satellite in question pursuant to Sections 25.264(a) and (b) and any co-frequency DBS space station requested in a pending application

[185] SIA 2013 Comments at 51.

[186] *See* proposed Section 25.288 in Appendix A, *infra*.

[187] Comments of DIRECTV, LLC filed on Jan. 14, 2013 (DIRECTV Comments), at 3-4.

filed prior to the filing of such predicted gain data and certifications. Changing the definition of "prior-filed U.S. DBS space station" as we propose would mean that a 17/24 GHz BSS applicant or licensee might need to take into account, for purposes of Sections 25.264(b)(3) and (e)(1), DBS space stations for which applications are filed after the filing of the application for the 17/24 GHz BSS space station in question.

179. Sections 25.264(c) and (d) require a 17/24 GHz BSS space station licensee to do the following no later than nine months prior to launch: re-calculate off-axis PFD in the 17.3-17.8 GHz band based on *measured* gain and file a report with the Commission based on the updated calculations, identifying "prior-filed" co-frequency DBS space stations at locations where the -117 dBW/$m^2$/100 kHz coordination trigger will be exceeded and specifying predicted PFD levels at those locations. DIRECTV recommends changing the deadline for meeting these requirements from nine months prior to launch to two months prior to launch to allow licensees to measure an antenna's off-axis gain after it has been integrated with the satellite bus.[188] Post-integration gain measurements would be affected by any transmitted signal interaction with spacecraft structures and might consequently correspond more closely with performance in orbit than measurements made prior to integration. We therefore propose to adopt the recommended change in the deadlines in Sections 25.264(c) and (d). In addition, we propose to amend Section 25.264(d) so that the information requirements in that section will apply to applicants for license modifications authorizing changes in the orbital locations of 17/24 GHz BSS space stations. Such information would be needed to assess compatibility with DBS space stations in the vicinity of a proposed new orbital location.

### 6. Polarization Requirements for FSS Space Stations

180. Section 25.210(a) requires space stations providing domestic FSS in the 3700-4200 MHz (space-to-Earth) and 5925-6425 MHz (Earth-to-space) frequency bands to use orthogonal linear polarization with one polarization plane defined by the equatorial plane, use opposite polarizations for uplink and downlink transmissions on the same transponder, and be capable of switching polarization sense upon ground command. In the *2012 NPRM*, the Commission invited comment as to whether these requirements are still necessary.[189] In subsequent comments, SIA asserted that these requirements were devised to facilitate coordination of high-power analog C-band transmissions on adjacent satellites, which are becoming rare, and contended that the requirements had outlived their usefulness.[190] The Commission noted in the *2013 Report and Order*, however, that some currently operational FCC-licensed space stations transmit analog signals in the 4/6 GHz bands and that the rules do not preclude authorizing analog space station operation in those bands in the future. In view of this, the Commission could not conclude from the record that eliminating the requirements in Section 25.210(a) would have no adverse impact on operators of C-band analog stations but said that it would invite further comment on the matter in a further NPRM.[191] We recognize, however, that space station operators routinely coordinate analog transmissions with operators of nearby satellites, and we are proposing an amendment that would make such coordination mandatory.[192] Further, taking into account that analog satellite transmissions are becoming rare, we propose to eliminate Section 25.210(a).

181. Section 25.210(i)(1) requires space station antennas used for FSS operation to provide cross-polarization isolation of at least 30 dB within the primary coverage area. In the *2012 NPRM*, the

[188] DIRECTV Comments at 4-5.

[189] 27 FCC Rcd at 11655, ¶ 127.

[190] SIA 2013 Comments at 55.

[191] 28 FCC Rcd at 12458, ¶ 180.

[192] *See* ¶ 52, *supra*, and § 25.140(a)(1) in Appendix A, *infra*.

Commission invited comment as to whether this requirement should be relaxed.[193] SIA advocated elimination of the requirement, contending that cross-polarization isolation has no bearing on inter-system interference except in cases where multiple satellites using the same frequencies operate at or around the same orbital location.[194] Since no commenter had provided a technical analysis that satellite analog video transmissions would be adequately protected if the cross-polarization requirement were eliminated, the Commission left Section 25.210(i)(1) unchanged in the *2013 Report and Order* but said that it would invite further comment on SIA's recommendation in another NPRM.[195] However, given that analog transmissions are routinely coordinated between operators and have become infrequent, as noted above, we propose to eliminate the requirement in Section 25.210(i)(1).

### U. Section 25.156 "Consideration of applications"

182. Section 25.156(b) states that an order granting an application in part or subject to a non-routine condition will be considered final unless the Commission revises the action or sets the application for hearing in response to a petition for reconsideration by the applicant that "rejects the grant as made" and explains why the application should be granted as originally requested. We propose to eliminate this provision to make Part 25 consistent with the International Bureau's longstanding practice of including a statement in conditional license grants that petitions for reconsideration or applications for review may be filed pursuant to Section 1.106 or 1.115, which afford these recourses to any party whose interests are adversely affected by an action taken under delegated authority.

### V. Section 25.159 "Limits on pending applications and unbuilt satellite systems"

183. Section 25.159(a) prohibits a party with five pending license applications on file with the Commission for operation of "GSO-like" space stations[196] in a particular frequency band, or five licenses for unbuilt GSO-like space stations in a particular frequency band, or a number of such pending applications and licenses amounting to five in total, from applying for a license for operation of another GSO-like space station in the same frequency band. SIA and EchoStar advocate elimination of this rule for several reasons.[197] They maintained that the rule is unnecessary because the Commission's bond and milestone rules and the three-strike rule in Section 25.159(d) suffice to accomplish the underlying objective of preventing spectrum warehousing.[198] They also argued that the limits in Section 25.159(a) unduly hinder financing and implementation of fleet upgrades or expansion and also limit options for international coordination. We invite comment on these recommendations.

### W. Section 25.163 "Reinstatement"

184. Section 25.163(a)(3) refers to "procedures … established to insure timely filings in the future." We propose to change "insure" to "ensure" in this provision.

### X. Section 25.165 "Posting of bonds"

185. Section 25.165(a) requires recipients of satellite licenses, except licenses for DBS satellites, SDARS satellites, or replacement satellites, to post a bond within 30 days of the license grant. For purposes of this rule, "replacement satellite" is defined in Section 25.165(e) as a satellite that is authorized to be operated at the same orbit location, in the same frequency bands, and with the same

[193] 27 FCC Rcd at 11656, ¶ 130.

[194] SIA 2013 Comments at 55.

[195] 28 FCC Rcd at 12459, ¶ 184.

[196] The term "GSO-like satellite system" is defined in 47 C.F.R. § 25.158 as a GSO satellite designed to communicate with earth stations with directional antennas.

[197] SIA 2013 Comments at 70; EchoStar Comments at 13-14.

[198] *See* 47 C.F.R. §§ 25.164, 25.165, 25.159(d).

coverage area as one of the licensee's existing satellites and is to be launched so that it will be brought into use at approximately the same time as, but no later than, the existing satellite is retired. ORBCOMM notes that this definition seems to limit the replacement satellite exemption to replacements for GSO satellites and contends that there is no good reason to discriminate against NGSO licensees in this regard.[199] We propose to amend the definition to make clear that the exemption from the bond requirement applies to replacements for NGSO satellites as well as replacements for GSO satellites. We also propose to amend the definition of "replacement satellite" to include GSO satellites authorized for operation at orbital locations within ±0.15 degrees of the satellites that they are to replace.

### Y. Section 25.202 "Frequencies, frequency tolerance, and emission limits"

186. Section 25.202(a)(1) lists the frequency bands that are available for FSS operation. Use restrictions and coordination requirements for operation in particular listed bands are noted in footnoted annotations. In 2012, the Commission removed annotations that merely reiterated or cross-referenced provisions included in the Table of Frequency Allocations[200] and inserted an advisory statement in Section 25.202(a)(1) that operation in some of the listed bands is subject to use restrictions or coordination requirements set forth in the Table and that relevant restrictions and coordination requirements not mentioned in the Table are stated in annotations to the following list.[201] One of the deleted annotations, indicating that NGSO systems may use certain listed bands only for operation of gateway earth stations, is not included in the Table of Allocations. We propose to restore that annotation in Section 25.202(a)(1).

187. Section 25.202(g) states that "telemetry, tracking and command functions must be conducted at either or both edges of the allocated band(s)." SIA recommends amending this provision to allow mid-band TT&C operation that would cause no more interference and require no more protection than the licensee's service traffic. SIA asserts that this change would allow use of mid-band beacons to facilitate earth station antenna tracking and accurate satellite beam pointing.[202] The Commission invited comment on the advisability of amending Section 25.202(g) in this way in the *2012 NPRM*[203] but concluded in the *2013 Report and Order* that there was insufficient record support for such a change and asserted that concerns raised by DIRECTV and SES/NSS/O3b warranted further examination.[204] Neither DIRECTV nor SES/NSS/O3b, however, opposes adoption of an amendment like that suggested in the *2012 NPRM* and recommended by SIA.[205] Indeed, SES/NSS/O3b supports SIA's recommendation in this regard.[206] After further consideration, we believe that it would serve the public interest to permit licensees to transmit non-emergency TT&C signals in portions of their assigned spectrum other than at the band edges, provided that such TT&C operation will cause no more interference or require greater protection from interference than ordinary communications traffic on the same satellite network. We propose to amend Section 25.202(g) accordingly.

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[199] Comments of ORBCOMM Inc. filed Jan. 14, 2013 at 18.

[200] The Table of Frequency Allocations can be found in 47 C.F.R. § 2.106.

[201] *2006 Biennial Regulatory Review – Revision of Part 25*, Report and Order, 27 FCC Rcd 11585, 11589-90, ¶ 18 (2012).

[202] SIA 2013 Comments at 52.

[203] 27 FCC Rcd at 11627. ¶ 20.

[204] 28 FCC Rcd at 12455. ¶ 170.

[205] Rather, they oppose a recommendation from Intelsat to delete Section 25.202(g) altogether, which would allow licensees to transmit high-power emergency TT&C signals in the middle of their assigned frequency bands. DIRECTV Reply Comments at 5; SES/NSS/O3b Joint Reply Comments at 18.

[206] SES/NSS/O3b Joint Reply Comments at 18-19.

### Z. Section 25.203 "Choice of sites and frequencies"

188. Section 25.203(f) requires "any applicant" for operating authority for a new permanent-fixed earth station at any site within a certain defined geographic area, or for authority to change the frequency, power, antenna height or directivity, or location of an existing earth station within that area, to notify the Director of the National Radio Astronomy Observatory of the technical particulars and exact location of the proposed station. We propose to amend this rule to exempt applicants for receive-only earth station licenses[207] from this notification requirement, because stations that do not transmit cannot interfere with radio astronomy observation.

189. Section 25.203(g)(1) reminds earth station operators that their licenses may be conditioned under certain circumstances to protect Commission monitoring stations from harmful interference, among other things.[208] Specifically, Section 25.203(g)(1) states that the Commission will examine earth station applications for possible harmful interference to monitoring stations based on the extent to which the operation of those earth stations will cause an increase in the field strength at the location of the monitoring stations, "assuming a free space characteristic impedance of 120 ohms."[209] We propose deleting the free space characteristic impedance assumption from Section 25.203(g)(1) for two reasons. First, the impedance of free space is not 120 ohms, it is approximately 120π ohms, or in other words, approximately 376.73 ohms. The constant term "π" was apparently omitted due to a typographical error. Second, we do not believe it is necessary for the rule to continue to state the value of a widely-recognized physical constant. We also propose other revisions to Section 25.203(g)(1), set forth in Appendix A to this *Further Notice*, to simplify and clarify the rule.

190. Section 25.203(j) states that applicants for operating authority for NGSO MSS feeder-link operation in the 17.7-20.2 GHz and 27.5-30.0 GHz bands must specify the frequencies and spacecraft antenna gain contours towards each proposed feeder-link earth station location and coordinate with licensees of FSS and terrestrial radio stations sharing those bands. We propose to delete the requirement to specify frequencies and gain contours, which is redundant with provisions in Section 25.114(c) that require applicants to provide the same information.

### AA. Operating Rules for Earth Stations

#### 1. Section 25.204 "Power limits for earth stations"

191. Section 25.204(e) allows operators of FSS earth stations to increase the power of uplink transmissions above otherwise applicable limits to overcome "rain fade" – that is, signal attenuation due to the scattering and absorbing effects of precipitation in the atmosphere. Section 25.204(e)(1) specifies a default rain-fade rule for FSS uplink transmissions in frequencies above 10 GHz that are not subject to the more band specific rain-fade rules in the other sub-paragraphs of Section 25.204(e).[210] This provision states that the EIRP and EIRP density of uplink transmissions in frequencies above 10 GHz may exceed normal limits by 1 dB above the amount of monitored rain-fade attenuation during periods of

[207] Licenses are required for operation of receive-only earth stations under certain narrow circumstances. *See* 47 C.F.R. § 25.131(j).

[208] 47 C.F.R. § 25.203(g)(1). The Commission's monitoring stations are listed in Section 0.121(c) of the rules, 47 C.F.R. § 0.121(c).

[209] "Applications for stations (except mobile stations) which will produce on any frequency a direct wave fundamental field strength of greater than 10 mV/m in the authorized bandwidth of service (–65.8 dBW/$m^2$ power flux density assuming a free space characteristic impedance of 120 ohms) at the referenced coordinates, may be examined to determine extent of possible interference." 47 C.F.R. § 25.203(g)(1).

[210] *See* 47 C.F.R. §§ 25.204(e)(2) (rain-fade rule for FSS uplink transmission in the 13.77-13.78 GHz band), 25.204(e)(3) (rain-fade rule for FSS uplink transmission to GSO space stations in the 28.35-28.6 GHz or 29.25-30.0 GHz band), and 25.204(e)(4) (rain-fade rule for uplink transmissions from 17/24 GHz BSS feeder-link stations).

precipitation. Section 25.204(e)(1) also states that the maximum power level must be coordinated with operators of space stations adjacent to the target satellite. SIA contends that the 1 dB limit obviates any need for coordination and notes that there is no similar coordination requirement in the other rain-fade rules in Section 25.204(e).[211] No commenter opposes this proposed amendment. We agree that the coordination requirement in Section 25.204(e)(1) is unnecessary, and we propose to eliminate it.

### 2. Section 25.205 "Minimum angle of antenna elevation"

192. We propose to change the caption of this section to "Minimum antenna elevation angle." Section 25.205(a) states that the Commission will not normally permit earth stations to transmit at main-lobe axis elevation angles less than five degrees above the horizontal plane but may authorize operation at an elevation angle as low as three degrees in a seaward direction or upon a showing of good cause. A parallel provision in Section 25.205(d) states that Earth Stations Aboard Aircraft[212] will not be authorized for transmission at elevation angles less than five degrees when they are not airborne. As recommended by SIA,[213] we propose to amend these provisions to permit routine authorization of operation at elevation angles down to three degrees in frequency bands not shared with terrestrial radio systems, which would align these rules with an international standard.[214] Authority for operation at elevation angles below three degrees might be granted in response to waiver requests supported by demonstrations of good cause.

193. Sections 25.205(b) and (c) state that Earth Stations on Vessels and Vehicle-Mounted Earth Stations[215] that are allowed to transmit at elevation angles less than five degrees must meet the applicable limits on EIRP and EIRP density towards the horizon in Sections 25.204(h), (i), and (j). We propose to eliminate Sections 25.205(b) and (c), which are redundant with Sections 25.204(h), (i), and (j).

### 3. Section 25.211 "Analog video transmissions in the Fixed-Satellite Service"

194. In a previous section of this Further NPRM, we discussed the routine licensing criteria in Section 25.211(d).[216] Here we propose changes in two other provisions in Section 25.211.

195. Section 25.211(a) requires the center frequencies of analog video carriers in the 3700-4200 MHz downlink band to be spaced at 20 MHz intervals starting at 3720 MHz and requires the corresponding uplink center frequencies to be 2225 MHz higher. Intelsat advocates elimination of this rule. While noting that the purpose of the rule is to reduce the likelihood of interference between co-frequency analog video transmissions from adjacent space stations operating with opposite polarization schemes, Intelsat stresses that adjacent space station operators have coordinated analog video operation not conforming to these requirements.[217] Moreover, if applied to operation of transponders with bandwidths other than 36 MHz or multiples thereof, adherence to the center-channel placement formula in Section 25.211(a) would result in inefficient transponder utilization and would be suboptimal for minimization of intermodulation interference. We therefore propose to eliminate Section 25.211(a),

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[211] SIA 2013 Comments at 19.

[212] *See* definition in 47 C.F.R. § 25.103.

[213] *See* SIA 2013 Comments at 53.

[214] *See* ITU Radio Regulations, No. 21.14 (specifying 3-degree minimum elevation angle for earth station antennas unless otherwise agreed in international coordination).

[215] *See* definitions of these terms in 47 C.F.R. § 25.103.

[216] *See* ¶¶ 76-77, *supra*.

[217] Intelsat Comments at 16, citing *Amendment of the Commission's Rules and Regulations to Reduce Alien Carrier Interference Between Fixed-Satellites at Reduced Orbital Spacings and to Revise Application Processing Procedures for Satellite Communications Services*, Second Report and Order and Further Notice of Proposed Rulemaking, 8 FCC Rcd 1316, 1320-21 ¶¶ 26-28 (1993).

which would afford more design flexibility for space stations transmitting analog video signals in the 3700-4200 MHz band.

196. Section 25.211(b) includes a sentence that prohibits transmission of an unmodulated carrier at a power level sufficient to saturate a satellite transponder, except by the space station licensee for testing purposes. SIA maintains that this rule should apply to all earth station operation, not just analog video uplink transmission in the 4/6 GHz FSS band, which is the subject of the other provisions in Section 25.211(b). SIA therefore recommends moving this provision to Section 25.275 as a rule of general applicability. We propose to do so.

197. The last sentence in Section 25.211(b) states that "12/14 GHz video transmissions for TV/FM shall identify the particular carrier frequencies for necessary coordination with adjacent U.S. satellite systems and affected satellite systems of other administrations." We propose to delete this sentence, as any specification of carrier frequencies necessary for successful completion of required coordination can be directly addressed by operators in the course of the coordination.

#### 4. Section 25.258 "Sharing between NGSO MSS Feeder links Stations and GSO FSS services in the 29.25-29.5 GHz bands"

198. As originally adopted, Section 25.258(b) stated that:

> Licensed GSO FSS systems shall, to the maximum extent possible, operate with frequency/polarization selections, in the vicinity of operational or planned NGSO MSS feeder link earth station complexes, that will minimize instances of unacceptable interference to the GSO FSS space stations.[218]

In response to a petition for reconsideration, the Commission amended that provision to require GSO FSS earth stations transmitting in the 29.25-29.5 GHz band in the vicinity of planned or operational NGSO MSS feeder-link earth station complexes to operate, to the extent possible, with frequencies and polarization that will minimize "unacceptable interference with GSO FSS *or NGSO MSS* uplink reception" (emphasis added).[219] The Commission inadvertently reversed that change when it subsequently adopted additional provisions in Section 25.258(b).[220] We propose to amend the first sentence in Section 25.258(b) to reinstate the previously adopted modification.

### BB. Section 25.283 "End-of-life disposal"

199. Section 25.283(c) states that after relocating a space station to a post-mission disposal orbit, the licensee must ensure, unless prevented by technical failures beyond its control, that "all stored energy sources on board the satellite are discharged, by venting excess propellant, discharging batteries, relieving pressure vessels, and other appropriate measures." SIA recommends changing the phrase "and

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[218] *See Rulemaking to Amend Parts 1, 2, 21, and 25 of the Commission's Rules to Redesignate the 27.5-29.5 GHz Frequency Band, to Reallocate the 29.5-30.0 GHz Frequency Band, to Establish Rules and Policies for Local Multipoint Distribution Service and for Fixed Satellite Services*, IB Docket No. 92-297, First Report and Order, 11 FCC Rcd 19005 (1996), Appendix B ¶ 4.

[219] *Rulemaking to Amend Parts 1, 2, 21, and 25 of the Commission's Rules to Redesignate the 27.5-29.5 GHz Frequency Band, to Reallocate the 29.5-30.0 GHz Frequency Band, to Establish Rules and Policies for Local Multipoint Distribution Service and for Fixed Satellite Services*, IB Docket No. 92-297, Memorandum Opinion and Order, 16 FCC Rcd 11436, 11441, ¶ 13 (2001), 67 FR 39308 (June 7, 2002).

[220] *Redesignation of the 17.7-19.7 GHz Frequency Band, Blanket Licensing of Satellite Earth Stations in the 17.7-20.2 GHz and 27.5-30.0 GHz Frequency Bands, and the Allocation of Additional Spectrum in the 17.3-17.8 GHz and 24.75-25.25 GHz Frequency Bands for Broadcast Satellite-Service Use*, IB Docket No. 98-172, Second Order on Reconsideration, 17 FCC Rcd 24248 (2002). The Commission did not state any intention of amending the provision in question in this order and was evidently unaware that the provision had recently been revised. 17 FCC Rcd 24257, ¶¶ 21-22 and n.54 (quoting the text of Section 25.258(b) as originally adopted).

other appropriate measures" to "or other appropriate measures."[221] SIA notes that a spacecraft design that has been in use for many years does not facilitate complete venting of all pressure vessels and contends that the suggested re-wording would align Section 25.283(c) with the corresponding provision in Section 24.114(d)(14)(ii), which requires a space station applicant to state whether stored energy will be removed at the spacecraft's end of life, by depleting residual fuel and leaving all fuel line valves open, venting any pressurized system, leaving all batteries in a permanent discharge state, and removing any remaining source of stored energy, "or through other equivalent procedures specifically disclosed in the application." SIA also maintains that the change would make the rule in Section 25.283(c) more consistent with U.S. Government guidelines and international standards.[222] We invite comment on SIA's recommendation. We also invite suggestions for specific alternative requirements for spacecraft with pressure vessels that cannot be completely discharged, for example, specifying a maximum permitted level of stored energy for inert gases at a specified temperature.

## IV. REGULATORY IMPACT CONCLUSION

200. The amendments we propose here would update the Commission's rules for satellite services to reflect evolving technology, eliminate unnecessary technical and information-filing requirements, and reorganize, clarify, and simplify existing requirements. We believe that these changes would serve the public interest by promoting compliance with the Commission's operating rules, improving the ability of the public and Commission to assess the interference potential of proposed operations, affording more flexibility for incorporating state-of-the-art design, easing administrative burdens, and facilitating rapid deployment of new and improved satellite services. We believe that these benefits would outweigh any resultant costs and that the rule changes would reduce net costs, on average, for applicants and licensees. We invite comment on these conclusions.

## V. PROCEDURAL MATTERS

### A. Ex Parte Presentations

201. We will continue to treat this proceeding as a "permit-but-disclose" proceeding in accordance with the Commission's *ex parte* rules.[223] Persons making *ex parte* presentations must file a copy of any written presentation or a memorandum summarizing any oral presentation within two business days after the presentation (unless a different deadline applicable to the Sunshine period applies). Persons making oral *ex parte* presentations are reminded that memoranda summarizing the presentation must (1) list all persons attending or otherwise participating in the meeting at which the *ex parte* presentation was made, and (2) summarize all data presented and arguments made during the presentation. If the presentation consisted in whole or in part of the presentation of data or arguments already reflected in the presenter's written comments, memoranda or other filings in the proceeding, the presenter may provide citations to such data or arguments in his or her prior comments, memoranda, or other filings (specifying the relevant page and/or paragraph numbers where such data or arguments can be found) in lieu of summarizing them in the memorandum. Documents shown or given to Commission staff during *ex parte* meetings are deemed to be written *ex parte* presentations and must be filed consistent with rule 1.1206(b). In proceedings governed by rule 1.49(f) or for which the Commission has made available a method of electronic filing, written *ex parte* presentations and memoranda summarizing oral *ex parte* presentations, and all attachments thereto, must be filed through the electronic comment filing system available for that proceeding, and must be filed in their native format (*e.g.*, .doc, .xml, .ppt,

[221] SIA 2013 Comments at 30.

[222] *Id.*, citing U.S. Government Orbital Debris Mitigation Standard Practices at Section 2-2 and European Code of Conduct for Space Debris Mitigation (June 28, 2004) at § 4.2.1. The State Department, the Department of Commerce (NOAA), the Department of Defense, and NASA were involved in drafting the orbital debris guidelines.

[223] 47 C.F.R. §§ 1.1200 *et seq.*

searchable .pdf). Participants in this proceeding should familiarize themselves with the Commission's *ex parte* rules.

### B. Initial Regulatory Flexibility Analysis

202. As required by the Regulatory Flexibility Act of 1980, as amended,[224] the Commission has prepared an Initial Regulatory Flexibility Analysis (IRFA) for this Notice, of the possible significant economic impact on small entities of the policies and rules addressed in this document. The IRFA is set forth as Appendix D. Written public comments are requested on this IRFA. Comments must be identified as responses to the IRFA and must be filed by the deadlines for comments on the Notice provided on or before the dates indicated on the first page of this Notice. The Regulatory Flexibility Act of 1980, as amended (RFA),[225] requires that a regulatory flexibility analysis be prepared for rulemaking proceedings unless the agency certifies that "the rule will not have a significant economic impact on a substantial number of small entities."[226] The RFA generally defines the term "small entity" as referring to any "small business," "small organization," or "small governmental jurisdiction."[227] The term "small business" has the same meaning as the term "small business concern" under the Small Business Act.[228] A small business 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).[229] A small organization is generally "any not-for-profit enterprise which is independently owned and operated and is not dominant in its field."[230] "Small governmental jurisdiction" generally means governments of cities, counties, towns, townships, villages, school districts, or special districts, with a population of less than 50,000.[231]

### C. Paperwork Reduction Act

203. This document contains proposed new and modified information collection requirements. It also proposes to eliminate a number of existing information collection requirements. The Commission, as part of its continuing effort to reduce paperwork burdens, invites the general public and OMB to comment on the information collection requirements contained in this document, as required by PRA. In addition, pursuant to the Small Business Paperwork Relief Act of 2002,[232] we seek specific comment on how we might "further reduce the information collection burden for small business concerns with fewer than 25 employees."[233]

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[224] 5 U.S.C. § 603.

[225] The RFA, *see* 5 U.S.C. § 601 *et seq*., has been amended by the Contract With America Advancement Act of 1996, Pub. L. No. 104-121, 110 Stat. 847 (1996) (CWAAA). Title II of the CWAAA is the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA).

[226] 5 U.S.C. § 605(b).

[227] 5 U.S.C. § 601(6).

[228] 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 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).

[229] Small Business Act, 15 U.S.C. § 632 (1996).

[230] 5 U.S.C. § 601(4).

[231] 5 U.S.C. § 601(5).

[232] Pub. L. No. 107-198.

[233] 44 U.S.C. § 3506(c)(4).

### D. Filing of Comments and Reply Comments

204. Pursuant to sections 1.415 and 1.419 of the Commission's rules, 47 C.F.R. §§ 1.415, 1.419, interested parties may file comments and reply comments on or before the dates indicated on the first page of this document. When filing comments or reply comments, please reference **IB Docket No. 12-267.** Comments may be filed using: (1) the Commission's Electronic Comment Filing System (ECFS), (2) the Federal Government's eRulemaking Portal, or (3) by filing paper copies. *See Electronic Filing of Documents in Rulemaking Proceedings*, 63 Fed. Reg. 24121 (1998).

205. Electronic Filers: Comments may be filed electronically using the Internet by accessing the ECFS: http://www.fcc.gov/cgb/ecfs/ or the Federal eRulemaking Portal: http://www.regulations.gov/. Filers should follow the instructions provided on the website for submitting comments.

206. Paper Filers: Parties who choose to file by paper must file an original and four copies of each filing. If more than one docket or rulemaking number appears in the caption of this proceeding, filers must submit two additional copies for each additional docket or rulemaking number.

207. Filings can be sent by hand or messenger delivery, by commercial overnight courier, or by first-class or overnight U.S. Postal Service mail. All filings must be addressed to the Commission's Secretary, Office of the Secretary, Federal Communications Commission.

208. All hand-delivered or messenger-delivered paper filings for the Commission's Secretary must be delivered to FCC Headquarters at 445 12th Street, SW, Room TW-A325, Washington, DC 20554. All hand deliveries must be held together with rubber bands or fasteners. Any envelopes must be disposed of before entering the building.

209. Commercial overnight mail (other than U.S. Postal Service Express Mail and Priority Mail) must be sent to 9300 East Hampton Drive, Capitol Heights, MD 20743.

210. U.S. Postal Service first-class, Express, and Priority mail must be addressed to 445 12th Street, SW, Washington DC 20554.

211. People with Disabilities: To request materials in accessible formats for people with disabilities (braille, large print, electronic files, audio format), send an email to fcc504@fcc.gov or call the Consumer and Governmental Affairs Bureau at 202-418-0530 (voice) or 202-418-0432 (TTY). Contact the FCC to request reasonable accommodations for filing comments (accessible format documents, sign language interpreters, CART, etc.) by e-mail at: fcc504@fcc.gov; phone: 202-418-0530 or TTY: 202-418-0432.

## VI. ORDERING CLAUSES

212. Accordingly, IT IS ORDERED, pursuant to Sections 4(i), 7(a), 11, 303(c), 303(f), 303(g), and 303(r) of the Communications Act of 1934, as amended, 47 U.S.C. §§ 154(i), 157(a), 161, 303(c), 303(f), 303(g), 303(r), that this Further Notice of Proposed Rulemaking in IB Docket No. 12-267 IS ADOPTED.

213. IT IS FURTHER ORDERED that the Commission's Consumer and Governmental Affairs Bureau, Reference Information Center shall send a copy of this Further Notice of Proposed Rulemaking, including the initial regulatory flexibility act analysis, to the Chief Counsel for Advocacy of the Small Business Administration, in accordance with Section 603(a) of the Regulatory Flexibility Act, 5 U.S.C. § 601, *et seq.* (1981).

FEDERAL COMMUNICATIONS COMMISSION

Marlene H. Dortch
Secretary

## APPENDIX A

## Proposed Rule Changes

The Federal Communications Commission proposes to amend title 47 of the Code of Federal Regulations, parts 0 and 25, as follows:

### PART 0 – Commission Organization

1. The authority citation for Part 0 continues to read as follows:

AUTHORITY: SECS. 5, 48 Stat. 1068, as amended, 47 U.S.C. 155.

2. In § 0.457, add paragraph (d)(1)(vii)(C) to read as follows:

§ 0.457 Records not routinely available for public inspection.

* * * * *

(d) * * *

(1) * * *

(vii) * * *

(C) Draft APIs and Coordination Requests filed pursuant to § 25.110(b)(3) are not routinely available for public inspection before the Commission submits them to the ITU. Such ITU submissions will be announced by public notice pursuant to § 25.151(a).

### PART 25 -- SATELLITE COMMUNICATIONS

3. The authority citation for Part 25 is revised to read as follows:

Authority: Interprets or applies Sections 4, 301, 302, 303, 307, 309, 319, 332, and 705 of the Communications Act, as amended, 47 U.S.C. Sections 154, 301, 302, 303, 307, 309, 319, 332, and 705 unless otherwise noted.

4. In § 25.103, add definitions of "conventional C-band," "conventional Ku-band," "extended C-band," "plane perpendicular to the GSO arc," "plane tangent to the GSO arc," "skew angle," "two-degree-compliant space station," and "VSAT network"; remove the definition of "12/14 GHz band" and "C-band"; and revise the definitions of "20/30 GHz bands," "NGSO FSS gateway earth station," and "protection areas" to read as follows:

§ 25.103 Definitions.

* * * * *

20/30 GHz bands. The 18.3-18.8 GHz (space-to-Earth), 19.7-20.2 GHz (space-to-Earth), 28.35-28.6 GHz (Earth-to-space), and 29.25-30.0 GHz (Earth-to-space) frequency bands, which the Commission has designated as primary for GSO FSS operation.

* * * * *

Conventional C-band. The 3700-4200 MHz (space-to-Earth) and 5925-6425 MHz (Earth-to-space) FSS frequency bands.

Conventional Ku-band. The 11.7-12.2 GHz (space-to-Earth) and 14.0-14.5 GHz (earth-to-space) FSS frequency bands.

* * * * *

Extended C-band. As used in this part, this term refers to the 3600-3700 MHz (space-to-Earth), 5850-5925 MHz (Earth-to-space), 6425-6700 (Earth-to-space), and 6700-7025 MHz (bi-directional) FSS frequency bands.

* * * * *

NGSO FSS gateway earth station. An earth station or complex of multiple earth station antennas supporting the routing and switching functions of an NGSO FSS system. An NGSO FSS gateway earth station does not originate or terminate communication traffic, but interconnects multiple user-operated earth stations operating in other frequency bands with primary terrestrial networks, such as the public switched telephone network and Internet networks, communicating with the user-operated earth stations via links with NGSO satellites. An NGSO FSS gateway earth station may also be used for telemetry, tracking, and command transmissions and is not for the exclusive use of any customer.

* * * * *

Plane perpendicular to the GSO arc. The plane that is perpendicular to the "plane tangent to the GSO arc," as defined below, and includes a line between the earth station in question and the GSO space station that it is communicating with.

Plane tangent to the GSO arc. The plane defined by the location of an earth station's transmitting antenna and a line in the equatorial plane that is tangent to the GSO arc at the location of the GSO space station that the earth station is communicating with.

* * * * *

Protection areas. The geographic regions where U.S. Department of Defense meteorological satellite systems or National Oceanic and Atmospheric Administration meteorological satellite systems, or both such systems, receive signals from low earth orbiting satellites. Also, areas around NGSO MSS feeder-link earth stations in the 1.6/2.4 GHz Mobile-Satellite Service determined in the manner specified in § 25.203(j).

* * * * *

Skew angle. The angle between the minor axis of an axially asymmetric antenna beam and the plane tangent to the GSO arc.

* * * * *

Two-degree-compliant space station. A GSO FSS space station operating in the conventional or extended C-band, the conventional or extended Ku-band, or the 20/30 GHz bands within the routine limits on downlink PSD or PFD specified in § 25.140(a)(3) and communicating only with earth stations operating in conformance with routine uplink parameters specified in § 25.134, § 25.138(a), § 25.211(d), § 25.212(c), (d), or (f), § 25.218, 25.221(a)(1) or (a)(3), § 25.222(a)(1) or (a)(3), § 25.223(b), § 25.226(a)(1) or (a)(3), or § 25.227(a)(1) or (a)(3).

* * * * *

VSAT network. A network consisting of "remote" earth stations with small antennas that communicate via one or more FSS space stations, which usually include one or more "hub" or "gateway" earth stations that route messages and may perform other network control functions.

5. In § 25.110, revise paragraphs (b) and (d) to read as follows:

§ 25.110 Filing of applications, fees, and number of copies.

* * * * *

(b) Submitting your application.

(1) All earth station license applications must be filed electronically on Form 312 in accordance with the applicable provisions of part 1, subpart Y of this chapter.

(2) Except as provided in paragraph (b)(3) of this section, applications for space station licenses must be filed electronically on Form 312 in accordance with the applicable provisions of part 1, subpart Y of this chapter and include all information required by § 25.114.

(3) A license application for a GSO FSS space station not subject to the provisions in Appendix 30A or 30B of the ITU's Radio Regulations may be submitted in two steps, as follows:

(i) Such an application may be initiated by filing, in accordance with the applicable provisions of part 1, subpart Y of this chapter, a draft API and Coordination Request for proposed space station operation in specified frequency bands at a specified orbital location with a letter signed by the party in interest or a designated representative requesting that the draft API and Coordination Request be submitted to the ITU and a declaration of acceptance of ITU cost-recovery responsibility in accordance with § 25.111(d). Such a filing need not include a completed Form 312.

(ii) An application initiated pursuant to paragraph (b)(3)(i) of this section may be completed by filing a complete Form 312 for the proposed space station and any other information required by § 25.114 within two years of the date of the public notice announcing the filing of the API and Coordination Request.

* * * * *

(d) An applicant must pay the appropriate filing fee in accordance with part 1, subpart G of this chapter, at the time when it files Form 312.

6. In § 25.112, revise the section heading, the first sentence in paragraph (b), and paragraph (c) to read as follows and add paragraph (d):

§ 25.112 Dismissal and return of applications.

* * * * *

(b) Applications for space station authority found defective under paragraph (a)(3) or (a)(4) of this section will not be considered. * * *

(c) The Commission will dismiss an application for failure to respond substantially within a specified time period to official correspondence or requests for additional information. Dismissal will be without prejudice unless the application is mutually exclusive pursuant to § 25.155, in which case it will be dismissed with prejudice.

(d) An application will be dismissed without prejudice as a matter of right if the applicant requests its dismissal prior to final Commission action.

7. In § 25.113, revise paragraphs (f), (g), and (h) to read as follows and add paragraph (i):

§ 25.113 Station construction, deployment approval, and operation of spare satellites.

* * * * *

(f) Construction permits are not required for U.S.-licensed space stations, except for stations that the applicant proposes to operate to disseminate program content to be received by the public at large, rather than only by subscribers. Construction of a station for which a construction permit is not required may commence, at the applicant's own risk, prior to grant of a license.

(g) Except as set forth in paragraphs (h) and (i) of this section, approval for orbital deployment and a station license (*i.e.*, operating authority) must be applied for and granted before a space station may be deployed and operated in orbit. Approval for orbital deployment may be requested in an application for a space station license. However, an application for authority to deploy and operate an on-ground spare satellite will be considered pursuant to the following procedures:

(1) Applications for deployment and operation of an on-ground spare NGSO-like satellite will be considered pursuant to the procedures set forth in §25.157, except as set forth in paragraph (g)(3) of this section.

(2) Applications for deployment and operation of an on-ground spare GSO-like satellite will be considered pursuant to the procedures set forth in §25.158, except as set forth in paragraph (g)(3) of this section.

(3) Neither paragraph (g)(1) nor (g)(2) of this section will apply in cases where the space station to be deployed is determined to be an emergency replacement for a previously authorized space station that has been lost as a result of a launch failure or a catastrophic in-orbit failure.

(h) Operators of NGSO satellite systems licensed by the Commission need not file separate applications to operate technically identical in-orbit spares deployed pursuant to a blanket license granted under § 25.114(a). However, the licensee must notify the Commission within 30 days of bringing an in-orbit spare into operation and certify that its activation has not increased the number of operating space stations above the number previously authorized and that the licensee has determined by measurement that the activated spare is operating within the terms of the license.

(i) Replacement of Space Stations within the System License Term. An operator of NGSO space stations under a blanket license granted by the Commission need not apply for license modification to deploy and operate technically identical replacement satellites in a previously-authorized orbit within the term of the system authorization. However, the licensee must notify the Commission of the intended launch at least thirty days in advance and certify that its operation of the additional space station(s) will not increase the number of operating space stations above the maximum number specified in the license.

8. In § 25.114, remove paragraph (c)(13) and revise paragraphs (a), (b), (c)(4)(vi)(D), (d)(10), and (d)(15)(i), (iii), and (iv) to read as follows:

§ 25.114 Applications for space station authorizations.

(a) (1) A license application filed pursuant to § 25.110(b)(2) for a GSO space station or NGSO space station or space station constellation must comprise a comprehensive proposal and must be submitted on FCC Form 312, Main Form and Schedule S, with attached exhibits required by paragraph (d) of this section.

(2) An application for blanket authority for an NGSO constellation of space stations that are not all technically identical must provide the information required by paragraphs (c) and (d) of this section for each type of station in the constellation.

(3) For an application filed pursuant to the two-step procedure in § 25.110(b)(3), the filing pursuant to § 25.110(b)(3)(ii) must be submitted on FCC Form 312, Main Form and Schedule S, with attached exhibits as required by paragraph (d) of this section, and must constitute a comprehensive proposal.

(b) Each application for a new or modified space station authorization must contain the formal waiver

required by section 304 of the Communications Act, 47 U.S.C. 304.

(c) * * *

(4) * * *

(vi) * * *

(D) For a space station with steerable beams that are not shapeable, specify the applicable contours, as defined in paragraph(c)(4)(vi)(A) or (B) of this section, with a description of a proposed coverage area for each steerable beam or provide the contour information described in paragraph (c)(4)(vi)(C) of this section for each steerable beam.

(d) * * *

(10) Applications for space station authorizations in the 1.6/2.4 GHz or 2 GHz Mobile-Satellite Service must include information required by § 25.143(b);

* * * * *

(15) * * *

(i) Except as set forth in paragraph (d)(15)(ii) of this section, an applicant proposing to operate in the 17.3-17.7 GHz frequency band must demonstrate that the proposed space station will comply with the power flux density limits in § 25.208(w).

* * * * *

(iii) An applicant proposing to provide international service in the 17.7-17.8 GHz band must certify that it will meet the power flux density limits in § 25.208(c).

(iv) Any information required by §§ 25.264(a)(6), 25.264(b)(4), or 25.264(d).

* * * * *

9. In § 25.115, revise paragraphs (a)(2)(iii)-(vii) to read as follows; remove paragraphs (a)(2)(viii) and (ix); revise paragraph (c)(1) to read as follows; remove the word “CSAT” and “CSATs” wherever they appear in paragraph (c); revise paragraph (e), paragraph (g) introductory text, and paragraphs (g)(1) and (2) to read as follows; and remove and reserve paragraph (h):

§ 25.115 Applications for earth station authorizations.

(a) * * *

(2) Applicants for licenses for transmitting earth stations in the Fixed-Satellite Service may file on FCC Form 312EZ if all of the following criteria are met:

* * * * *

(iii) the application meets all relevant routine licensing criteria in §§ 25.134, 25.211, or 25.212 or includes information filed pursuant to paragraph (g)(1) of this section indicating that off-axis EIRP density from the proposed earth stations will not exceed relevant routine levels specified in § 25.138(a) or § 25.218; and

(iv) Operation of the proposed station has been successfully coordinated with terrestrial systems, if the station would transmit in the 5925-6425 MHz band; and

(v) The application includes an environmental impact statement pursuant to §1.1311 of this chapter, if required; and

(vi) The applicant does not propose to communicate via non-U.S.-licensed satellites not on the Permitted Space Station List; and

(vii) If the proposed station(s) will transmit in the 28.35-28.6 GHz and/or 29.5-30 GHz bands, the applicant proposes to communicate only via satellites for which coordination has been completed pursuant to Footnote US334 of the U.S. Table of Frequency Allocations with respect to Federal Government systems authorized on a primary basis, under an agreement previously approved by the Commission and the National Telecommunications and Information Administration, and the applicant certifies that it will operate consistently with the agreement.

* * * * *

(c)(1) Large Networks of Small Antennas operating in the 11.7-12.2 GHz and 14.0-14.5 GHz frequency bands with U.S.-licensed or non-U.S.-licensed satellites for domestic or international services. Applications to license small antenna network systems operating in the 11.7-12.2 GHz and 14.0-14.5 GHz frequency band under blanket operating authority may be filed on FCC Form 312 or Form 312EZ, with a Schedule B for each large (5 meters or larger) hub station and each representative type of small antenna (less than 5 meters) operating within the network.

* * * * *

(e) License applications for earth stations operating in any portion of the 18.3-20.2 GHz and 28.35-30.0 GHz bands must be filed on FCC Form 312, Main Form and Schedule B, and must include any information required by paragraph (g) or (j) of this section or by § 25.130. An applicant may request authority for operation of GSO FSS earth stations in the 20/30 GHz bands without specifying the location of user terminals but must specify the number of terminals to be covered by the license, the geographic area(s) in which they will operate, and the location of hub and/or gateway stations.

* * * * *

(g) Applications for earth stations that will transmit to geostationary satellites in any portion of the 5850-7025 MHz, 12.75-13.25 GHz, 13.75-14.5 GHz, 24.75-25.25 GHz, 28.35-28.6 GHz, or 29.25-30.0 GHz band must include, in addition to the particulars of operation identified on Form 312 and associated Schedule B, the information specified in either paragraph (g)(1) or (g)(2) below for each earth station antenna type.

(1) Specification of off-axis EIRP density calculated from measurements made consistent with the requirements in § 25.132(b)(1), in accordance with the following requirements. For purposes of this rule, the "off-axis angle" is the angle in degrees from a line between an earth station antenna and the target satellite.

(i) A plot of maximum co-polarized EIRP density in the plane tangent to the GSO arc, for off-axis angles from minus 180° to plus 180°;

(ii) A plot of maximum cross-polarized EIRP spectral density in the plane tangent to the GSO arc at off-axis angles from minus 10° to plus 10°;

(iii) A plot of maximum co-polarized EIRP density in the plane perpendicular to the GSO arc at off-axis angles from 0° to plus 30°;

(iv) A plot of maximum cross-polarized EIRP density in the plane tangent to the GSO arc at off-axis angles from minus 10° to plus 10°;

(v) A plot of maximum cross-polarized EIRP density in the plane perpendicular to the GSO arc at off-axis angles from minus 10° to plus 10°;

(vi) The relevant off-axis EIRP density envelopes in § 25.138, 25.218, 25.221, 25.222, 25.223, 25.226, or 25.227 must be superimposed on plots submitted pursuant to paragraphs (i)-(v) above.

(vii) The showing must include a supplemental table for each off-axis angular range in which the relevant routine EIRP density envelope will be exceeded, specifying angular coordinates in degrees off-axis and corresponding calculated off-axis EIRP density at 0.2 degree increments over the angular range

in which the routine envelope will be exceeded and one degree on each side of that range.

(2) An applicant that certifies pursuant to § 25.132(a)(1) that a proposed antenna's measured gain pattern conforms to relevant standards in §§ 25.209(a) and (b) and that input power density to the antenna will not exceed a relevant limit in § 25.134, 25.211, or 25.212 need not provide a showing pursuant to paragraph (g)(1) of this section for operation with that antenna.

* * * * *

10. In § 25.117, add paragraph (h) to read as follows:

§ 25.117 Modification of station license.

* * * * *

(h) Unless otherwise ordered by the Commission, an application for any of the following kinds of modification of the operation of a GSO space station will be deemed granted 35 days after the date of the public notice that the application has been accepted for filing, provided no objection is filed during the 30-day notice period and the application does not propose a change that would be inconsistent with a Commission rule or require modification of the BSS plan in Appendix 30 or the associated feeder link plan in Appendix 30A of the ITU Radio Regulations.

(1) Relocation of a DBS or GSO FSS space station by no more than 0.15 degrees from the initially authorized orbital location; or

(2) Repositioning one or more antenna beams by no more than 0.3 angular degrees from a line between the space station and the initially authorized boresight location(s).

11. In § 25.118, revise paragraphs (a), (b), and (e) to read as follows:

§ 25.118 Modifications not requiring prior authorization.

(a) Earth station modifications, notification required. Earth station licensees may make the following modifications without prior Commission authorization, provided they notify the Commission, using FCC Form 312 and Schedule B, within 30 days of the modification. The notification must be filed electronically through the International Bureau Filing System (IBFS) in accordance with the applicable provisions of part 1, subpart Y of this chapter.

(1) Authorized VSAT earth station operators may add VSAT remote terminals without prior authorization, provided that they have complied with all applicable frequency coordination procedures in accordance with § 25.251.

(2) A licensee providing service on a private carrier basis may change its operations to common carrier status without obtaining prior Commission authorization. The licensee must notify the Commission using Form 312 within 30 days after the completed change to common carrier status.

(3) An earth station operator may change a point of communication without prior authorization, provided that the operator does not repoint the earth station's antenna and that (i) the change results from a space station relocation described in paragraph (e) of this section, or (ii) the new point of communication is a replacement GSO space station operated by the operator of the original point of communication within 0.15 degrees of orbital longitude of the same location, with authority to serve the U.S., and the change does not entail any increase in the earth station's EIRP or EIRP density.

(4) Licensees may make other changes to their authorized earth stations without prior authority from the Commission, provided the modification does not involve:

(i) An increase in EIRP or EIRP density (either main lobe or off-axis);

(ii) A change in operating frequencies;

(iii) A change from the originally authorized coordinates of more than 1 second in latitude or longitude for stations operating in frequency bands shared with terrestrial systems or more than 10 seconds of latitude or longitude for stations operating in frequency bands not shared with terrestrial systems;

(iv) A change in polarization;

(v) An increase in antenna height;

(vi) Antenna repointing; or

(iv) A change in the location of a remote control point.

(b) Earth station license modifications, notification not required. Notwithstanding paragraph (a) of this section, equipment in an authorized earth station may be replaced without prior authorization and without notifying the Commission if the new equipment is electrically identical to the existing equipment.

* * * * *

(e) Relocation of GSO space stations. A space station licensee may relocate a GSO space station without prior authorization, but upon 30 days prior notice to the Commission and any potentially affected licensed spectrum user, provided that the operator meets the following requirements. The notification must be filed electronically on Form 312 through the International Bureau Filing System (IBFS) in accordance with the applicable provisions of part 1, subpart Y of this chapter:

(1) The space station will be relocated to a position within ±0.15 degrees of another orbit location assigned to the same licensee.

(2) The licensee certifies that the space station will operate after the relocation within the technical parameters authorized and coordinated for the space station previously assigned to that location.

(3) The licensee certifies that it will comply with all the conditions of its license for operation at the changed location.

(4) The licensee certifies that it will limit operations of the space station to Tracking, Telemetry, and Command (TT&C) functions during the relocation and satellite drift transition period.

(5) The licensee certifies that it has coordinated the station-keeping volume of the relocated satellite with operators of adjacent space stations.

(6) The licensee certifies that the relocation will not result in a lapse of service for any current customer.

(7) If the space station to be relocated is a DBS space station, the licensee certifies that there will be no increase in interference due to the operations of the relocated space station that would require the Commission to submit a proposed modification to the ITU Appendix 30 Broadcasting-Satellite Service ("BSS") Plan and/or the Appendix 30A feeder link Plan to the ITU Radiocommunication Bureau. A DBS licensee that meets this certification requirement is not subject to the requirements in paragraph (e)(2) of this section.

(8) A DBS licensee must also certify that it will meet the geographic service requirements in § 25.148(c) after the relocation.

12. In § 25.129, revise paragraph (c) to read as follows:

§ 25.129 Equipment authorization for portable earth-station transceivers.

* * * * *

(c) In addition to the information required by § 1.1307(b) and § 2.1033(c) of this chapter, applicants for certification required by this section must submit any additional equipment test data necessary to

demonstrate compliance with pertinent standards for transmitter performance prescribed in § 25.138, § 25.202(d) and (f), and § 25.216, must submit the statements required by § 2.1093(c) of this chapter, and must demonstrate compliance with the labeling requirement in § 25.285(b).

13. In § 25.130, revise paragraph (b), paragraph (g) introductory text, and the note to paragraph (g) to read as follows:

§ 25.130 Filing requirements for transmitting earth stations.

* * * * *

(b) A frequency coordination analysis in accordance with § 25.203(b) must be provided for earth stations transmitting in the frequency bands shared with equal rights between terrestrial and space services, except applications for user transceiver units associated with the NVNG mobile-satellite service, which must instead provide the information required by § 25.135, and applications for 1.6/2.4 GHz MSS user transceivers, which must demonstrate that the transceivers will operate in compliance with relevant requirements in § 25.213. Also, applications for transmitting earth stations must include any notification or demonstration required by any other relevant provision in Section 25.203.

* * * * *

(g) Parties may apply, either in an initial application or an application for modification of license, for operating authority for multiple transmitting FSS earth stations that are not eligible for blanket or network licensing under another section of this part in the following circumstances:

* * * * *

NOTE TO PARAGRAPH (g): This paragraph does not apply to VSAT network applications filed pursuant to § 25.115(c) or § 25.218; applications for 20/30 GHz hub stations filed pursuant to § 25.115(e); applications for NGSO FSS gateway earth stations filed pursuant to § 25.115(f); applications filed pursuant to § 25.221, § 25.222, § 25.226, or § 25.227; or applications for 29 GHz NGSO MSS feeder link stations in a complex as defined in § 25.257.

14. In § 25.131, revise paragraphs (b) and (j)(2) to read as follows:

§ 25.131 Filing requirements and registration for receive-only earth stations.

* * * * *

(b) Receive-only earth stations in the Fixed-Satellite Service that operate with U.S.-licensed space stations, or with non-U.S.-licensed space stations that have been duly approved for U.S. market access, may be registered with the Commission in order to protect them from interference from terrestrial microwave stations in bands shared co-equally with the Fixed Service in accordance with the procedures of §§ 25.203 and 25.251, subject to the stricture in § 25.209(e).

* * * * *

(j) * * *

(2) Operators of receive-only earth stations need not apply for license authority to receive transmissions from non-U.S.-licensed space stations that have been duly approved for U.S. market access, provided the space station operator and earth station operator comply with all applicable rules in this chapter and with applicable conditions in the Permitted Space Station List or market-access authorization.

15. In § 25.132, revise the section heading and paragraphs (a) and (b) to read as follows:

§ 25.132 Verification of earth station antenna performance.

(a)(1) Except as provided in paragraph (a)(2) of this section, applications for transmitting earth stations in the Fixed-Satellite Service, including feeder-link stations, must include certification that the applicant has reviewed the results of a series of radiation pattern tests performed by the antenna manufacturer on representative equipment in representative configurations, and the test results demonstrate that the equipment meets relevant off-axis gain standards in § 25.209, measured in accordance with paragraph (b)(1) of this section. Applicants and licensees must be prepared to submit the radiation pattern measurements to the Commission on request.

(2) Applicants that specify off-axis EIRP density pursuant to § 25.115(g)(1) are exempt from the certification requirement in paragraph (a)(1) of this section.

(b)(1) For purposes of paragraph (a)(1) of this section and § 25.115(g)(1), the following measurements on a production antenna performed on calibrated antenna range must be made at the top and bottom of each frequency band assigned for uplink transmission:

(i) (A) Co-polarized gain in the azimuth plane must be measured across a range extending to 180 degrees on each side of the main-lobe axis, and the measurements must be represented in two plots: one across the entire angular range of ±180 degrees from the main-lobe axis and the other across ±10 degrees from the main-lobe axis.

(B) Co-polarized gain must be measured from 0 to 30 degrees from beam peak in the elevation plane.

(ii) Cross-polarization gain must be measured across a range of plus and minus 10 degrees from beam peak in the azimuth and elevation planes.

(iii) Main beam gain.

(iv) For antennas with asymmetric apertures or beams, where the minor axis of the antenna beam (major axis of the antenna aperture) will not always be aligned parallel to the plane tangent to the GSO arc, measurements must be made at the worst-case skew angle at which the antenna will operate.

(2) The relevant envelope specified in § 25.209 must be superimposed on each measured pattern.

16. In § 25.133, revise paragraphs (a)(2), (b)(1)(v) and (vi), and (b)(2) to read as follows and remove and reserve paragraph (c):

§ 25.133 Period of construction; certification of commencement of operation.

(a) * * *

(2) Operation of a network of earth stations at unspecified locations under an initial blanket license must commence within 12 months from the date of the license grant unless the Commission orders otherwise.

(b) (1) * * *

(v) A certification that the facility as authorized has been completed and that each antenna has been tested and found to perform within authorized gain patterns or off-axis EIRP density levels; and

(vi) The date when the earth station became operational.

(2) For FSS earth stations authorized under a blanket license, the licensee must notify the Commission when the earth station network commences operation. The notification should include the information described in paragraphs (b)(1)(i)-(iv) of this section and a certification that each hub antenna, and each type of antenna used in remote stations in the network, has been tested and found to perform within

authorized gain patterns or off-axis EIRP density levels.

* * * * *

17. In § 25.134, revise the section heading as follows, revise paragraphs (a) and (b) to read as follows, add paragraph (c) to read as follows, remove paragraph (g), and re-designate paragraph (h) as paragraph (g):

§ 25.134 Licensing provisions for 4/6 GHz, 12/14 GHz, and 20/30 GHz VSAT networks.

(a) A license application for operation of a VSAT network in the 4/6 GHz bands may be routinely processed if frequency coordination has been satisfactorily completed pursuant to § 25.203 and the criteria in paragraph (a)(1) or (2) are met:

(1) (i) Equivalent antenna diameter is 4.5 meters or more, and the applicant certifies pursuant to § 25.132(a)(1) that the off-axis gain of transmitting antennas in the network will not exceed the relevant levels specified in § 25.209(a) and (b);

(ii) The input power of any full-transponder analog video transmission will not exceed the relevant limit in Section 25.211(d), and the bandwidth and input power density of any other type of analog transmission will not exceed the relevant limits in § 25.212(d);

(iii) The power density of any digitally modulated carrier will not exceed $-2.7 - 10\log(N)$ dBW/4 kHz at the input of any network antenna. "N" is the number of network earth stations transmitting simultaneously in the same frequencies to the same target satellite, not counting burst collisions resulting from operation with a contention protocol. N=1 for any station not transmitting simultaneously with others on common frequencies to the same target satellite and stations in networks that permit such simultaneous co-frequency transmission only in contention protocol operation.

(2) The application is not subject to an exclusion in § 25.218(a)(1) or (2) and includes tables filed pursuant to § 25.115(g)(1) indicating that off-axis EIRP density from the proposed earth stations will not exceed relevant routine levels specified in § 25.218.

(b) Applications for VSAT operation in the 12/14 GHz bands may be routinely processed if the criteria in the following paragraph (1) or (2) are met.

(1) (i) Equivalent antenna diameter is 1.2 meters or more, and the applicant certifies pursuant to § 25.132(a)(1) that the off-axis gain of transmitting antennas in the network will not exceed the relevant levels specified in § 25.209(a) and (b);

(ii) The input power of any full-transponder analog video transmission will not exceed the relevant limit in Section 25.211(d), and the bandwidth and input power density of any other type of analog transmission will not exceed the relevant limits in § 25.212(c);

(iii) The power spectral density of any digitally modulated carrier into any transmitting earth station antenna in the proposed network will not exceed $-14.0 - 10\log(N)$ dBW/4 kHz. N is the number of network earth stations that transmitting simultaneously in the same frequencies to the same target satellite, not counting packet burst collisions resulting from operation with a contention protocol. N=1 for any station not transmitting simultaneously with others on common frequencies to the same target satellite and stations in networks that permit such simultaneous co-frequency transmission only in contention protocol operation.

(2) The application is not subject to an exclusion in § 25.218(a)(1) or (2) and includes tables filed pursuant to § 25.115(g)(1) indicating that off-axis EIRP density from the proposed earth stations will not exceed relevant routine levels specified in § 25.218.

(c) Applications for VSAT stations that will transmit digitally modulated signals to GSO space stations in the 28.35-28.6 GHz and/or 29.25-30.0 GHz band may be routinely processed if the criteria in the following paragraph (1) or (2) are met:

(1) (i) Equivalent antenna diameter is at least 0.66 meters and the applicant certifies pursuant to § 25.132(a)(1) that the off-axis gain of transmitting antennas in the network will not exceed the relevant levels specified in § 25.209(a) and (b);

(ii) The power spectral density of any digitally modulated carrier into any transmitting earth station antenna in the proposed network will not exceed $3.5 - 10\log(N)$ dBW/MHz. "N" is the number of network earth stations transmitting simultaneously in the same frequencies to the same target satellite, not counting burst collisions resulting from operation with a contention protocol. N=1 for any station not transmitting simultaneously with others on common frequencies to the same target satellite and stations in networks that permit such simultaneous co-frequency transmission only in contention protocol operation.

(2) The application includes tables filed pursuant to § 25.115(g)(1) indicating that off-axis EIRP density from the proposed earth stations will not exceed relevant routine levels specified in § 25.138.

* * * * *

18. In § 25.138, revise the section heading, paragraph (a) introductory text, and paragraphs (a)(1)-(5) and (b) to read as follows; remove and reserve paragraphs (c), (d), and (e); and remove paragraph (g):

§ 25.138 Licensing requirements for GSO FSS Earth Stations in the 20/30 GHz bands.

(a) Applications for earth station licenses in the GSO FSS in the 20/30 GHz bands that indicate that the following requirements will be met and include the information required by relevant provisions in §§ 25.115 and 25.130 may be routinely processed:

(1) The EIRP spectral density of co-polarized signals in the plane tangent to the GSO arc, as defined in § 25.103, will not exceed the following values under clear sky conditions:

| | | |
|---|---|---|
| $32.5-25\log(\theta)-10\log(N)$ | dBW/MHz | for $2.0° \leq \theta \leq 7°$ |
| $11.35-10\log(N)$ | dBW/MHz | for $7° \leq \theta \leq 9.23°$ |
| $35.5-25\log(\theta)-10\log(N)$ | dBW/MHz | for $9.23° \leq \theta \leq 48°$ |
| $3.5-10\log(N)$ | dBW/MHz | for $48° < \theta \leq 180°$ |

where $\theta$ is the angle in degrees from a line from the earth station antenna to the assigned location of the target satellite. For stations in networks that allow multiple terminals to transmit simultaneously in shared frequencies with equal on-axis EIRP, "N" is the maximum number of network earth stations transmitting simultaneously in the same frequencies to the same target satellite, not counting burst collisions resulting from operation with a contention protocol. N=1 for any station not transmitting simultaneously with others on common frequencies to the same target satellite and stations in networks that permit such simultaneous co-frequency transmission only in contention protocol operation.

(2) In the plane perpendicular to the GSO arc, as defined in § 25.103, the EIRP density of co-polarized signals will not exceed the following values under clear sky conditions:

| | | |
|---|---|---|
| $35.5-25\log(\theta)-10\log(N)$ | dBW/MHz | for $3.5° \leq \theta \leq 7°$ |

| | | |
|---|---|---|
| 14.35-10log(N) | dBW/MHz | for 7° <θ ≤9.23° |
| 38.5-25log(θ)-10log(N) | dBW/MHz | for 9.23° <θ ≤48° |
| 6.5-10log(N) | dBW/MHz | for 48° <θ ≤180° |

where: θ and N are as defined in paragraph (a)(1) of this section.

(3) The EIRP density levels specified in paragraphs (a)(1) and (2) of this section may be exceeded by up to 3 dB, for values of θ >10°, over 10% of the range of theta (θ) angles from 10-180º on each side of the line from the earth station to the target satellite.

(4) The EIRP density of cross-polarized signals will not exceed the following values in the plane tangent to the GSO arc or in the plane perpendicular to the GSO arc under clear sky conditions:

| | | | |
|---|---|---|---|
| 22.5-25log(θ)-10log(N) | dBW/MHz | For | 2.0° <θ ≤7.0° |
| 1.35-10log(N) | dBW/MHz | For | 7.0° <θ ≤9.23° |

where θ and N are as defined in paragraph (a)(1) of this section.

(5) A license application for a network using variable power-density control of earth stations transmitting simultaneously in shared frequencies to the same target satellite may be routinely processed if the applicant demonstrates the following:

(i) EIRP density from each station in the network will not exceed a level 1 dB below the levels specified in paragraphs (a)(1), (a)(2), and (a)(4) of this section, with the value of N=1.

(ii) Aggregate EIRP density toward any co-frequency space station other than the target satellite not resulting from colliding data bursts transmitted pursuant to a contention protocol will not exceed the limit specified in paragraph (a)(5)(i) above.

* * * * *

(b) Operation with off-axis EIRP density exceeding a relevant envelope specified in paragraph (a) of this section and applications proposing such operation are subject to coordination requirements in § 25.220.

* * * * *

19. In § 25.140, revise paragraphs (a) and (b)(3) to read as follows:

§ 25.140 Further requirements for license applications for geostationary space stations in the Fixed-Satellite Service and the 17/24 GHz Broadcasting-Satellite Service.

(a) (1) In addition to the information required by § 25.114, an applicant for GSO FSS space station operation involving transmission of analog video signals must certify that the proposed analog video operation has been coordinated with operators of authorized co-frequency space stations within 6 degrees of the requested orbit location.

(2) In addition to the information required by § 25.114, an applicant for a GSO FSS space station at an orbital location less than 2 degrees from the assigned location of an authorized co-frequency GSO space station must either certify that the proposed operation has been coordinated with the operator of the co-frequency space station or submit an interference analysis demonstrating the compatibility of the proposed system with the co-frequency space station. Such analysis must include, for each type of radio frequency carrier, the link noise budget, modulation parameters, and overall link performance analysis. (See Appendices B and C to Licensing of Space Stations in the Domestic Fixed-Satellite Service, FCC

83-184, and the following public notices, copies of which are available in the Commission's EDOCS database: DA 03-3863 and DA 04-1708.) The provisions in this paragraph do not apply to proposed analog video operation, which is subject to the requirement in paragraph (a)(1).

(3) In addition to the information required by § 25.114, applicants for GSO FSS space stations must provide the following for operation other than analog video operation:

(i) With respect to proposed operation in the conventional or extended C-band, certification that downlink EIRP density will not exceed 1 dBW/4kHz for digital transmissions or 8 dBW/4kHz for analog transmissions and that EIRP density from associated uplink operation will not exceed applicable envelopes in § 25.218 or § 25.221(a) unless the non-conforming uplink and/or downlink operation is coordinated with operators of authorized co-frequency space stations at assigned locations within 6 degrees of the orbital location of the proposed space station.

(ii) With respect to proposed operation in the conventional or extended Ku-band, certification that downlink EIRP density will not exceed 10 dBW/4kHz for digital transmission or 17 dBW/4kHz for analog transmission and that associated uplink operation will not exceed applicable EIRP density envelopes in § 25.218, § 25.222, § 25.226, or § 25.227 unless the non-conforming uplink and/or downlink operation is coordinated with operators of authorized co-frequency space stations at assigned locations within 6 degrees of the orbital location of the proposed space station.

(iii) With respect to proposed operation in the 20/30 GHz band, certification that the proposed space stations will not generate power flux-density at the Earth's surface in excess of −118 dBW/$m^2$/MHz and that associated uplink operation will not exceed applicable EIRP density envelopes in § 25.138(a) unless the non-conforming uplink and/or downlink operation is coordinated with operators of authorized co-frequency space stations at assigned locations within 6 degrees of the orbital location of the proposed space station.

(iv) With respect to proposed operation in other FSS bands, an interference analysis demonstrating compatibility with any previously authorized co-frequency space station at a location two degrees away or certification that the proposed operation has been coordinated with the operator(s) of the previously authorized space station(s). If there is no previously authorized space station at a location two degrees away, the applicant must submit an interference analysis demonstrating compatibility with a hypothetical co-frequency space station two degrees away with the same receiving and transmitting characteristics as the proposed space station.

(b) * * *

(3) Except as described in paragraph (b)(5) of this section, an applicant for a license to operate a 17/24 GHz BSS space station that will be located precisely at one of the 17/24 GHz BSS orbital locations specified in Appendix F of the Report and Order adopted May 2, 2007, IB Docket No. 06-123, FCC 07-76, must provide an interference analysis demonstrating the compatibility of its proposed network with any current or future authorized space station in the 17/24 GHz BSS that complies with the technical rules in this part and will be located at least 4 degrees from the proposed space station.

* * * * *

20. In § 25.142, remove paragraph (a)(5).

§ 25.142 [Amended]

21. In § 25.143, revise paragraph (a) to read as follows, remove paragraph (c), redesignate paragraph (f) as paragraph (c), and redesignate paragraph (h) as paragraph (d).

§ 25.143 Licensing provisions for the 1.6/2.4 GHz Mobile-Satellite Service and 2 GHz Mobile-Satellite

Service.

(a) Authority to launch and operate a constellation of NGSO satellites will be awarded in a single blanket license for operation of a specified number of space stations in specified orbital planes. An individual license will be issued for each GSO satellite, whether it is to be operated in a GSO-only system or in a GSO/NGSO hybrid system.

* * * * *

22. In § 25.145, revise the section heading and paragraph (e) to read as follows, remove and reserve paragraph (f), and remove paragraph (h).

§ 25.145 Licensing provisions for the Fixed-Satellite Service in the 18.3-20.2 GHz and 28.35-30.0 GHz bands.

* * * * *

(e) Prohibition of certain agreements. No license shall be granted to any applicant for a space station in the Fixed-Satellite Service operating in portions of the 18.3-20.2 GHz and 28.35-30.0 GHz bands if that applicant, or any persons or companies controlling or controlled by the applicant, shall acquire or enjoy any right, for the purpose of handling traffic to or from the United States, its territories or possessions, to construct or operate space segment or earth stations, or to interchange traffic, which is denied to any other United States company by reason of any concession, contract, understanding, or working arrangement to which the Licensee or any persons or companies controlling or controlled by the Licensee are parties.

23. In § 25.146, revise the second sentence in paragraph (a)(1) to read as follows and remove paragraph (m).

§ 25.146 Licensing and operating rules for the non-geostationary orbit Fixed-Satellite Service in the 10.7 GHz-14.5 GHz bands.

(a) * * *

(1) * * * The PFD masks shall be generated in accordance with the specification stipulated in the most recent version of ITU-R Recommendation S.1503, "Functional description to be used in developing software tools for determining conformity of non-geostationary satellite orbit fixed-satellite system networks with limits contained in Article 22 of the Radio Regulations." * * *

* * * * *

24. Remove and reserve § 25.147.

25. In § 25.151, revise the section heading and paragraphs (a)(1), (a)(7), and (a)(8) to read as follows and add paragraphs (a)(9) and (10).

§ 25.151 Public notice.

(a) * * *

(1) The receipt of applications for new station authorizations, except applications for space station authorizations filed pursuant to § 25.110(b)(3)(i) of this part;

* * * * *

(7) Information which the Commission in its discretion believes to be of public significance;

(8) Special environmental considerations as required by part 1 of this chapter; and

(9) Submission of APIs and Coordination Requests to the ITU in response to requests filed pursuant to § 25.110(b)(3)(i).

(10) Receipt of information filed pursuant to § 25.110(b)(3)(ii).

* * * * *

26. Remove and reserve § 25.152**.**

27. In § 25.155, delete the word "electrical" in paragraph (a) and revise paragraphs (b) and (c) to read as follows:

§ 25.155 Mutually exclusive applications.

* * * * *

(b) A license application for NGSO-like satellite operation, as defined in § 25.157, will be entitled to comparative consideration with one or more mutually exclusive applications only if the application is received by the Commission in a condition acceptable for filing by the "cut-off" date specified in a public notice.

(c) A license application for GSO-like satellite operation, as defined in § 25.158, will be entitled to comparative consideration with another application only if:

(1) The application is mutually exclusive with another GSO-like space station application; and

(2) The application is received by the Commission in a condition acceptable for filing at the same millisecond as the other application.

28. In § 25.156, remove paragraph (b) and revise paragraphs (d)(1)-(5) to read as follows:

§ 25.156 Consideration of applications.

* * * * *

(d)(1) Applications for NGSO-like satellite operation will be considered pursuant to the procedures set forth in § 25.157, except as provided in § 25.157(b).

(2) Applications for GSO-like satellite operation will be considered pursuant to the procedures set forth in § 25.158, except as provided in § 25.158(a)(2).

(3) Applications for both NGSO-like satellite operation and GSO-like satellite operation in two or more service bands will be treated as separate applications for each service band, and each service band request will be considered pursuant to § 25.157 or § 25.158, as appropriate.

(4) Applications for feeder link authority or intersatellite link authority will be treated like an application separate from its associated service band. Each feeder link request or intersatellite link request will be considered pursuant to the procedure for applications for GSO-like operation or NGSO-like operation, as applicable.

(5) In cases where the Commission has not adopted frequency-band specific service rules, the Commission will not consider applications for NGSO-like satellite operation after it has granted an application for GSO-like operation in the same frequency band, and it will not consider applications for GSO-like operation after it has granted an application for NGSO-like operation in the same band, unless and until the Commission establishes NGSO/GSO sharing criteria for that frequency band. In the event

that the Commission receives applications for NGSO-like operation and applications for GSO-like operation at the same time, and the Commission has not adopted sharing criteria in that band, the Commission will divide the spectrum between GSO-like and NGSO-like licensees based on the proportion of qualified GSO-like and NGSO-like applicants.

* * * * *

29. In § 25.157, revise the section heading, paragraphs (a), (b), (c) introductory text, (g)(1), and the last sentence in paragraph (g)(2) to read as follows:

§ 25.157 Consideration of applications for NGSO-like satellite operation.

(a) This section specifies the procedures for considering license applications for "NGSO-like" satellite operation, except as provided in paragraph (b) of this section. For purposes of this section, the term "NGSO-like satellite operation" is defined as:

(1) operation of any NGSO satellite system, and

(2) operation of a GSO MSS satellite to communicate with earth stations with non-directional antennas.

(b) The procedures prescribed in this section do not apply to an application by the licensed operator of an NGSO constellation or GSO MSS space station for authority to launch and operate a replacement satellite, or satellites, with the same operating frequencies as the satellite(s) to be replaced and (if the replacement satellite is GSO) at an orbital location within ±0.15 degrees of the assigned location of the satellite to be replaced and which will be launched before the satellite(s) to be replaced are, or is, retired from service or within a reasonable time after loss of a satellite during launch or due to premature failure in orbit.

(c) Each application for NGSO-like satellite operation that is acceptable for filing under § 25.112, except replacement applications described in paragraph (b) of this section, will be reviewed to determine whether it is a "competing application," *i.e.*, filed in response to a public notice initiating a processing round, or a "lead application," *i.e.*, all other applications for NGSO-like satellite operation.

* * * * *

(g)(1) In the event that a license granted in a processing round pursuant to this section is cancelled for any reason, the Commission will redistribute the bandwidth allocated to that applicant equally among the remaining applicants whose licenses were granted concurrently with the cancelled license, unless the Commission determines that such a redistribution would not result in a sufficient number of licensees remaining to make reasonably efficient use of the frequency band.

(2) * * * Parties already holding licenses for NGSO-like satellite operation in that frequency band will not be permitted to participate in that processing round.

* * * * *

30. In § 25.158, revise the section heading, paragraphs (a), (b) introductory text, (b)(2), (c), and (d) introductory text to read as follows:

§ 25.158 Consideration of applications for GSO-like satellite systems.

(a) (1) Except as provided in paragraph (a)(2) below, this section specifies the Commission's procedures for considering license applications for "GSO-like" satellite operation. For purposes of this section, the term "GSO-like satellite system" means a GSO satellite designed to communicate with earth stations with directional antennas, including operation of GSO satellites to provide MSS feeder links.

(2) The procedures prescribed in this section do not apply to an application for authority to launch and

operate a replacement satellite with the same operating frequencies and at the same orbital location as a space station currently licensed to the applicant, to be launched before the satellite to be replaced is retired from service or within a reasonable time after loss of the satellite to be replaced due to launch failure or premature failure in orbit.

(b) Except as provided in paragraph (a)(2) of this section, license applications for GSO-like satellite systems, including first-step filings pursuant to § 25.110(b)(3)(i), will be placed in a queue and considered in the order that they are filed, pursuant to the following procedure:

* * * * *

(2) If the application is acceptable for filing, the application will be placed on public notice pursuant to § 25.151.

(i) For applications filed pursuant to § 25.110(b)(3)(i), the public notice will announce that the API and Coordination Request has been submitted to the ITU. When further information is filed pursuant to § 25.110(b)(3)(ii), it will be reviewed to determine whether it is substantially complete within the meaning of § 25.112. If so, a second public notice will be issued pursuant to § 25.151 to give interested parties an opportunity to file pleadings pursuant to § 25.154.

(ii) For any other license application for a GSO-like satellite system, the public notice will announce that the application has been found acceptable for filing and will give interested parties an opportunity to file pleadings pursuant to § 25.154.

(c) An applicant for a license for a GSO-like satellite system is not allowed to transfer, assign, or otherwise permit any other entity to assume its place in any queue.

(d) In the event that two or more applications for GSO-like satellite systems are mutually exclusive within the meaning of § 25.155(c), the Commission will consider those applications pursuant to the following procedure:

* * * * *

31. In § 25.163, revise paragraph (a)(3) to read as follows:

§ 25.163 Reinstatement.

(a) * * *

(3) The petition sets forth with specificity the procedures that have been established to ensure timely filings in the future.

* * * * *

32. In § 25.165, revise the section heading and paragraphs (a)(1)-(3), (c), and (e) to read as follows and add paragraphs (f) and (g) to read as follows:

§ 25.165 Surety bonds.

(a) * * *

(1) An NGSO licensee must file a surety bond requiring payment, in the event of a default as defined paragraph (c) of this section, in an amount to be determined by adjusting a baseline amount of $[x] million for inflation in accordance with paragraph (a)(4) of this section, with the resulting dollar amount rounded to the nearest $10,000.

(2) A GSO licensee must file a surety bond requiring payment, in the event of a default as defined paragraph (c) of this section, in an amount to be determined by adjusting a baseline amount of $[y]

million for inflation in accordance with paragraph (a)(4) of this section, with the resulting dollar amount rounded to the nearest $10,000.

(3) Licensees of satellite systems including both NGSO satellites and GSO satellites that will operate in the same frequency bands must file a bond requiring payment, in the event of a default as defined paragraph (c) of this section, in an amount to be determined by adjusting a baseline amount of $[x] million for inflation in accordance with paragraph (a)(4) of this section, with the resulting dollar amount rounded to the nearest $10,000.

(4) Inflation adjustment for purposes of paragraphs (a)(1) - (3) and (f) of this section shall be computed by multiplying the baseline dollar amount by the Bureau of Economic Analysis "GDPChain-type Price Index" (GDP-CPI) for the most recent quarter and dividing the product by the GDP-CDI for [year and quarter when inflation-adjustment rule is adopted].

* * * * *

(c) A licensee will be considered to be in default if it surrenders the license before meeting all milestone requirements or if it fails to meet any milestone deadline set forth in §25.164, and, at the time of milestone deadline, the licensee has not provided a sufficient basis for extending the milestone.

* * * * *

(e) A replacement satellite is one that:

(1) is authorized to be operated at an orbital location within 0.15 degrees of the assigned location of a GSO satellite licensed to the same party or is authorized for NGSO operation and will replace an existing NGSO satellite licensed to the same party;

(2) is authorized to operate in the same frequency bands, and with the same coverage area as the satellite to be replaced; and

(3) is scheduled to be launched so that it will be brought into use at approximately the same time as, but no later than, the existing satellite is retired.

(f) An applicant that has filed an API and Coordination Request pursuant to § 25.110(b)(3)(i) must obtain a surety bond in accordance with the requirements in paragraph (b) of this section. The bond must require payment, in the event of a default as defined in paragraph (g) of this section, of an amount to be determined by adjusting a baseline amount of $[$y_1$][1] million in accordance with paragraph (a)(4) of this section, with the resulting dollar amount rounded to the nearest $10,000. The application will be returned as defective pursuant to § 25.112 if a copy of the required bond is not filed with the Commission within 30 days after release of a public notice announcing that the Commission has filed the API and Coordination Request with the ITU.

(g) An applicant or licensee will be deemed to be in default with respect to a bond filed pursuant to paragraph (f) of this section under any of the following circumstances:

(1) If the applicant fails to file complete Form 312 and Schedule S information pursuant to § 25.110(b)(3)(ii) within two years after the issuance of the public notice announcing the submission of the API and Coordination Request to the ITU.

(2) If the license application filed pursuant to § 25.110(b)(3) is dismissed and is not refiled prior to the two-year deadline in § 25.110(b)(3)(ii) or the application is denied and the ruling is administratively final.

(3) If a license granted for a space station proposed in the application filed pursuant to § 25.110(b)(3) is

[1] The value of $y_1$ would be two fifths of the baseline amount specified in paragraph (a)(2) for a post-grant bond for a GSO licensee.

surrendered before the authorized space station is launched.

(4) If a license granted for the space station proposed in the application filed pursuant to § 25.110(b)(3) is declared null and void for failure to meet a milestone requirement in § 25.164 and the milestone ruling is administratively final.

33. In § 25.202, revise the table and footnotes in paragraph (a)(1) and paragraph (g) to read as follows:

§ 25.202 Frequencies, frequency tolerance, and emission limits.

(a) (1) * * *

list:

| **Space-to-earth (GHz)** | **Earth-to-space (GHz)** |
|---|---|
| 3.6-3.65 | 5.091-5.25 [8] |
| 3.65-3.7 | 5.85-5.925 |
| 3.7-4.2 | 5.925-6.425 |
| 4.5-4.8 | 6.425-6.525 |
| 6.7-7.025 [8] | 6.525-6.7 |
| 7.025-7.075 | 6.7-7.025 |
| 10.7-11.7 [8] | 7.025-7.075 |
| 11.7-12.2 | 12.7-12.75 |
| 12.2-12.7 | 12.75-13.25 [8] |
| 18.3-18.58 [1] [2] | 13.75-14 |
| 18.58-18.8 | 14-14.2 |
| 18.8-19.3 | 14.2-14.5 |
| 19.3-19.7 | 15.43-15.63 [8] |
| 19.7-20.2 | 17.3-17.8 |
| 37.5-40 [3] | 24.75-25.05 |
| 40-42 | 25.05-25.25 |
| | 27.5-28.35 [2] |

| | |
|---|---|
| | 28.35-28.6 [4] |
| | 28.6-29.1 [5] |
| | 29.1-29.25 [6] |
| | 29.25-29.5 [7] |
| | 29.5-30.0 [4] |
| | 47.2-50.2 |

[1]The 18.3-18.58 GHz band is shared co-equally with existing terrestrial radiocommunication systems until November 19, 2012.

[2]FSS is secondary to LMDS in this band.

[3]Use of this band by the Fixed-Satellite Service is limited to gateway earth station operations, provided the licensee under this Part obtains a license under part 101 of this chapter or an agreement from a part 101 licensee for the area in which an earth station is to be located. Satellite earth station facilities in this band may not be ubiquitously deployed and may not be used to serve individual consumers.

[4]This band is primary for GSO FSS and secondary for NGSO FSS.

[5]This band is primary for NGSO FSS and secondary for GSO FSS.

[6]This band is primary for MSS feeder links and LMDS hub-to-subscriber transmission.

[7]This band is primary for MSS feeder links and GSO FSS.

[8]Use of this band by NGSO FSS systems is limited to transmissions to or from gateway earth stations.

* * * * *

(g) (1) Except as provided in paragraph (g)(2) below, telemetry, tracking, and command signals must be transmitted at either or both edges of the allocated band(s).

(2) Additional, non-emergency telemetry, tracking, and command signals may be transmitted in frequencies within the assigned bands that are not at a band edge if such transmissions cause no more interference and require no greater protection from harmful interference than the communications traffic on the satellite network.

(3) Frequencies, polarization, and coding of telemetry, tracking, and command transmissions must be selected to minimize interference into other satellite networks.

34. In § 25.203, add paragraph (c)(6) and revise the first sentence in paragraph (f), paragraph (g)(1), and paragraph (j) to read as follows:

§ 25.203 Choice of sites and frequencies.

* * * * *

(c) * * *

(6) Multiple antennas in an NGSO FSS gateway earth station complex located within an area bounded by one second of latitude and one second of longitude may be regarded as a single earth station for purposes of coordination with terrestrial services.

* * * * *

(f) Notification to the National Radio Astronomy Observatory: In order to minimize possible harmful interference at the National Radio Astronomy Observatory site at Green Bank, Pocahontas County, W. Va., and at the Naval Radio Research Observatory site at Sugar Grove, Pendleton County, W. Va., any applicant for operating authority under this part for a new transmit or transmit-receive earth station, other than a mobile or temporary fixed station, within the area bounded by 39°15′ N. on the north, 78°30′ W. on the east, 37°30′ N. on the south and 80°30′ W. on the west or for modification of an existing license for such station to change the station's frequency, power, antenna height or directivity, or location must, when filing the application with the Commission, simultaneously notify the Director, National Radio Astronomy Observatory, P.O. Box No. 2, Green Bank, W. Va. 24944, in writing, of the technical particulars of the proposed station. * * *

(g) * * *

(1) Applicants for authority to operate a new transmitting earth station in the vicinity of an FCC monitoring station or to modify the operation of a transmitting earth station in a way that would increase the field strength produced at such a monitoring station above that previously authorized should consider the possible need to protect the FCC stations from harmful interference. Geographic coordinates of the facilities that require protection are listed in § 0.121(c) of the Commission's Rules. Applications for fixed stations that will produce field strength greater than 10 mV/m or power flux density greater than $-65.8$ dBW/m$^2$ in the authorized emission bandwidth at any of the referenced coordinates may be examined to determine the extent of possible interference. Depending on the theoretical field strength value and existing root-sum-square or other ambient radio field signal levels at the referenced coordinates, a condition to protect the monitoring station may be included in the station authorization.

* * * * *

(j) Applicants for non-geostationary 1.6/2.4 GHz Mobile-Satellite Service/Radiodetermination-Satellite Service feeder links in the 17.7-20.2 GHz and 27.5-30.0 GHz bands must coordinate with licensees of Fixed-Satellite Service and terrestrial-service systems sharing the band to determine geographic protection areas around each non-geostationary Mobile-Satellite Service/Radiodetermination-Satellite Service feeder-link earth station.

* * * * *

35. In § 25.204, remove the last sentence in paragraph (e)(1).

36. In § 25.205, revise the section heading and paragraph (a) to read as follows, remove paragraphs (b) and (c), revise paragraph (d) and redesignate as paragraph (b), to read as follows:

§ 25.205 Minimum antenna elevation angle.

(a) Earth station antennas may not transmit at elevation angles less than 5 degrees, measured from the horizontal plane to the direction of maximum radiation, in a frequency band shared with terrestrial radio services or at elevation angles less than 3 degrees in other frequency bands. In some instances, it may be necessary to specify greater minimum elevation angles because of interference considerations.

(b) ESAAs in aircraft on the ground may not transmit at elevation angles less than 3 degrees. There is no minimum angle of antenna elevation for ESAAs while airborne.

37. In § 25.209, revise paragraphs (a), (b), and (c) to read as follows, remove and reserve paragraph (e), remove the word “procedures” wherever it appears in paragraph (f) and replace it with the word “requirements,” and revise paragraph (h) to read as follows:

§ 25.209 Earth station antenna performance standards.

(a) Except as provided in paragraph (f) of this section, the gain of any earth station antenna operating in the Fixed-Satellite Service, including earth stations providing feeder links for satellite services other than FSS, may not exceed the following limits:

(1) In the plane tangent to the GSO arc, as defined in § 25.103, for earth stations not operating in the conventional Ku-band, the 28.35-30 GHz band, or the 24.75-25.25 GHz band:

| | | | |
|---|---|---|---|
| $29-25\log_{10}\theta$ | dBi | for | $1.5° \leq \theta \leq 7°$ |
| 8 | dBi | for | $7° < \theta \leq 9.2°$ |
| $32-25\log_{10}\theta$ | dBi | for | $9.2° < \theta \leq 48°$ |
| −10 | dBi | for | $48° < \theta \leq 180°$ |

where θ is the angle in degrees from a line from the focal point of the antenna to the target satellite, and dBi refers to dB relative to an isotropic radiator. This envelope may be exceeded by up to 3 dB in 10% of the range of θ angles from ±7-180º.

(2) In the plane tangent to the GSO arc, for earth stations operating in the conventional Ku-band:

| | | | |
|---|---|---|---|
| $29-25\log_{10}\theta$ | dBi | for | $1.5° \leq \theta \leq 7°$ |
| 8 | dBi | for | $7° < \theta \leq 9.2°$ |
| $32-25\log_{10}\theta$ | dBi | for | $9.2° < \theta \leq 48°$ |
| −10 | dBi | for | $48° < \theta \leq 85°$ |
| 0 | dBi | for | $85° < \theta \leq 180°$ |

where θ and dBi are as defined in paragraph (a)(1) above. This envelope may be exceeded by up to 3 dB in 10% of the range of θ angles from ±7-180º.

(3) In the plane tangent to the GSO arc, for earth stations operating in the 28.35-30 GHz or 24.75-25.25 GHz band:

| | | | |
|---|---|---|---|
| $29-25\log_{10}\theta$ | dBi | for | $2° \leq \theta \leq 7°$ |
| 8 | dBi | for | $7° < \theta \leq 9.2°$ |
| $32-25\log_{10}\theta$ | dBi | for | $9.2° < \theta \leq 48°$ |
| 0 | dBi | for | $48° < \theta \leq 180°$ |

where θ and dBi are as defined in paragraph (a)(1) above. This envelope may be exceeded by up to 3 dB in 10% of the range of θ angles from ±7-180º.

(4) In the plane perpendicular to the GSO arc, as defined in § 25.103, for earth stations not operating in the conventional Ku-band, 28.35-30 GHz band, or 24.75-25.25 GHz band:

Outside the main beam, the gain of the antenna shall lie below the envelope defined by:

| | | | |
|---|---|---|---|
| $32-25\log_{10}\theta$ | dBi | for | $3° < \theta \leq 48°$ |
| −10 | dBi | for | $48° < \theta \leq 180°$ |

where θ and dBi are as defined in paragraph (a)(1) above. This envelope may be exceeded by up to 6 dB in 10% of the range of θ angles from ±3-180º.

(5) In the plane perpendicular to the GSO arc, for earth stations operating in the conventional Ku-band:

Outside the main beam, the gain of the antenna shall lie below the envelope defined by:

| | | | |
|---|---|---|---|
| $32-25\log_{10}\theta$ | dBi | for | $3° < \theta \leq 48°$ |
| −10 | dBi | for | $48° < \theta \leq 85°$ |
| 0 | dBi | for | $85° < \theta \leq 180°$ |

where θ and dBi are as defined in paragraph (a)(1) above. This envelope may be exceeded by up to 6 dB in 10% of the range of θ angles from ±3-180º.

(6) In the plane perpendicular to the GSO arc, for earth stations operating in the 28.35-30 GHz band or 24.75-25.25 GHz band:

Outside the main beam, the gain of the antenna shall lie below the envelope defined by:

| | | | |
|---|---|---|---|
| $32-25\log_{10}\theta$ | dBi | for | $3.5° < \theta \leq 7°$ |
| 10.9 | dBi | for | $7° < \theta \leq 9.2°$ |
| $35-25\log_{10}\theta$ | dBi | for | $9.2° < \theta \leq 48°$ |
| 3 | dBi | for | $48º < \theta \leq 180°$ |

where θ and dBi are as defined in paragraph (a)(1) above. This envelope may be exceeded by up to 6 dB in 10% of the range of θ angles from ±3-180º.

(b) Except as provided in paragraph (f) of this section, the off-axis cross-polarization gain of any antenna used for transmission from an FSS earth station, including earth stations providing feeder links for satellite services other than FSS, may not exceed the following limits:

(1) In the plane tangent to the GSO arc, for earth stations not operating in the 28.35-30 GHz band or the 24.75-25.25 GHz band:

| | | | |
|---|---|---|---|
| $19-25\log_{10}\theta$ | dBi | For | $1.8° < \theta \leq 7°$ |
| −2 | dBi | For | $7° < \theta \leq 9.2°$ |

where θ and dBi are as defined in paragraph (a)(1) above.

(2) In the plane perpendicular to the GSO arc, for earth stations not operating in the 28.35-30 GHz band or the 24.75-25.25 GHz band:

| | | | |
|---|---|---|---|
| $19-25\log_{10}\theta$ | dBi | For | $3° < \theta \leq 7°$ |
| −2 | dBi | For | $7° < \theta \leq 9.2°$ |

where θ and dBi are as defined in paragraph (a)(1) above.

(3) In the plane perpendicular to the GSO arc, for earth stations operating in the 28.35-30 GHz band or 24.75-25.25 GHz band:

| | | | |
|---|---|---|---|
| $19-25\log_{10}\theta$ | dBi | For | $2° < \theta \leq 7°$ |
| −2 | dBi | For | $7° < \theta \leq 9.2°$ |

where θ and dBi are as defined in paragraph (a)(1) above.

(c)(1) An earth station licensed for operation with an FSS space station or registered for reception of transmissions from such a space station pursuant to § 25.131(b) and (d) is not entitled to protection from interference from authorized operation of other stations that would not cause harmful interference to that earth station if it were using an antenna with receive-band gain patterns conforming to the levels specified in § 25.209(a) and (b).

(2) A 17/24 GHz BSS telemetry earth station is not entitled to protection from harmful interference from authorized space station operation that would not cause harmful interference to that earth station if it were using an antenna with receive-band gain patterns conforming to the levels specified in paragraphs (a) and (b) of this section. Receive-only earth stations in the 17/24 GHz BSS are entitled to protection from harmful interference caused by other space stations to the extent indicated in § 25.224.

* * * * *

(h) The gain of any transmitting antenna in a gateway earth station communicating with NGSO FSS satellites in the 10.7-11.7 GHz, 12.75-13.15 GHz, 13.2125-13.25 GHz, 13.8-14.0 GHz, and/or 14.4-14.5 GHz bands must lie below the envelope defined as follows:

| | | | |
|---|---|---|---|
| $29-25\log_{10}(\theta)$ | dBi | for | $1° \leq \theta \leq 36°$ |
| -10 | dBi | for | $36° \leq \theta \leq 180°$ |

where θ and dBi are as defined in paragraph (a)(1) above. This envelope may be exceeded by up to 3 dB in 10% of the range of θ angles from ±7-180º.

38. In § 25.210, remove and reserve paragraph (a) and revise paragraph (i) to read as follows:

§ 25.210 Technical requirements for space stations.

* * * * *

(i) Space station antennas in the 17/24 GHz Broadcasting Satellite Service 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 shall be at least 25 dB within its primary coverage area.

* * * * *

39. In § 25.211, remove and reserve paragraph (a) and revise paragraphs (b) and (e) to read as follows:

§ 25.211 Analog video transmissions in the Fixed-Satellite Service.

(a) [Reserved]

(b) All 4/6 GHz analog video transmissions shall contain an energy dispersal signal at all times with a minimum peak-to-peak bandwidth set at whatever value is necessary to meet the power flux density limits specified in § 25.208(a) and successfully coordinated internationally and accepted by adjacent U.S. satellite operators based on the use of state of the art space and earth station facilities. All transmissions in frequency bands described in § 25.208 (b) and (c) shall also contain an energy dispersal signal at all times with a minimum peak-to-peak bandwidth set at whatever value is necessary to meet the power flux density limits specified in § 25.208(b) and (c) and successfully coordinated internationally and accepted by adjacent U.S. satellite operators based on the use of state of the art space and earth station facilities.

* * * * *

(e) Applications for authority for analog video uplink transmission in the 5925-6425 MHz or 14.0-14.5 GHz band that are not eligible for routine processing under paragraph (d) of this section are subject to the requirements of § 25.220.

40. In § 25.212, revise paragraphs (c)(1), (d), and (e) to read as follows and add paragraph (g):

§ 25.212 Narrowband analog transmissions and digital transmissions in the GSO Fixed Satellite Service.

* * * * *

(c)(1) An earth station that is not subject to licensing under § 25.134, § 25.222, § 25.226, or § 25.227 may be routinely licensed for analog transmissions in the 14.0-14.5 GHz band with bandwidths up to 200 kHz (or up to 1 MHz for command carriers at the band edge) if the equivalent diameter of the transmitting antenna is 1.2 meters or greater, input power spectral density into the antenna will not exceed $-8 - 10\log_{10}(N)$ dBW/4 kHz, and the applicant certifies conformance with relevant antenna performance standards in § 25.209(a) and (b). "N" is the number of earth stations transmitting simultaneously in the same frequencies to the same target satellite. For stations not transmitting simultaneously on common frequencies to the same target satellite, N=1.

* * * * *

(d) An individual earth station that is not subject to licensing under § 25.221 may be routinely licensed for digital transmission in the 5925-6425 MHz band or analog transmission in that band with carrier bandwidths up to 200 kHz (or up to 1 MHz for command carriers at the band edge) if the equivalent diameter of the transmit antenna is 4.5 meters or greater, the applicant certifies conformance with relevant antenna performance standards in § 25.209(a) and (b), and power density into the antenna will not exceed $+0.5 - 10\log_{10}(N)$ dBW/4 kHz for analog carriers or $-2.7 - 10\log_{10}(N)$ dBW/4 kHz for digital carriers, where "N" is as defined in paragraph (c)(1) of this section.

(e) Applications for authority for fixed earth station operation in the 5925-6425 GHz or 14.0-14.5 GHz band that do not qualify for routine processing under relevant criteria in this section, § 25.211, or § 25.218 are subject to the requirements in § 25.220.

* * * * *

(g) An earth station not subject to network licensing under § 25.134 may be routinely licensed for digital transmission in the 28.35-28.6 GHz and/or 29.25-30.0 GHz bands if the equivalent diameter of the transmitting antenna is 66 centimeters or greater, input power spectral density into the antenna will not exceed 3.5 dBW/MHz, and the application includes certification pursuant to §25.132(a)(1) of conformance with the antenna gain performance requirements in §25.209(a) and (b).

41. In § 25.218, revise paragraphs (a)-(h) to read as follows:

§ 25.218 Off-axis EIRP density envelopes for FSS earth stations transmitting in certain frequency bands.

(a) This section applies to applications for Fixed-Satellite Service earth stations transmitting to geostationary-orbit space stations in the conventional C-band, extended C-band, conventional Ku-band, or extended Ku band, including VSAT applications not meeting routine licensing criteria in § 25.134, with the following exceptions:

(1) ESV, VMES, and ESAA applications and

(2) Applications proposing transmission of analog command signals at a band edge with bandwidths greater than 1 MHz or transmission of any other type of analog signal with bandwidths greater than 200 kHz.

(b) Earth station applications subject to this section may be routinely processed if they meet the applicable off-axis EIRP density envelopes set forth in this section below and include the table required by § 25.115(h).

(c) Analog earth station operation in the conventional or extended C-band. (1) In the plane tangent to the GSO arc, as defined in § 25.103:

| | | | |
|---|---|---|---|
| $29.5-10\log_{10}(N)-25\log_{10}\theta$ | dBW/4 kHz | For | $1.5° \leq \theta \leq 7°$ |
| $8.5-10\log_{10}(N)$ | dBW/4 kHz | For | $7° < \theta \leq 9.2°$ |
| $32.5-10\log_{10}(N)-25\log_{10}\theta$ | dBW/4 kHz | For | $9.2° < \theta \leq 48°$ |
| $-9.5-10\log_{10}(N)$ | dBW/4 kHz | For | $48° < \theta \leq 180°$ |

where θ is the angle in degrees from a line from the earth station antenna to the assigned location of the target satellite and "N" is the number of network earth stations transmitting simultaneously in the same frequencies to the same target satellite. The EIRP density levels specified for $\theta > 7^{o}$ may be exceeded by up to 3 dB in up to 10% of the range of theta (θ) angles from ±7-180º.

(2) In the plane perpendicular to the GSO arc, as defined in § 25.103:

| | | | |
|---|---|---|---|
| $32.5-10\log_{10}(N)-25\log_{10}\theta$ | dBW/4 kHz | For | $3° \leq \theta \leq 48°$ |
| $-9.5-10\log_{10}(N)$ | dBW/4 kHz | For | $48° < \theta \leq 180°$ |

where θ is as defined in paragraph (c)(1) of this section. These EIRP density levels may be exceeded by up to 6 dB in the region of main reflector spillover energy and in up to 10% of the range of θ angles not included in that region, on each side of the line from the earth station to the target satellite.

(d) Digital earth station operation in the conventional or extended C-band. (1) In the plane tangent to the GSO arc:

| | | | |
|---|---|---|---|
| $26.3-10\log_{10}(N)-25\log_{10}\theta$ | dBW/4 kHz | For | $1.5° \leq \theta \leq 7°$ |

| | | | |
|---|---|---|---|
| $5.3-10\log_{10}(N)$ | dBW/4 kHz | For | $7° < \theta \leq 9.2°$ |
| $29.3-10\log_{10}(N)-25\log_{10}\theta$ | dBW/4 kHz | For | $9.2° < \theta \leq 48°$ |
| $-12.7-10\log_{10}(N)$ | dBW/4 kHz | For | $48° < \theta \leq 180°$ |

where θ is as defined in paragraph (c)(1) of this section, and N is defined below. The EIRP density levels specified for θ > 7º may be exceeded by up to 3 dB in up to 10% of the range of theta (θ) angles from ±7-180º. For stations in networks that allow multiple terminals to transmit simultaneously in shared frequencies with equal on-axis EIRP, "N" is the number of network earth stations transmitting simultaneously in the same frequencies to the same target satellite, not counting burst collisions resulting from operation with a contention protocol. N=1 for any station not transmitting simultaneously with others on common frequencies to the same target satellite and stations in networks that permit such simultaneous co-frequency transmission only in contention protocol operation.

(2) In the plane perpendicular to the GSO arc:

| | | | |
|---|---|---|---|
| $29.3-10\log_{10}(N)-25\log_{10}\theta$ | dBW/4 kHz | For | $3° \leq \theta \leq 48°$ |
| $-12.7-10\log_{10}(N)$ | dBW/4 kHz | For | $48° < \theta \leq 180°$ |

where θ is as defined in paragraph (c)(1) of this section, and N is as defined in paragraph (d)(1) of this section. These EIRP density levels may be exceeded by up to 6 dB in the region of main reflector spillover energy and in up to 10% of the range of θ angles not included in that region, on each side of the line from the earth station to the target satellite.

(3) A license application for a network using variable power-density control of earth stations transmitting simultaneously in shared frequencies to the same target satellite may be routinely processed if the applicant demonstrates the following:

(i) Off-axis EIRP density from each station in the network will be kept at least 1 dB below the levels specified in paragraphs (d)(1) and (2) of this section, with the value of N=1.

(ii) Aggregate EIRP density toward any co-frequency space station other than the target satellite not resulting from colliding data bursts transmitted pursuant to a contention protocol will not exceed the limit specified in paragraph (d)(3)(i) above.

(e) Analog earth station operation in the conventional Ku-band. (1) In the plane tangent to the GSO arc:

| | | | |
|---|---|---|---|
| $21-10\log_{10}(N)-25\log_{10}\theta$ | dBW/4 kHz | For | $1.5° \leq \theta \leq 7°$ |
| $0-10\log_{10}(N)$ | dBW/4 kHz | For | $7° < \theta \leq 9.2°$ |
| $24-10\log_{10}(N)-25\log_{10}\theta$ | dBW/4 kHz | For | $9.2° < \theta \leq 48°$ |
| $-18-10\log_{10}(N)$ | dBW/4 kHz | For | $48° < \theta \leq 85°$ |
| $-8-10\log_{10}(N)$ | dBW/4 kHz | For | $85° < \theta \leq 180°$ |

where θ is as defined in paragraph (c)(1) of this section. The EIRP density levels specified for θ > 7º may be exceeded by up to 3 dB in up to 10% of the range of theta (θ) angles from ±7-180º.

(2) In the plane perpendicular to the GSO arc:

| | | | |
|---|---|---|---|
| $24-10\log_{10}(N)-25\log_{10}\theta$ | dBW/4 kHz | For | $3° \leq \theta \leq 48°$ |
| $-18-10\log_{10}(N)$ | dBW/4 kHz | For | $48° < \theta \leq 85°$ |
| $-8-10\log_{10}(N)$ | dBW/4 kHz | For | $85° < \theta \leq 180°$ |

where θ is as defined in paragraph (c)(1) of this section. These EIRP density levels may be exceeded by up to 6 dB in the region of main reflector spillover energy and in up to 10% of the range of θ angles not included in that region, on each side of the line from the earth station to the target satellite.

(f) Digital earth station operation in the conventional Ku-band. (1) In the plane tangent to the GSO arc:

| | | | |
|---|---|---|---|
| $15-10\log_{10}(N)-25\log_{10}\theta$ | dBW/4 kHz | For | $1.5° \leq \theta \leq 7°$ |
| $-6-10\log_{10}(N)$ | dBW/4 kHz | For | $7° < \theta \leq 9.2°$ |
| $18-10\log_{10}(N)-25\log_{10}\theta$ | dBW/4 kHz | For | $9.2° < \theta \leq 48°$ |
| $-24-10\log_{10}(N)$ | dBW/4 kHz | For | $48° < \theta \leq 85°$ |
| $-14-10\log_{10}(N)$ | dBW/4 kHz | For | $85° < \theta \leq 180°$ |

where θ is as defined in paragraph (c)(1) of this section, and N is as defined in paragraph (d)(1) of this section. The EIRP density levels specified for $\theta > 7^{o}$ may be exceeded by up to 3 dB in up to 10% of the range of theta (θ) angles from ±7-180º.

(2) In the plane perpendicular to the GSO arc:

| | | | |
|---|---|---|---|
| $18-10\log_{10}(N)-25\log_{10}\theta$ | dBW/4 kHz | For | $3° \leq \theta \leq 48°$ |
| $-24-10\log_{10}(N)$ | dBW/4 kHz | For | $48° < \theta \leq 85°$ |
| $-14-10\log_{10}(N)$ | dBW/4 kHz | For | $85° < \theta \leq 180°$ |

where θ is as defined in paragraph (c)(1) of this section, and N is as defined in paragraph (d)(1) of this section. These EIRP density levels may be exceeded by up to 6 dB in the region of main reflector spillover energy and in up to 10% of the range of θ angles not included in that region, on each side of the line from the earth station to the target satellite.

(3) A license application for a network using variable power-density control of earth stations transmitting simultaneously in shared frequencies to the same target satellite may be routinely processed if the applicant demonstrates the following:

(i) Off-axis EIRP density from each station in the network will be kept at least 1 dB below the levels specified in paragraphs (f)(1) and f)(2) of this section, with the value of N=1.

(ii) Aggregate EIRP density toward any co-frequency space station other than the target satellite not resulting from colliding data bursts transmitted pursuant to a contention protocol will not exceed the limit specified in paragraph (f)(3)(i) above.

(g) Analog earth station operation in the extended Ku-band. (1) In the plane tangent to the GSO arc:

| | | | |
|---|---|---|---|
| $21-10\log_{10}(N)-25\log_{10}\theta$ | dBW/4 kHz | For | $1.5° \leq \theta \leq 7°$ |

| | | | |
|---|---|---|---|
| $0-10\log_{10}(N)$ | dBW/4 kHz | For | $7° < \theta \leq 9.2°$ |
| $24-10\log_{10}(N)-25\log_{10}\theta$ | dBW/4 kHz | For | $9.2° < \theta \leq 48°$ |
| $-18-10\log_{10}(N)$ | dBW/4 kHz | For | $48° < \theta \leq 180°$ |

where θ is as defined in paragraph (c)(1) of this section, and N is as defined in paragraph (d)(1) of this section. The EIRP density levels specified for θ > 7º may be exceeded by up to 3 dB in up to 10% of the range of theta (θ) angles from ±7-180º.

(2) In the plane perpendicular to the GSO arc:

| | | | |
|---|---|---|---|
| $24-10\log_{10}(N)-25\log_{10}\theta$ | dBW/4 kHz | For | $3° \leq \theta \leq 48°$ |
| $-18-10\log_{10}(N)$ | dBW/4 kHz | For | $48° < \theta \leq 180°$ |

where θ is as defined in paragraph (c)(1) of this section. These EIRP density levels may be exceeded by up to 6 dB in the region of main reflector spillover energy and in up to 10% of the range of θ angles not included in that region, on each side of the line from the earth station to the target satellite.

(h) Digital earth station operation in the extended Ku-band. (1) In the plane tangent to the GSO arc:

| | | | |
|---|---|---|---|
| $15-10\log_{10}(N)-25\log_{10}\theta$ | dBW/4 kHz | For | $1.5° \leq \theta \leq 7°$ |
| $-6-10\log_{10}(N)$ | dBW/4 kHz | For | $7° < \theta \leq 9.2°$ |
| $18-10\log_{10}(N)-25\log_{10}\theta$ | dBW/4 kHz | For | $9.2° < \theta \leq 48°$ |
| $-24-10\log_{10}(N)$ | dBW/4 kHz | For | $48° < \theta \leq 180°$ |

where θ is as defined in paragraph (c)(1) of this section, and N is as defined in paragraph (d)(1) of this section. The EIRP density levels specified for θ > 7º may be exceeded by up to 3 dB in up to 10% of the range of theta (θ) angles from ±7-180º.

(2) In the plane perpendicular to the GSO arc:

| | | | |
|---|---|---|---|
| $18-10\log_{10}(N)-25\log_{10}\theta$ | dBW/4 kHz | For | $3° \leq \theta \leq 48°$ |
| $-24-10\log_{10}(N)$ | dBW/4 kHz | For | $48° < \theta \leq 85°$ |

where θ is as defined in paragraph (c)(1) of this section and N is as defined in paragraph (d)(1) of this section. These EIRP density levels may be exceeded by up to 6 dB in the region of main reflector spillover energy and in up to 10% of the range of θ angles not included in that region, on each side of the line from the earth station to the target satellite.

(3) A license application for a network using variable power-density control of earth stations transmitting simultaneously in shared frequencies to the same target satellite may be routinely processed if the applicant demonstrates the following:

(i) Off-axis EIRP density from each station in the network will be kept at least 1 dB below the levels specified in paragraphs (h)(1) and (2) of this section, with the value of N=1.

(ii) Aggregate EIRP density toward any co-frequency space station other than the target satellite not resulting from colliding data bursts transmitted pursuant to a contention protocol will be kept at least 1 dB below the levels specified in paragraphs (h)(1) and (2) of this section, with the value of N=1.

42. In § 25.220, revise paragraphs (a) and (b) to read as follows, remove and reserve paragraph (d)(1)(i), and revise paragraph (d)(2) to read as follows:

§ 25.220 Non-conforming transmit/receive earth station operations.

(a) The requirements in this section apply to applications for, and operation of, earth stations transmitting in the conventional or extended C-band, the conventional or extended Ku-band, or the 20/30 GHz bands that do not qualify for routine licensing under relevant criteria in § 25.134, § 25.138, § 25.211, § 25.212, § 25.218, § 25.221(a)(1) or (3), § 25.222(a)(1) or (3), § 25.226(a)(1) or (3), or § 25.227(a)(1) or (3).

(b) Applications filed pursuant to this section must include the information required by § 25.115(g)(1).

* * * * *

(d) * * *

(2) The operator of an earth station licensed pursuant to this section must reduce EIRP density toward a subsequently launched two-degree-compliant space station receiving in the same uplink band at a position within 6 degrees of the earth station's target satellite if the non-conforming earth station operation has not been coordinated with the operator of the new satellite. The earth station operator must reduce EIRP density to levels at or within relevant routine limits toward a two-degree-compliant space station receiving in the same uplink band at a position more than 6 degrees away from the target satellite if operation of the co-frequency space station is adversely affected by the non-conforming earth station operation, unless the non-conforming operation is permitted under a coordination agreement with the operator of the co-frequency satellite.

* * * * *

43. In § 25.221, revise paragraphs (a)(1)(i), (a)(2), (a)(3), (b) introductory text, and (b)(1) introductory text to read as follows, remove and reserve paragraphs (b)(1)(i) and (ii), and revise paragraphs (b)(2) and (3) to read as follows:

§ 25.221 Blanket Licensing provisions for Earth Stations on Vessels (ESVs) receiving in the 3700-4200 MHz (space-to-Earth) band and transmitting in the 5925-6425 MHz (Earth-to-space) band, operating with GSO Satellites in the Fixed-Satellite Service.

(a) * * *

(1) * * *

(i) * * *

(A) Off-axis EIRP spectral density emitted in the plane tangent to the GSO arc, as defined in § 25.103, shall not exceed the following values:

| | | | |
|---|---|---|---|
| $26.3 - 10\log(N) - 25\log\theta$ | dBW/4 kHz | for | $1.5° \leq \theta \leq 7°$ |
| $5.3 - 10\log(N)$ | dBW/4 kHz | for | $7° < \theta \leq 9.2°$ |
| $29.3 - 10\log(N) - 25\log\theta$ | dBW/4 kHz | for | $9.2° < \theta \leq 48°$ |
| $-12.7 - 10\log(N)$ | dBW/4 kHz | for | $48° < \theta \leq 180°$ |

Where theta ($\theta$) is the angle in degrees from a line from the earth station antenna to the assigned orbital location of the target satellite. For stations in networks that allow multiple terminals to transmit simultaneously in shared frequencies with equal on-axis EIRP, "N" is the number of

network earth stations transmitting simultaneously in the same frequencies to the same target satellite, not counting burst collisions resulting from operation with a contention protocol. N=1 for any station not transmitting simultaneously with others on common frequencies to the same target satellite and stations in networks that permit such simultaneous co-frequency transmission only in contention protocol operation. The EIRP density levels specified for $\theta > 7^{o}$ may be exceeded by up to 3 dB in up to 10% of the range of theta ($\theta$) angles from ±7-180º.

(B) In the plane perpendicular to the GSO arc, as defined in § 25.103, EIRP spectral density of co-polarized signals shall not exceed the following values:

| | | | |
|---|---|---|---|
| $29.3 - 10\log(N) - 25\log\theta$ | dBW/4 kHz | for | $3.0° \leq \theta \leq 48°$ |
| $-12.7 - 10\log(N)$ | dBW/4 kHz | for | $48° < \theta \leq 180°$ |

Where $\theta$ and N are as defined in paragraph (a)(1)(i)(A) of this section. These EIRP density levels may be exceeded by up to 6 dB in the region of main reflector spillover energy and in up to 10% of the range of $\theta$ angles not included in that region, on each side of the line from the earth station to the target satellite.

(C) The off-axis EIRP spectral-density of cross-polarized signals shall not exceed the following values in the plane tangent to the GSO arc or in the plane perpendicular to the GSO arc:

| | | | |
|---|---|---|---|
| $16.3 - 10\log(N) - 25\log\theta$ | dBW/4 kHz | for | $1.8° \leq \theta \leq 7.0°$ |
| $-4.7 - 10\log(N)$ | dBW/4 kHz | for | $7.0° < \theta \leq 9.2°$ |

Where $\theta$ and N are as defined in paragraph (a)(1)(i)(A) of this section.

(D) For non-circular ESV antennas, the major axis of the antenna must be aligned with the plane tangent to the GSO arc to the extent required to meet the specified off-axis EIRP spectral-density criteria.

* * * * *

(2) The following requirements apply to ESV systems that operate with off-axis EIRP spectral-densities in excess of the levels in paragraph (a)(1)(i) or (a)(3)(i) of this section under licenses granted based on certifications filed pursuant to paragraph (b)(2) of this section.

(i) An ESV or ESV system licensed based on certifications filed pursuant to paragraph (b)(2) of this section must operate in accordance with the off-axis EIRP density specifications provided to the target satellite operator in order to obtain the certifications.

(ii) Any ESV transmitter operating under a license granted based on certifications filed pursuant to paragraph (b)(2) of this section must be self-monitoring and capable of shutting itself off and must cease or reduce emissions within 100 milliseconds after generating off-axis EIRP-density in excess of the specifications supplied to the target satellite operator.

(iii) A system with variable power control of individual ESV transmitters must monitor the aggregate off-axis EIRP density from simultaneously-transmitting ESV transmitters at the system's network control and monitoring center. If simultaneous operation of two or more ESV transmitters causes aggregate off-axis EIRP density to exceed the off-axis EIRP-density specifications supplied to the target satellite operator, the network control and monitoring center must command those transmitters to cease emissions or reduce the aggregate EIRP density to a level at or below those specifications, and the transmitters must comply within 100 milliseconds of receiving the command.

(3) The following requirements apply to an ESV system that uses variable power control of individual earth stations transmitting simultaneously in the same frequencies to the same target satellite, unless the

ESV system operates pursuant to paragraph (a)(2) of this section.

(i) Aggregate EIRP density from terminals in the network toward any co-frequency satellite other than the target satellite(s) must be at least 1 dB below the limits defined in paragraph (a)(1)(i) of this section, with the value of N = 1.

(ii) Each ESV transmitter must be self-monitoring and capable of shutting itself off and must cease or reduce emissions within 100 milliseconds after generating off-axis EIRP density in excess of the limit in paragraph (a)(3)(i) of this section.

(iii) Aggregate power density from simultaneously-transmitting ESV transmitters must be monitored at the system's network control and monitoring center. If simultaneous operation of two or more ESV transmitters causes aggregate off-axis EIRP density to exceed the off-axis EIRP density limit in paragraph (a)(3)(i) of this section, the network control and monitoring center must command those transmitters to cease emissions or reduce the aggregate EIRP density to a level at or below that limit, and those transmitters must comply within 100 milliseconds of receiving the command.

* * * * *

(b) Applications for ESV operation in the 5925-6425 MHz (Earth-to-space) band to GSO satellites in the Fixed-Satellite Service must include, in addition to the particulars of operation identified on Form 312, and associated Schedule B, applicable technical demonstrations or certifications pursuant to paragraph (b)(1), (b)(2), or (b)(3) of this section and the documentation identified in paragraphs (b)(4) through (b)(6) of this section.

(1) An ESV applicant proposing to implement a transmitter under paragraph (a)(1) of this section must provide the information required by § 25.115(g)(1). The applicant must also specify the value N defined in paragraph (a)(1)(i)(A) of this section. An applicant proposing to implement a transmitter under paragraph (a)(1)(ii)(A) of this section must also provide the certifications identified in paragraph (b)(1)(iii) of this section. An ESV applicant proposing to implement a transmitter under paragraph (a)(1)(ii)(B) of this section must also provide the demonstrations identified in paragraph (b)(1)(iv) of this section.

* * * * *

(2) An applicant proposing to operate with off-axis EIRP density in excess of the levels specified in paragraph (a)(1)(i) or (a)(3)(i) of this section must provide the following in exhibits to its earth station application:

(i) off-axis EIRP density data pursuant to § 25.115(g)(1):

(ii) the certifications required by § 25.220(d);

(iii) a detailed showing that each ESV transmitter in the system will automatically cease or reduce emissions within 100 milliseconds after generating EIRP density exceeding specifications provided to the target satellite operator;

(iv) a detailed showing that the aggregate power density from simultaneously-transmitting ESV transmitters will be monitored at the system's network control and monitoring center; that if simultaneous operation of two or more ESV transmitters causes the aggregate off-axis EIRP density to exceed the off-axis EIRP density specifications supplied to the target satellite operator, the network control and monitoring center will command those transmitters to cease emissions or reduce the aggregate EIRP density to a level at or below those specifications; and that those transmitters will comply within 100 milliseconds of receiving the command; and

(v) a certification that the ESV system will operate in compliance with the power limits in § 25.204(h).

(3) An applicant proposing to implement an ESV system subject to paragraph (a)(3) of this section must provide the following information in exhibits to its earth station application:

(i) off-axis EIRP density data pursuant to § 25.115(g)(1);

(ii) a detailed showing of the measures that will be employed to maintain aggregate EIRP density at or below the limit in paragraph (a)(3)(i) of this section;

(iii) a detailed showing that each ESV terminal will automatically cease or reduce emissions within 100 milliseconds after generating off-axis EIRP density exceeding the limit in paragraph (a)(3)(i) of this section;

(iv) a detailed showing that the aggregate power density from simultaneously-transmitting ESV transmitters will be monitored at the system's network control and monitoring center; that if simultaneous operation of two or more ESV transmitters causes aggregate off-axis EIRP density to exceed the off-axis EIRP density limit in paragraph (a)(3)(i) of this section, the network control and monitoring center will command those transmitters to cease emissions or reduce the aggregate EIRP density to a level at or below that limit; and that those transmitters will comply within 100 milliseconds of receiving the command; and

(v) certification that the ESV system will operate in compliance with the power limits in § 25.204(h).

* * * * *

44. In § 25.222, revise paragraphs (a)(1)(i), (a)(2), and (a)(3) to read as follows, revise paragraph (b) introductory text and paragraph (b)(1) introductory text to read as follows, remove and reserve paragraphs (b)(1)(i) and (ii), and revise paragraphs (b)(2) and (3) to read as follows:

§ 25.222 Blanket Licensing provisions for Earth Stations on Vessels (ESVs) receiving in the 10.95-11.2 GHz (space-to-Earth), 11.45-11.7 GHz (space-to-Earth), 11.7-12.2 GHz (space-to-Earth) bands and transmitting in the 14.0-14.5 GHz (Earth-to-space) band, operating with GSO Satellites in the Fixed-Satellite Service.

(a) * * *

(1) * * *

(i) * * *

(A) Off-axis EIRP spectral density emitted in the plane tangent to the GSO arc, as defined in § 25.103, shall not exceed the following values:

| | | | |
|---|---|---|---|
| $15 - 10\log(N) - 25\log\theta$ | dBW/4 kHz | for | $1.5° \leq \theta \leq 7°$ |
| $-6 - 10\log(N)$ | dBW/4 kHz | for | $7° < \theta \leq 9.2°$ |
| $18 - 10\log(N) - 25\log\theta$ | dBW/4 kHz | for | $9.2° < \theta \leq 48°$ |
| $-24 - 10\log(N)$ | dBW/4 kHz | for | $48° < \theta \leq 85°$ |
| $-14 - 10\log(N)$ | dBW/4kHz | for | $85° < \theta \leq 180°$ |

Where theta ($\theta$) is the angle in degrees from a line from the earth station antenna to the assigned orbital location of the target satellite. For stations in networks that allow multiple terminals to transmit simultaneously in shared frequencies with equal on-axis EIRP, "N" is the number of network earth stations transmitting simultaneously in the same frequencies to the same target satellite, not counting burst collisions resulting from operation with a contention protocol. N=1 for any station not transmitting simultaneously with others on common frequencies to the same target satellite and stations in networks that permit such simultaneous co-frequency transmission only in

contention protocol operation. The EIRP density levels specified for $\theta > 7^{o}$ may be exceeded by up to 3 dB in up to 10% of the range of theta ($\theta$) angles from ±7-180º.

(B) The off-axis EIRP density of co-polarized signals shall not exceed the following values in the plane perpendicular to the GSO arc, as defined in § 25.103:

| | | | |
|---|---|---|---|
| $18 - 10\log(N) - 25\log\theta$ | dBW/4 kHz | for | $3.0° \leq \theta \leq 48°$ |
| $-24 - 10\log(N)$ | dBW/4 kHz | for | $48° < \theta \leq 85°$ |
| $-14 - 10\log(N)$ | dBW/4kHz | for | $85° < \theta \leq 180°$ |

Where $\theta$ and N are as defined in paragraph (a)(1)(i)(A) of this section. These EIRP density levels may be exceeded by up to 6 dB in the region of main reflector spillover energy and in up to 10% of the range of $\theta$ angles not included in that region, on each side of the line from the earth station to the target satellite.

(C) The off-axis EIRP density of cross-polarized signals shall not exceed the following values in the plane tangent to the GSO arc or in the plane perpendicular to the GSO arc:

| | | | |
|---|---|---|---|
| $5-10\log(N)-25\log\theta$ | dBW/4 kHz | for | $1.8° \leq \theta \leq 7.0°$ |
| $-16-10\log(N)$ | dBW/4 kHz | for | $7.0° < \theta \leq 9.2°$ |

Where $\theta$ and N are as defined in paragraph (a)(1)(i)(A) of this section.

(D) For non-circular ESV antennas, the major axis of the antenna must be aligned with the plane tangent to the GSO arc to the extent required to meet the specified off-axis EIRP density criteria.

* * * * *

(2) The following requirements apply to ESV systems that operate with off-axis EIRP spectral-densities in excess of the levels in paragraph (a)(1)(i) or (a)(3)(i) of this section under licenses granted based on certifications filed pursuant to paragraph (b)(2) of this section.

(i) An ESV or ESV system licensed based on certifications filed pursuant to paragraph (b)(2) of this section must operate in accordance with the off-axis EIRP density specifications provided to the target satellite operator in order to obtain the certifications.

(ii) Any ESV transmitter operating under a license granted based on certifications filed pursuant to paragraph (b)(2) of this section must be self-monitoring and capable of shutting itself off and must cease or reduce emissions within 100 milliseconds after generating off-axis EIRP-density in excess of the specifications supplied to the target satellite operator.

(iii) A system with variable power control of individual ESV transmitters must monitor the aggregate off-axis EIRP density from simultaneously-transmitting ESV transmitters at the system's network control and monitoring center. If simultaneous operation of two or more ESV transmitters causes aggregate off-axis EIRP density to exceed the off-axis EIRP-density specifications supplied to the target satellite operator, the network control and monitoring center must command those transmitters to cease emissions or reduce the aggregate EIRP density to a level at or below those specifications, and the transmitters must comply within 100 milliseconds of receiving the command.

(3) The following requirements apply to an ESV system that uses variable power control of individual earth stations transmitting simultaneously in the same frequencies to the same target satellite, unless the ESV system operates pursuant to paragraph (a)(2) of this section.

(i) Aggregate EIRP density from terminals in the network toward any co-frequency satellite other than

the target satellite(s) must be at least 1 dB below the limits defined in paragraph (a)(1)(i) of this section, with the value of N = 1.

(ii) Each ESV transmitter must be self-monitoring and capable of shutting itself off and must cease or reduce emissions within 100 milliseconds after generating off-axis EIRP density in excess of the limit in paragraph (a)(3)(i) of this section.

(iii) Aggregate power density from simultaneously-transmitting ESV transmitters must be monitored at the system's network control and monitoring center. If simultaneous operation of two or more ESV transmitters causes aggregate off-axis EIRP density to exceed the off-axis EIRP density limit in paragraph (a)(3)(i) of this section, the network control and monitoring center must command those transmitters to cease emissions or reduce the aggregate EIRP density to a level at or below that limit, and those transmitters must comply within 100 milliseconds of receiving the command.

* * * * *

(b) Applications for ESV operation in the 14.0-14.5 GHz (Earth-to-space) band to GSO satellites in the Fixed-Satellite Service must include, in addition to the particulars of operation identified on Form 312, and associated Schedule B, applicable technical demonstrations or certifications pursuant to paragraph (b)(1), (b)(2), or (b)(3) of this section and the documentation identified in paragraphs (b)(4) through (6) of this section.

(1) An ESV applicant proposing to implement a transmitter under paragraph (a)(1) of this section must provide the information required by § 25.115(g)(1). The applicant must also specify the value N defined in paragraph (a)(1)(i)(A) of this section. An applicant proposing to implement a transmitter under paragraph (a)(1)(ii)(A) of this section must also provide the certifications identified in paragraph (b)(1)(iii) of this section. An ESV applicant proposing to implement a transmitter under paragraph (a)(1)(ii)(B) of this section must also provide the demonstrations identified in paragraph (b)(1)(iv) of this section.

* * * * *

(2) An applicant proposing to operate with off-axis EIRP density in excess of the levels in paragraph (a)(1)(i) or (a)(3)(i) of this section must provide the following in exhibits to its earth station application:

(i) off-axis EIRP density data pursuant to § 25.115(g)(1);

(ii) the certifications required by § 25.220(d);

(iii) a detailed showing that each ESV transmitter in the system will automatically cease or reduce emissions within 100 milliseconds after generating EIRP density exceeding specifications provided to the target satellite operator; and

(iv) a detailed showing that the aggregate power density from simultaneously transmitting ESV transmitters will be monitored at the system's network control and monitoring center; that if simultaneous operation of two or more ESV transmitters causes the aggregate off-axis EIRP density to exceed the off-axis EIRP density specifications supplied to the target satellite operator, the network control and monitoring center will command those transmitters to cease emissions or reduce the aggregate EIRP density to a level at or below those specifications; and that those transmitters will comply within 100 milliseconds of receiving the command.

(3) An applicant proposing to implement an ESV system subject to paragraph (a)(3) of this section must provide the following information in exhibits to its earth station application:

(i) off-axis EIRP density data pursuant to § 25.115(g)(1);

(ii) a detailed showing of the measures that will be employed to maintain aggregate EIRP density at or below the limit in paragraph (a)(3)(i) of this section;

(iii) a detailed showing that each ESV terminal will automatically cease or reduce emissions within 100 milliseconds after generating off-axis EIRP density exceeding the limit in paragraph (a)(3)(i) of this section; and

(iv) a detailed showing that the aggregate power density from simultaneously-transmitting ESV transmitters will be monitored at the system's network control and monitoring center; that if simultaneous operation of two or more ESV transmitters causes aggregate off-axis EIRP density to exceed the off-axis EIRP density limit in paragraph (a)(3)(i) of this section, the network control and monitoring center will command those transmitters to cease emissions or reduce the aggregate EIRP density to a level at or below that limit; and that those transmitters will comply within 100 milliseconds of receiving the command.

* * * * *

45. In § 25.223, revise paragraphs (b), (c), and (d) to read as follows:

§ 25.223 Alternative licensing rules for feeder-link earth stations in the 17/24 GHz BSS.

* * * * *

(b) Applications for earth station licenses in the 24.75-25.25 GHz portion of 17/24 GHz BSS may be routinely processed if they meet the following requirements:

(1) The EIRP density of co-polarized signals shall not exceed the following values in the plane tangent to the GSO arc, as defined in § 25.103, under clear sky conditions:

| | | |
|---|---|---|
| 32.5-25log(θ) | dBW/MHz | for $2° \leq \theta \leq 7°$ |
| 11.4 | dBW/MHz | for $7° \leq \theta \leq 9.2°$ |
| 35.5-25log(θ) | dBW/MHz | for $9.2° \leq \theta \leq 48°$ |
| 3.5 | dBW/MHz | for $48° \leq \theta \leq 180°$ |

Where θ is the angle in degrees from a line from the earth station antenna to the assigned orbital location of the target satellite.

(2) The EIRP density of co-polarized signals shall not exceed the following values under clear sky conditions in the plane perpendicular to the GSO arc, as defined in § 25.103:

| | | |
|---|---|---|
| 35.5-25log(θ) | dBW/MHz | for $2° \leq \theta \leq 7°$ |
| 14.4 | dBW/MHz | for $7° \leq \theta \leq 9.2°$ |
| 38.5-25log(θ) | dBW/MHz | for $9.2° \leq \theta \leq 48°$ |
| 6.5 | dBW/MHz | for $48° \leq \theta \leq 180°$ |

Where θ is as defined in paragraph (b)(1) of this section.

(3) The EIRP density levels specified in paragraphs (a)(1) and (2) of this section may be exceeded by up to 3 dB for values of $\theta > 10°$, in 10% of the range of theta (θ) angles from 10º-180º on each side of the line from the earth station to the target satellite.

(4) The EIRP density of cross-polarized signals shall not exceed the following values in the plane tangent to the GSO arc or in the plane perpendicular to the GSO arc, under clear sky conditions:

| | | |
|---|---|---|
| 22.5-25log(θ) | dBW/MHz | for $2° \leq \theta \leq 7°$ |
| 1.4 | dBW/MHz | for $7° \leq \theta \leq 9.2°$ |

Where θ is as defined in paragraph (b)(1) of this section.

(c) An applicant proposing levels in excess of those specified in paragraph (b) of this section must certify that potentially affected parties acknowledge and do not object to the use of the applicant's higher EIRP densities.

(1) For proposed non-conforming EIRP density levels up to 3 dB in excess of the limits defined in paragraph (b) of this section, potentially affected parties are operators of co-frequency U.S.-authorized 17/24 GHz BSS space stations at angular separations of up to ±6° from the proposed satellite points of communication. For proposed EIRP density levels more than 3 dB but not more than 6 dB in excess of the limits defined in paragraph (b) of this section, potentially affected parties are operators of co-frequency U.S.-authorized space stations up to ±10° from the proposed satellite points of communication.

(2) Notwithstanding paragraph (c)(1) of this section, an applicant need not certify that the operator of a co-frequency space station consents to proposed non-conforming operation if EIRP density from the proposed earth station will not exceed the levels specified in paragraph (b) toward any position in the geostationary arc within 1 degree of the assigned orbital location of the co-frequency space station.

(3) Power density levels more than 6 dB in excess of the limits defined in paragraph (b) of this section will not be permitted.

(d)(1) The operator of an earth station licensed pursuant to paragraph (c) of this section shall bear the burden of coordinating with the operator of a co-frequency space station subsequently licensed by the Commission for operation at an orbital location 10 degrees or less from the earth station's target satellite if the co-frequency space station's reception of conforming uplink transmissions is, or would be, adversely affected by the earth station's non-conforming operation. If no agreement is reached, the earth station operator must reduce EIRP density toward that co-frequency space station to a level in conformance with the envelopes specified in paragraph (b) of this section.

(2) The operator of an earth station licensed pursuant to paragraph (c)(1) or (c)(2) of this section must reduce EIRP density to levels at or within those specified in paragraph (b) toward a U.S.-licensed space station receiving in the same uplink band at a position more than 6 or 10 degrees away from the earth station's target satellite if the co-frequency space station's reception of conforming uplink transmissions is adversely affected by the non-conforming earth station operation, unless the non-conforming operation is permitted under a coordination agreement with the operator of the co-frequency space station.

* * * * *

46. In § 25.226, revise paragraphs (a)(1)(i), (a)(2), and (a)(3), (b) introductory text, and (b)(1), introductory text, remove and reserve paragraphs (b)(1)(i) and (ii), and revise paragraphs (b)(2) and (b)(3) to read as follows:

§ 25.226 Blanket Licensing provisions for domestic, U.S. Vehicle-Mounted Earth Stations (VMESs) receiving in the 10.95-11.2 GHz (space-to-Earth), 11.45-11.7 GHz (space-to-Earth), and 11.7-12.2 GHz (space-to-Earth) bands and transmitting in the 14.0-14.5 GHz (Earth-to-space) band, operating with Geostationary Satellites in the Fixed-Satellite Service.

(a) * * *

(1) * * *

(i) * * *

(A) Off-axis EIRP spectral density emitted in the plane tangent to the GSO arc, as defined in § 25.103, shall not exceed the following values:

| | | | |
|---|---|---|---|
| 15−10log(N)−25logθ | dBW/4 kHz | for | 1.5° ≤ θ ≤ 7° |
| −6 −10log(N) | dBW/4 kHz | for | 7° < θ ≤ 9.2° |
| 18 −10log(N)−25logθ | dBW/4 kHz | for | 9.2° < θ ≤ 48° |
| −24 −10log(N) | dBW/4 kHz | for | 48° < θ ≤ 85° |
| −14 −10log(N) | dBW/4 kHz | for | 85° < θ ≤ 180° |

where theta (θ) is the angle in degrees from a line from the earth station antenna to the assigned orbital location of the target satellite. For stations in networks that allow multiple terminals to transmit simultaneously in shared frequencies with equal on-axis EIRP, "N" is the number of network earth stations transmitting simultaneously in the same frequencies to the same target satellite, not counting burst collisions resulting from operation with a contention protocol. N=1 for any station not transmitting simultaneously with others on common frequencies to the same target satellite and stations in networks that permit such simultaneous co-frequency transmission only in contention protocol operation. The EIRP density levels specified for θ > 7º may be exceeded by up to 3 dB in up to 10% of the range of theta (θ) angles from ±7-180º.

(B) The off-axis EIRP spectral density of co-polarized signals shall not exceed the following values in the plane perpendicular to the GSO arc, as defined in § 25.103:

| | | | |
|---|---|---|---|
| 18 − 10log(N) − 25logθ | dBW/4 kHz | for | 3.0° ≤ θ ≤ 48° |
| −24 − 10log(N) | dBW/4 kHz | for | 48° < θ ≤ 85° |
| −14 − 10log(N) | dBW/4kHz | for | 85° < θ ≤180° |

Where θ and N are as defined in paragraph (a)(1)(i)(A) of this section. These EIRP density levels may be exceeded by up to 6 dB in the region of main reflector spillover energy and in up to 10% of the range of θ angles not included in that region, on each side of the line from the earth station to the target satellite.

(C) The EIRP density of cross-polarized signals shall not exceed the following values in the plane tangent to the GSO arc or in the plane perpendicular to the GSO arc:

| | | | |
|---|---|---|---|
| 5−10log(N)−25logθ | dBW/4 kHz | for | 1.8° ≤ θ ≤7.0° |
| −16−10log(N) | dBW/4 kHz | for | 7.0° < θ ≤9.2° |

where θ and N are as defined in paragraph (a)(1)(i)(A) of this section.

(D) For non-circular VMES antennas, the major axis of the antenna must be aligned with the plane tangent to the GSO arc to the extent required to meet the specified off-axis EIRP spectral density criteria.

* * * * *

(2) The following requirements apply to VMES systems that operate with off-axis EIRP spectral-

densities in excess of the levels in paragraph (a)(1)(i) or (a)(3)(i) of this section under licenses granted based on certifications filed pursuant to paragraph (b)(2) of this section.

(i) A VMES or VMES system licensed based on certifications filed pursuant to paragraph (b)(2) of this section must operate in accordance with the off-axis EIRP density specifications provided to the target satellite operator in order to obtain the certifications.

(ii) Any VMES transmitter operating under a license granted based on certifications filed pursuant to paragraph (b)(2) of this section must be self-monitoring and capable of shutting itself off and must cease or reduce emissions within 100 milliseconds after generating off-axis EIRP-density in excess of the specifications supplied to the target satellite operator.

(iii) A system with variable power control of individual VMES transmitters must monitor the aggregate off-axis EIRP density from simultaneously-transmitting VMES transmitters at the system's network control and monitoring center. If simultaneous operation of two or more VMES transmitters causes aggregate off-axis EIRP density to exceed the off-axis EIRP density specifications supplied to the target satellite operator, the network control and monitoring center must command those transmitters to cease emissions or reduce the aggregate EIRP density to a level at or below those specifications and the transmitters must comply within 100 milliseconds of receiving the command.

(3) The following requirements apply to a VMES system that uses variable power control of individual VMES earth stations transmitting simultaneously in the same frequencies to the same target satellite, unless the system operates pursuant to paragraph (a)(2) of this section.

(i) Aggregate EIRP density from terminals in the network toward any co-frequency satellite other than the target satellite(s) must be at least 1 dB below the limits defined in paragraph (a)(1)(i) of this section, with the value of N = 1.

(ii) Each VMES transmitter must be self-monitoring and capable of shutting itself off and must cease or reduce emissions within 100 milliseconds after generating off-axis EIRP density in excess of the limit in paragraph (a)(3)(i) of this section.

(iii) Aggregate power density from simultaneously-transmitting VMES transmitters must be monitored at the system's network control and monitoring center. If simultaneous operation of two or more transmitters in a VMES network causes aggregate off-axis EIRP density to exceed the off-axis EIRP density limit in paragraph (a)(3)(i) of this section, the network control and monitoring center must command those transmitters to cease emissions or reduce the aggregate EIRP density to a level at or below that limit, and those transmitters must comply within 100 milliseconds of receiving the command.

* * * * *

(b) Applications for VMES operation in the 14.0-14.5 GHz (Earth-to-space) band to GSO satellites in the Fixed-Satellite Service must include, in addition to the particulars of operation identified on Form 312, and associated Schedule B, applicable technical demonstrations pursuant to paragraph (b)(1), (b)(2), or (b)(3) of this section and the documentation identified in paragraphs (b)(4) through (b)(8) of this section.

(1) A VMES applicant proposing to implement a transmitter under paragraph (a)(1) of this section must provide the information required by § 25.115(g)(1). The applicant must also specify the value N defined in paragraph (a)(1)(i)(A) of this section. An applicant proposing to implement a transmitter under paragraph (a)(1)(ii)(A) of this section must also provide the certifications identified in paragraph (b)(1)(iii) of this section. An applicant proposing to implement a transmitter under paragraph (a)(1)(ii)(B) of this section must also provide the demonstrations identified in paragraph (b)(1)(iv) of this section.

* * * * *

(2) An applicant proposing to operate with off-axis EIRP density in excess of the levels in paragraph (a)(1)(i) or (a)(3)(i) of this section must provide the following in exhibits to its earth station application:

(i) off-axis EIRP density data pursuant to § 25.115(g)(1);

(ii) the certifications required by § 25.220(d);

(iii) a detailed showing that each VMES transmitter in the system will automatically cease or reduce emissions within 100 milliseconds after generating EIRP density exceeding specifications provided to the target satellite operator; and

(iv) a detailed showing that the aggregate power density from simultaneously-transmitting VMES transmitters will be monitored at the system's network control and monitoring center; that if simultaneous operation of two or more VMES transmitters causes the aggregate off-axis EIRP density to exceed the off-axis EIRP density specifications supplied to the target satellite operator, the network control and monitoring center will command those transmitters to cease emissions or reduce the aggregate EIRP density to a level at or below those specifications; and that those transmitters will comply within 100 milliseconds of receiving the command.

(3) An applicant proposing to implement a VMES system subject to paragraph (a)(3) of this section must provide the following information in exhibits to its earth station application:

(i) off-axis EIRP density data pursuant to § 25.115(g)(1);

(ii) a detailed showing of the measures that will be employed to maintain aggregate EIRP density at or below the limit in paragraph (a)(3)(i) of this section;

(iii) a detailed showing that each VMES terminal will automatically cease or reduce emissions within 100 milliseconds after generating off-axis EIRP density exceeding the limit in paragraph (a)(3)(i) of this section; and

(iv) a detailed showing that the aggregate power density from simultaneously-transmitting ESV transmitters will be monitored at the system's network control and monitoring center; that if simultaneous operation of two or more transmitters in the VMES network causes aggregate off-axis EIRP density to exceed the off-axis EIRP density limit in paragraph (a)(3)(i) of this section, the network control and monitoring center will command those transmitters to cease emissions or reduce the aggregate EIRP density to a level at or below that limit; and that those transmitters will comply within 100 milliseconds of receiving the command.

* * * * *

47. In § 25.227, revise paragraphs (a)(1)(i), (a)(2), (a)(3), (b) introductory text, and (b)(1) introductory text to read as follows, remove and reserve paragraphs (b)(1)(i) and (ii), and revise paragraphs (b)(2) and (b)(3) to read as follows:

* * * * *

§ 25.227 Blanket licensing provisions for Earth Stations Aboard Aircraft (ESAAs) receiving in the 10.95-11.2 GHz (space-to-Earth), 11.45-11.7 GHz (space-to-Earth), and 11.7-12.2 GHz (space-to-Earth) frequency bands and transmitting in the 14.0-14.5 GHz (Earth-to-space) frequency band, operating with Geostationary Satellites in the Fixed-Satellite Service.

(a) * * *

(1) * * *

(i) * * *

(A) EIRP spectral density emitted in the plane tangent to the GSO arc, as defined in § 25.103, must

not exceed the following values:

| | | | |
|---|---|---|---|
| $15 - 10 \log_{10} (N) - 25 \log_{10}\theta$ | dBW/4 kHz | For | $1.5° \leq \theta \leq 7°$ |
| $-6 - 10 \log_{10} (N)$ | dBW/4 kHz | For | $7° < \theta \leq 9.2°$ |
| $18 - 10 \log_{10} (N) - 25 \log_{10}\theta$ | dBW/4 kHz | For | $9.2° < \theta \leq 48°$ |
| $-24 - 10 \log_{10} (N)$ | dBW/4 kHz | For | $48° < \theta \leq 85°$ |
| $-14 - 10 \log_{10} (N)$ | dBW/4 kHz | For | $85° < \theta \leq 180°$ |

where theta (θ) is the angle in degrees from a line from the earth station's antenna to the assigned orbital location of the target satellite. For stations in networks that allow multiple terminals to transmit simultaneously in shared frequencies with equal on-axis EIRP, "N" is the number of network earth stations transmitting simultaneously in the same frequencies to the same target satellite, not counting burst collisions resulting from operation with a contention protocol. N=1 for any station not transmitting simultaneously with others on common frequencies to the same target satellite and stations in networks that permit such simultaneous co-frequency transmission only in contention protocol operation. The EIRP density levels specified for $\theta > 7^{o}$ may be exceeded by up to 3 dB in up to 10% of the range of theta (θ) angles from ±7-180º.

(B) The EIRP spectral density of co-polarized signals must not exceed the following values in the plane perpendicular to the GSO arc, as defined in § 25.103:

| | | | |
|---|---|---|---|
| $18 - 10\log(N) - 25\log\theta$ | dBW/4 kHz | for | $3.0° \leq \theta \leq 48°$ |
| $-24 - 10\log(N)$ | dBW/4 kHz | for | $48° < \theta \leq 85°$ |
| $-14 - 10\log(N)$ | dBW/4kHz | for | $85° < \theta \leq 180°$ |

where θ and N are as defined in paragraph (a)(1)(i)(A) of this section. These EIRP density levels may be exceeded by up to 6 dB in the region of main reflector spillover energy and in up to 10% of the range of θ angles not included in that region, on each side of the line from the earth station to the target satellite.

(C) The off-axis EIRP spectral-density of cross-polarized signals must not exceed the following values in the plane tangent to the GSO arc or in the plane perpendicular to the GSO arc:

| | | | |
|---|---|---|---|
| $5 - 10 \log_{10} (N) - 25\log_{10}\theta$ | dBW/4kHz | For | $1.8° < \theta \leq 7°$ |
| $-16 - 10 \log_{10} (N)$ | dBW/4kHz | For | $7° < \theta \leq 9.2°$ |

where θ and N are as defined in paragraph (a)(1)(i)(A) of this section.

* * * * *

(2) The following requirements apply to ESAA systems that operate with off-axis EIRP spectral-densities in excess of the levels in paragraph (a)(1)(i) or (a)(3)(i) of this section under licenses granted based on certifications filed pursuant to paragraph (b)(2) of this section.

(i) An ESAA or ESAA system licensed based on certifications filed pursuant to paragraph (b)(2) of this section must operate in accordance with the off-axis EIRP density specifications provided to the target satellite operator in order to obtain the certifications.

(ii) Any ESAA transmitter operating under a license granted based on certifications filed pursuant to paragraph (b)(2) of this section must be self-monitoring and capable of shutting itself off and must cease or reduce emissions within 100 milliseconds after generating off-axis EIRP-density in excess of the specifications supplied to the target satellite operator.

(iii) A system with variable power control of individual ESAA transmitters must monitor the aggregate off-axis EIRP density from simultaneously-transmitting ESAA transmitters at the system's network control and monitoring center. If simultaneous operation of two or more ESAA transmitters causes aggregate off-axis EIRP density to exceed the off-axis EIRP density specifications supplied to the target satellite operator, the network control and monitoring center must command those transmitters to cease emissions or reduce the aggregate EIRP density to a level at or below those specifications, and the transmitters must comply within 100 milliseconds of receiving the command.

(3) The following requirements apply to an ESAA system that uses variable power-density control of individual ESAA earth stations transmitting simultaneously in the same frequencies to the same target satellite, unless the system operates pursuant to paragraph (a)(2) of this section.

(i) Aggregate EIRP density from ESAA terminals toward any co-frequency satellite other than the target satellite(s) must be at least 1 dB below the limits specified in paragraph (a)(1)(i) of this section, with the value of N = 1.

(ii) Each ESAA transmitter must be self-monitoring and capable of shutting itself off and must cease or reduce emissions within 100 milliseconds after generating off-axis EIRP density in excess of the limit in paragraph (a)(3)(i) of this section.

(iii) A system with variable power control of individual ESAA transmitters must monitor aggregate power density from simultaneously-transmitting ESAA transmitters at the network control and monitoring center. If simultaneous operation of two or more transmitters causes aggregate off-axis EIRP density to exceed the off-axis EIRP density limit in paragraph (a)(3)(i) of this section, the network control and monitoring center must command those transmitters to cease emissions or reduce the aggregate EIRP density to a level at or below that limit, and those transmitters must comply within 100 milliseconds of receiving the command.

* * * * *

(b) Applications for ESAA operation in the 14.0-14.5 GHz (Earth-to-space) band to GSO satellites in the Fixed-Satellite Service shall include, in addition to the particulars of operation identified on Form 312, and associated Schedule B, the applicable technical demonstrations in paragraphs (b)(1), (b)(2), or (b)(3), and the documentation identified in paragraphs (b)(4) through (b)(8) of this section.

(1) An ESAA applicant proposing to implement a transmitter under paragraph (a)(1) of this section must provide the information required by § 25.115(g)(1). The applicant must also specify the value N defined in paragraph (a)(1)(i)(A) of this section. An applicant proposing to implement a transmitter under paragraph (a)(1)(ii)(A) of this section must also provide the certifications identified in paragraph (b)(1)(iii) of this section. An applicant proposing to implement a transmitter under paragraph (a)(1)(ii)(B) of this section must also provide the demonstrations identified in paragraph (b)(1)(iv) of this section.

* * * * *

(2) An ESAA applicant proposing to operate with off-axis EIRP density in excess of the levels in paragraph (a)(1)(i) or (a)(3)(i) of this section must provide the following in exhibits to its earth station application:

(i) off-axis EIRP density data pursuant to § 25.115(g)(1);

(ii) the certifications required by § 25.220(d); and

(iii) a detailed showing that each ESAA transmitter in the system will automatically cease or reduce emissions within 100 milliseconds after generating EIRP density exceeding specifications provided to the target satellite operator; and

(iv) a detailed showing that the aggregate power density from simultaneously-transmitting ESAA transmitters will be monitored at the system's network control and monitoring center; that if simultaneous operation of two or more ESAA transmitters causes the aggregate off-axis EIRP density to exceed the off-axis EIRP density specifications supplied to the target satellite operator, the network control and monitoring center will command those transmitters to cease emissions or reduce the aggregate EIRP density to a level at or below those specifications; and that those transmitters will comply within 100 milliseconds of receiving the command.

(3) An applicant proposing to implement an ESAA system subject to paragraph (a)(3) of this section must provide the following information in exhibits to its earth station application:

(i) off-axis EIRP density data pursuant to § 25.115(g)(1);

(ii) a detailed showing of the measures that will be employed to maintain aggregate EIRP density at or below the limit in paragraph (a)(3)(i) of this section;

(iii) a detailed showing that each ESAA terminal will automatically cease or reduce emissions within 100 milliseconds after generating off-axis EIRP density exceeding the limit in paragraph (a)(3)(i) of this section; and

(iv) a detailed showing that the aggregate power density from simultaneously-transmitting ESAA transmitters will be monitored at the system's network control and monitoring center; that if simultaneous operation of two or more transmitters in the ESAA network causes aggregate off-axis EIRP density to exceed the off-axis density limit in paragraph (a)(3)(i) of this section, the network control and monitoring center will command those transmitters to cease emissions or reduce the aggregate EIRP density to a level at or below that limit; and that those transmitters will comply within 100 milliseconds of receiving the command.

* * * * *

48. In § 25.258, revise the section heading and the first sentence in paragraph (b) to read as follows:

§ 25.258 Sharing between NGSO MSS feeder link stations and GSO FSS services in the 29.25-29.5 GHz Band.

* * * * *

(b) Licensed GSO FSS earth stations in the vicinity of operational or planned NGSO MSS feeder link earth station complexes shall, to the maximum extent possible, operate with frequency/polarization selections that will minimize unacceptable interference with reception of GSO FSS and NGSO MSS uplink transmissions in the 29.25-29.5 GHz band. * * *

49. In § 25.264, revise paragraph (a) introductory text and paragraph (a)(5) to read as follows, add paragraph (a)(6), and revise paragraph (b) introductory text, the second sentence in paragraph (b)(1), paragraph (b)(2)(ii), the first sentence in paragraph (b)(3), the first sentence in paragraph (c), the first sentence in paragraph (d) introductory text, and the first two sentences in paragraph (d)(1)(ii) to read as follows:

§25.264 Requirements to facilitate reverse-band operation in the 17.3-17.8 GHz band of 17/24 GHz Broadcasting-Satellite Service and Direct Broadcast Satellite Service space stations.

(a) Each 17/24 GHz BSS space station applicant or licensee 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: * * *

(5) Over a greater angular measurement range, if necessary, to account for any planned spacecraft orientation bias or change in operating orientation relative to the reference coordinate system. The applicant or licensee must state the reasons for including such additional 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 or within 60 days after completion of critical design review for the space station, whichever occurs later.

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

(1) * * * In this rule, the term prior-filed U.S. DBS space station refers to any co-frequency Direct Broadcast Satellite service space station for which an application was filed with the Commission, or an authorization was granted by the Commission, prior to the filing of the information and certifications required by paragraphs (a) and (b) of this section. * * *

(2) * * *

(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 dBW/m$^2$/100 kHz at those prior-filed U.S. DBS space station locations.

(3) If the calculated pfd exceeds the threshold level of −117 dBW/m$^2$/100 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. * * *

(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 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 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) above. * * *

(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 that is already in orbit, each 17/24 GHz BSS space station licensee must provide pfd calculations based on the measured off-axis gain data submitted in accordance with paragraph (c) of this section, as follows:

(1) * * *

(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/m$^2$/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 submitted the predicted data required by paragraphs (a) through (b) of this section but before submission of the measured data required by this paragraph. * * *

* * * * *

50. In § 25.275, add paragraph (e) to read as follows:

§ 25.275 Particulars of operation.

* * * * *

(e) Transmission from an earth station of an unmodulated carrier at a power level sufficient to saturate a satellite transponder is prohibited, except by the space station licensee to determine transponder performance characteristics.

51. Add § 25.288, to read as follows:

§ 25.288 Obligation to remedy interference caused by NGSO MSS feeder downlinks in the 6700-6875 MHz band.

If an NGSO MSS satellite transmitting in the band 6700-6875 MHz causes harmful interference to previously licensed co-frequency Public Safety facilities, the satellite licensee has an obligation to remedy the interference.

## APPENDIX B

### Alternative Proposed Revision of Milestone and Bond Rules

**Alternative 1**

In § 25.164, revise paragraphs (a) and (b) to read as follows, remove and reserve paragraph (c), and revise paragraph (d) to read as follows:

§ 25.164 Milestones.

(a) Licensees of geostationary orbit satellite systems, other than DBS and DARS satellite systems, licensed on or after August 27, 2003 will be required to comply with the schedule set forth in paragraphs (a)(1) and (2) of this section in implementing their satellite systems, unless a different schedule is established by Title 47, Chapter I, or by Commission Order, or by Order adopted pursuant to delegated authority. These dates are to be measured from the date the license is issued.

(1) *Two years:* Complete the critical design review of the licensed satellite system.

(2) *Five years:* Launch the space station, position it in its assigned orbital location, and operate it in accordance with the station authorization.

(b) Licensees of non-geostationary orbit satellite systems other than DBS and DARS satellite systems licensed on or after September 11, 2003, will be required to comply with the schedule set forth in paragraphs (b)(1) through (b)(5) of this section in implementing their satellite systems, unless a different schedule is established by Title 47, Chapter I, or by Commission Order, or by Order adopted pursuant to delegated authority. These dates are to be measured from the date the license is issued.

(1) *Two years:* Complete the critical design review of the licensed satellite system.

(2) *Three years, six months:* Launch the first space station, place it in the authorized orbit, and operate it in accordance with the station authorization.

(3) *Six years:* Bring all the satellites in the licensed satellite system into operation.

(c) [Reserved]

(d) No later than 15 days after the milestone deadline for CDR, the recipient of an initial license for operation of a space station, or space stations, other than DBS or SDARS space stations, must either certify that CDR has been completed for the authorized satellite(s) or notify the Commission in writing that CDR has not been completed. A licensee that certifies completion of CDR must also file a corroborating affidavit from the satellite manufacturer and evidence of appropriate payment to date.

* * * * *

**Alternative 2**

In § 25.164, revise paragraphs (a) and (b) to read as follows, remove and reserve paragraphs (c)-(e), and revise paragraphs (f) and (g) to read as follows:

§ 25.164 Milestones.

(a) The recipient of an initial license for a GSO space station, other than DBS or SDARS space stations, granted on or after August 27, 2003 must launch the space station, position it in its assigned orbital location, and operate it in accordance with the station authorization no later than five years after the grant of the license, unless a different schedule is established by Title 47, Chapter I, or by order of the Commission or order adopted pursuant to delegated authority.

(b) The recipient of an initial license for an NGSO satellite system, other than DBS or SDARS satellite systems, granted on or after September 11, 2003 must launch the authorized space stations, place them in the assigned orbits, and operate them in accordance with the station authorization no later than six years after the grant of the license, unless a different schedule is established by Title 47, Chapter I, or by order of the Commission or order adopted pursuant to delegated authority.

* * * * *

(f) A licensee subject to the requirements in paragraph (a) or (b) of this section must either demonstrate compliance with the requirement specified therein or notify the Commission in writing that the requirement was not met, within15 days after the specified deadline. Compliance with a milestone requirement in paragraph (a) or (b) of this section may be demonstrated by certifying pursuant to § 25.121(d) that the space station(s) in question, has, or have, been launched and placed in the authorized orbital location or non-geostationary orbit(s) and that in-orbit operation of the space station or stations has been tested and found to be consistent with the terms of the authorization.

(g) Licensees of satellite systems that include both NGSO satellites and GSO satellites, other than DBS and DARS satellite systems, must meet the requirement in paragraph (a) of this section with respect to the GSO satellite(s) and the requirement in paragraph (b) of this section with respect to the NGSO satellites.

* * * * *

In § 25.165, revise the section heading and paragraph (d) to read as follows:

§ 25.165 Surety bonds.

* * * * *

(d) (1) In the event of a default as defined in paragraph (c) of this section, the amount determined pursuant to paragraph (a) of this section must be paid to the U.S. Treasury, with any additional amount determined pursuant to paragraph (f) of this section.

(2) If a licensee surrenders a license for cancellation prior to an applicable deadline in § 25.164(a) or (b), the surety shall pay the U.S. Treasury $400,000 plus a pro rata amount to be determined according to this formula: A = B*D/T, where A is the pro rata amount to be paid; B is either zero or the amount determined pursuant to paragraph (a) of this section minus $400,000, whichever is greater; D is the number of days that elapsed from the date of license grant until the date when the license was surrendered, and T is the total number of days from the date of grant until the relevant deadline in § 25.164(a) or (b). If the license was for a hybrid system subject to paragraph (a)(3) of this section, T is the number of days between grant and the deadline determined in accordance with § 25.164(b).

(3) If paragraph (f) of this section is applicable and the license is surrendered for cancellation prior to an applicable deadline in § 25.164(a) or (b), the amount to be paid will be the sum of the amounts determined in accordance with paragraphs (d)(2) and (f) of this section.

* * * * *

## APPENDIX C

## Alternative Proposed Revision Of Two Degree Spacing Rules

1. In § 25.140, revise paragraphs (a) and (b)(3) to read as follows:

§ 25.140 Further requirements for license applications for geostationary space stations in the Fixed-Satellite Service and the 17/24 GHz Broadcasting-Satellite Service.

(a) (1) In addition to the information required by § 25.114, an applicant for GSO FSS space station operation involving transmission of analog video signals must certify that the proposed analog video operation has been coordinated with operators of authorized co-frequency space stations within 6 degrees of the requested orbit location.

(2) In addition to the information required by § 25.114, an applicant for a GSO FSS space station at an orbital location less than 2 degrees from the assigned location of an authorized co-frequency GSO space station must either certify that the proposed operation has been coordinated with the operator of the co-frequency space station or submit an interference analysis demonstrating the compatibility of the proposed system with the co-frequency space station. Such analysis must include, for each type of radio frequency carrier, the link noise budget, modulation parameters, and overall link performance analysis. (See Appendices B and C to Licensing of Space Stations in the Domestic Fixed-Satellite Service, FCC 83-184, and the following public notices, copies of which are available in the Commission's EDOCS database: DA 03-3863 and DA 04-1708.) The provisions in this paragraph do not apply to proposed analog video operation, which is subject to the requirement in paragraph (a)(1).

(3) In addition to the information required by § 25.114, applicants for GSO FSS space stations must provide the following for operation other than analog video operation:

(i) With respect to proposed operation in the conventional or extended C-band, certification that downlink EIRP density will not exceed 1 dBW/4kHz for digital transmissions or 8 dBW/4kHz for analog transmissions and that EIRP density from associated uplink operation will not exceed applicable envelopes in § 25.218 or § 25.221(a) unless the non-conforming uplink and/or downlink operation is coordinated with operators of previously authorized co-frequency space stations at assigned locations within 6 degrees of the orbital location of the proposed space station.

(ii) With respect to proposed operation in the conventional or extended Ku-band, certification that downlink EIRP density will not exceed 10 dBW/4kHz for digital transmission or 17 dBW/4kHz for analog transmission and that associated uplink operation will not exceed applicable EIRP density envelopes in § 25.218, § 25.222, § 25.226, or § 25.227 unless the non-conforming uplink and/or downlink operation is coordinated with operators of previously authorized co-frequency space stations at assigned locations within 6 degrees of the orbital location of the proposed space station.

(iii) With respect to proposed operation in the 20/30 GHz band, certification that the proposed space stations will not generate power flux-density at the Earth's surface in excess of −118 dBW/$m^2$/MHz and that associated uplink operation will not exceed applicable EIRP density envelopes in § 25.138(a) unless the non-conforming uplink and/or downlink operation is coordinated with operators of previously authorized co-frequency space stations at assigned locations within 6 degrees of the orbital location of the proposed space station.

(b) * * *

(3) Except as described in paragraph (b)(5) of this section, an applicant for a license to operate a 17/24 GHz BSS space station that will be located precisely at one of the 17/24 GHz BSS orbital locations specified in Appendix F of the Report and Order adopted May 2, 2007, IB Docket No. 06-123, FCC 07-76, must provide an interference analysis demonstrating the compatibility of its proposed network with any current or future authorized space station in the 17/24 GHz BSS that complies with the technical

rules in this part and will be located at least 4 degrees from the proposed space station.

* * * * *

2. In § 25.209, revise paragraphs (a), (b), and (c) to read as follows, remove and reserve paragraph (e), remove the word "procedures" wherever it appears in paragraph (f) and replace it with the word "requirements," and revise paragraph (h) to read as follows:

§25.209 Earth station antenna performance standards.

(a) Except as provided in paragraph (f) of this section, the gain of any earth station antenna operating in the Fixed-Satellite Service, including earth stations providing feeder links for satellite services other than FSS, may not exceed the following limits:

(1) In the plane tangent to the GSO arc, as defined in § 25.103, for earth stations not operating in the conventional Ku-band, the 28.35-30 GHz band, or the 24.75-25.25 GHz band:

| | | | |
|---|---|---|---|
| $29-25\log_{10}\theta$ | dBi | for | $1.5° \leq \theta \leq 7°$ |
| 8 | dBi | for | $7° < \theta \leq 9.2°$ |
| $32-25\log_{10}\theta$ | dBi | for | $9.2° < \theta \leq 48°$ |
| −10 | dBi | for | $48° < \theta \leq 180°$ |

where θ is the angle in degrees from a line from the focal point of the antenna to the target satellite, and dBi refers to dB relative to an isotropic radiator. This envelope may be exceeded by up to 3 dB in 10% of the range of θ angles from ±7-180º.

(2) In the plane tangent to the GSO arc, for earth stations operating in the conventional Ku-band:

| | | | |
|---|---|---|---|
| $29-25\log_{10}\theta$ | dBi | for | $1.5° \leq \theta \leq 7°$ |
| 8 | dBi | for | $7° < \theta \leq 9.2°$ |
| $32-25\log_{10}\theta$ | dBi | for | $9.2° < \theta \leq 48°$ |
| −10 | dBi | for | $48° < \theta \leq 85°$ |
| 0 | dBi | for | $85° < \theta \leq 180°$ |

where θ and dBi are as defined in paragraph (a)(1) above. This envelope may be exceeded by up to 3 dB in 10% of the range of θ angles from ±7-180º.

(3) In the plane tangent to the GSO arc, for earth stations operating in the 28.35-30 GHz band:

| | | | |
|---|---|---|---|
| $29-25\log_{10}\theta$ | dBi | for | $2° \leq \theta \leq 7°$ |
| 8 | dBi | for | $7° < \theta \leq 9.2°$ |
| $32-25\log_{10}\theta$ | dBi | for | $9.2° < \theta \leq 48°$ |

| | | | |
|---|---|---|---|
| 0 | dBi | for | $48° < \theta \leq 180°$ |

where θ and dBi are as defined in paragraph (a)(1) above. This envelope may be exceeded by up to 3 dB in 10% of the range of θ angles from ±7-180º.

(4) In the plane perpendicular to the GSO arc, as defined in § 25.103, for earth stations not operating in the conventional Ku-band, 28.35-30 GHz band, or 24.75-25.25 GHz band:

Outside the main beam, the gain of the antenna shall lie below the envelope defined by:

| | | | |
|---|---|---|---|
| $32-25\log_{10}\theta$ | dBi | for | $3° < \theta \leq 48°$ |
| −10 | dBi | for | $48° < \theta \leq 180°$ |

where θ and dBi are as defined in paragraph (a)(1) above. This envelope may be exceeded by up to 6 dB in 10% of the range of θ angles from ±3-180º.

(5) In the plane perpendicular to the GSO arc, for earth stations operating in the conventional Ku-band:

Outside the main beam, the gain of the antenna shall lie below the envelope defined by:

| | | | |
|---|---|---|---|
| $32-25\log_{10}\theta$ | dBi | for | $3° < \theta \leq 48°$ |
| −10 | dBi | for | $48° < \theta \leq 85°$ |
| 0 | dBi | for | $85° < \theta \leq 180°$ |

where θ and dBi are as defined in paragraph (a)(1) above. This envelope may be exceeded by up to 6 dB in 10% of the range of θ angles from ±3-180º.

(6) In the plane perpendicular to the GSO arc, for earth stations operating in the 28.35-30 GHz band or 24.75-25.25 GHz band:

Outside the main beam, the gain of the antenna shall lie below the envelope defined by:

| | | | |
|---|---|---|---|
| $32-25\log_{10}\theta$ | dBi | for | $3.5° < \theta \leq 7°$ |
| 10.9 | dBi | for | $7° < \theta \leq 9.2°$ |
| $35-25\log_{10}\theta$ | dBi | for | $9.2° < \theta \leq 48°$ |
| 3 | dBi | for | $48º < \theta \leq 180°$ |

where θ and dBi are as defined in paragraph (a)(1) above. This envelope may be exceeded by up to 6 dB in 10% of the range of θ angles from ±3-180º.

(b) Except as provided in paragraph (f) of this section, the off-axis cross-polarization gain of any antenna used for transmission from an FSS earth station, including earth stations providing feeder links for satellite services other than FSS, may not exceed the following limits:

(1) In the plane tangent to the GSO arc, for earth stations not operating in the 28.35-30 GHz band or the 24.75-25.25 GHz band:

| | | | |
|---|---|---|---|
| $19-25\log_{10}\theta$ | dBi | For | $1.8° < \theta \leq 7°$ |
| −2 | dBi | For | $7° < \theta \leq 9.2°$ |

where θ and dBi are as defined in paragraph (a)(1) above.

(2) In the plane perpendicular to the GSO arc, for earth stations not operating in the 28.35-30 GHz band or the 24.75-25.25 GHz band:

| | | | |
|---|---|---|---|
| $19-25\log_{10}\theta$ | dBi | For | $3° < \theta \leq 7°$ |
| −2 | dBi | For | $7° < \theta \leq 9.2°$ |

where θ and dBi are as defined in paragraph (a)(1) above.

(3) In the plane perpendicular to the GSO arc, for earth stations operating in the 28.35-30 GHz band or 24.75-25.25 GHz band:

| | | | |
|---|---|---|---|
| $19-25\log_{10}\theta$ | dBi | For | $2° < \theta \leq 7°$ |
| −2 | dBi | For | $7° < \theta \leq 9.2°$ |

where θ and dBi are as defined in paragraph (a)(1) above.

(c)(1) An earth station licensed for operation with an FSS space station or registered for reception of transmissions from such a space station pursuant to Sections 25.131(b) and (d) is not entitled to protection from interference from authorized operation of previously authorized stations that would not cause harmful interference to that earth station if it were using an antenna with receive-band gain patterns conforming to the levels specified in Sections 25.209(a) and (b). For purposes of this rule, a previously authorized station is one that was licensed by the Commission or approved for U.S. market access prior to the licensing of the earth station receiving interference.

(2) The operator of an earth station licensed for operation with an FSS space station or registered for reception of transmissions from such a space station pursuant to Sections 25.131(b) and (d) may claim protection from harmful interference from operation of any station that is not previously authorized as that term is defined in paragraph (c)(1) of this section, unless such interference is permitted under a coordination agreement with the earth station operator or the operator of a space station with which the earth station communicates.

(3) A 17/24 GHz BSS telemetry earth station is not entitled to protection from harmful interference from authorized space station operation that would not cause harmful interference to that earth station if it were using an antenna with receive-band gain patterns conforming to the levels specified in paragraphs (a) and (b) of this section. Receive-only earth stations in the 17/24 GHz BSS are entitled to protection from harmful interference caused by other space stations to the extent indicated in § 25.224.

* * * * *

(h) The gain of any transmitting antenna in a gateway earth station communicating with NGSO FSS satellites in the 10.7-11.7 GHz, 12.75-13.15 GHz, 13.2125-13.25 GHz, 13.8-14.0 GHz, and/or 14.4-14.5

GHz bands must lie below the envelope defined as follows:

| | | | |
|---|---|---|---|
| $29-25\log_{10}(\theta)$ | dBi | for | $1° \leq \theta \leq 36°$ |
| -10 | dBi | for | $36° \leq \theta \leq 180°$ |

where θ and dBi are as defined in paragraph (a)(1) above. This envelope may be exceeded by up to 3 dB in 10% of the range of θ angles from ±7-180º.

3. In § 25.220, revise paragraph (a)(1) to read as follows and re-designate as paragraph (a), remove and reserve paragraph (a)(2), revise paragraph (b) to read as follows, revise the third sentence in paragraph (d)(1) introductory text to read as follows, and remove and reserve paragraphs (d)(1)(i) and (d)(2):

§ 25.220 Non-conforming transmit/receive earth station operations.

(a) The requirements in this section apply to applications for, and operation of, earth stations transmitting in the conventional or extended C-band, the conventional or extended Ku-band, or the 20/30 GHz bands that do not qualify for routine licensing under relevant criteria in § 25.134, 25.138, 25.211, 25.212, 25.218, 25.221(a)(1) or (3), 25.222(a)(1) or (3), 25.226(a)(1) or (3), or 25.227(a)(1) or (3).

(b) Applications filed pursuant to this section must include the information required by § 25.115(g)(1).

* * * * *

(d) (1) * * * The applicant will be granted protection from receiving interference from the satellite systems included in the coordination agreements referred to in the certification required by paragraph (d)(1)(ii) of this section only to the extent that protection from receiving interference is afforded by those coordination agreements.

(2) [Reserved]

* * * * *

## APPENDIX D

## Initial Regulatory Flexibility Analysis

As required by the Regulatory Flexibility Act (RFA),[1] the Commission has prepared this Initial Regulatory Flexibility Analysis (IRFA) of the possible significant economic impact on small entities by the policies and rules proposed in this Notice. We request written public comments on this IRFA. Commenters must identify their comments as responses to the IRFA and must file the comments by the deadlines for comments on the Notice provided above in Section V.D. The Commission will send a copy of the Notice, including this IRFA, to the Chief Counsel for Advocacy of the Small Business Administration.[2] In addition, the Notice and IRFA (or summaries thereof) will be published in the Federal Register.[3]

### A. Need for, and Objectives of, the Proposed Rules

The Further Notice of Proposed Rulemaking seeks comment on a variety of proposals relating to Part 25 of the Commission's rules, which governs licensing and operation of space stations and earth stations for the provision of satellite communication services.[4] Adoption of the proposed changes would, among other things, facilitate international coordination of proposed satellite networks; eliminate the need to assess compliance with interim milestone requirements; revise space station bond requirements to more effectively deter spectrum warehousing; clarify requirements for routine earth station licensing; and expand applicability of routine licensing standards.

The FNPRM proposes several changes to Part 25 of the rules. Specifically, it proposes to:

1) Allow space station applicants to file through the Commission a satellite network with the International Telecommunication Union up to two years before filing a complete and detailed space station application with the Commission.

2) Eliminate some or all of the space station construction milestones, except for the requirement to bring the space station(s) into operation at the assigned location(s) within a specified period of time. Simplify the showings needed to demonstrate compliance with the CDR milestone, if it is retained.

3) Modify the space station bond requirements to provide better incentives against spectrum warehousing.

4) Modify the two-degree spacing policy to permit continued operation of a non-two-degree compliant satellite network to the extent that such operation can be coordinated with other operators prior to the introduction of a nearby two-degree-compliant satellite.

5) Eliminate the requirement for a space station applicant that starts constructing its satellite prior to filing an application with the Commission to notify the Commission in writing that it is doing so at its own risk and expense.

6) Clarify the requirements to limit aggregate uplink power density from multiple earth stations transmitting to the same satellite.

7) Provide for the automatic grant of applications for repositioning of space stations with a small offset from the originally authorized orbital location, and for minor repointing of space station antennas.

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[1] *See* 5 U.S.C. § 603. The RFA, *see* 5 U.S.C. § 601 *et seq.*, has been amended by the Contract With America Advancement Act of 1996, Pub. L. No. 104-121, Title II, 110 Stat. 847 (1996) (CWAAA).

[2] *See* 5 U.S.C. § 603(a).

[3] *Id.*

[4] 47 C.F.R. Part 25, Satellite Communications.

8) Allow earth station operators to communicate with a replacement satellite that is deployed with a small offset from the originally authorized satellite without prior Commission authorization.

9) Extend the frequency bands in which routine earth station licensing is permitted.

10) Expand routine earth station license qualification options for 20/30 GHz earth station applicants.

11) Clarify earth station off-axis antenna radiation pattern requirements, and the ranges over which the off-axis radiated power can exceed the specified limits.

12) Permit earth station applicants to file off-axis antenna radiation charts instead of tables except in off-axis angular regions where the off-axis radiation exceeds specified limits.

13) Eliminate the requirement for portable earth station manufacturers to demonstrate compliance with the radiated power limits in Section 25.204 of the Commission's rules.

14) Lower the minimum permissible elevation angle for earth stations operating in bands not shared with terrestrial services from five degrees to three degrees above the horizontal plane.

15) Eliminate the restrictions on the center frequencies on which analog video transmissions in the 3700-4200 MHz band can be conducted.

16) Eliminate the restrictions on space station antenna polarization for space stations operating in the 4/6 GHz bands, and the associated compliance demonstration requirements in the space station application form.

17) Eliminate the cross-polarization requirement associated with FSS space stations.

18) Update and improve definitions.

### B. Legal Basis

The proposed action is authorized under Sections 4(i), 7(a), 303(c), 303(f), 303(g), and 303(r) of the Communications Act of 1934, as amended, 47 U.S.C. §§ 154(i), 157(a), 161, 303(c), 303(f), 303(g), and 303(r).

### C. Description and Estimate of the Number of Small Entities to Which the Proposed Rules May 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 rules adopted herein.[5] The RFA generally defines the term "small entity" as having the same meaning as the terms "small business," "small organization," and "small governmental jurisdiction."[6] In addition, the term "small business" has the same meaning as the term "small business concern" under the Small Business Act.[7] A small business 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).[8] Below, we describe and estimate the number of small entity licensees that may be affected by the adopted rules.

[5] 5 U.S.C. § 604(a)(3).

[6] 5 U.S.C. § 601(6).

[7] 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 the Office of Advocacy of the Small Business Administration and after 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).

[8] Small Business Act, 15 U.S.C. § 632 (1996).

***Satellite Telecommunications and All Other Telecommunications***

The rules proposed in this Further NPRM would affect some providers of satellite telecommunications services, if adopted. Satellite telecommunications service providers include satellite and earth station operators. Since 2007, the SBA has recognized two census categories for satellite telecommunications firms: "Satellite Telecommunications" and "Other Telecommunications." Under the "Satellite Telecommunications" category, a business is considered small if it had $32.5 million or less in annual receipts.[9] Under the "Other Telecommunications" category, a business is considered small if it had $32.5 million or less in annual receipts.[10]

The first category of Satellite Telecommunications "comprises establishments primarily engaged in providing point-to-point telecommunications services to other establishments in the telecommunications and broadcasting industries by forwarding and receiving communications signals via a system of satellites or reselling satellite telecommunications."[11] For this category, Census Bureau data for 2007 show that there were a total of 512 satellite communications firms that operated for the entire year.[12] Of this total, 482 firms had annual receipts of under $25 million.[13]

The second category of Other Telecommunications is comprised of entities "primarily engaged in providing specialized telecommunications services, such as satellite tracking, communications telemetry, and radar station operation. This industry also includes establishments primarily engaged in providing satellite terminal stations and associated facilities connected with one or more terrestrial systems and capable of transmitting telecommunications to, and receiving telecommunications from, satellite systems. Establishments providing Internet services or voice over Internet protocol (VoIP) services via client-supplied telecommunications connections are also included in this industry."[14] For this category, Census Bureau data for 2007 show that there were a total of 2,383 firms that operated for the entire year.[15] Of this total, 2,346 firms had annual receipts of under $25 million.[16] We anticipate that some of these "Other Telecommunications firms," which are small entities, are earth station applicants/licensees that might be affected if our proposed rule changes are adopted.

We anticipate that our proposed rule changes may have an impact on earth and space station applicants and licensees. Space station applicants and licensees, however, rarely qualify under the definition of a small entity. Generally, space stations cost hundreds of millions of dollars to construct, launch and operate. Consequently, we do not anticipate that any space station operators are small entities that would be affected by our proposed actions.

[9] *See* 13 C.F.R. § 121.201, NAICS code 517410.

[10] *See* 13 C.F.R. § 121.201, NAICS code 517919.

[11] U.S. Census Bureau, 2007 NAICS Definitions, "517410 Satellite Telecommunications."

[12] *See* http://factfinder.census.gov/servlet/IBQTable?_bm=y&-geo_id=&-_skip=900&-ds_name=EC0751SSSZ4&-_lang=en.

[13] *Id*.

[14] U.S. Census Bureau, 2007 NAICS Definitions, "517919 Other Telecommunications", http://www.census.gov/naics/2007/def/ND517919.HTM.

[15] *See* 13 C.F.R. § 121.201, NAICS code 517919.

[16] U.S. Census Bureau, 2007 Economic Census, Subject Series: Information, Table 5, "Establishment and Firm Size: Employment Size of Firms for the United States: 2007 NAICS Code 517919" (issued Nov. 2010).

### D. Description of Projected Reporting, Recordkeeping, and Other Compliance Requirements for Small Entities

The Further NPRM proposes a number of rule changes that will affect reporting, recordkeeping and other compliance requirements for earth and space station operators. Most proposed changes, as described below, would decrease the burden for all businesses operators, especially firms that hold licenses to operate earth stations.

We propose to streamline and reorganize the rules to facilitate improved compliance. First, the Further NPRM seeks comment on revisions to simplify information collections in applications for earth station licensees, and increase the number of earth station applications eligible for routine processing. Specifically, the Further NPRM seeks comment on eliminating reporting requirements that are more burdensome than necessary. For example, because it may be more convenient for some applicants to qualify for routine licensing based on certification of conformance with off-axis gain, input power density, and antenna-size criteria than to submit data to demonstrate compliance with routine off-axis EIRP density limits, we propose to incorporate alternative off-axis gain, input power density, and antenna-size criteria in the rules for applicants for earth stations transmitting to GSO satellites in the 28.35-28.6 GHz and/or 29.25-30.0 GHz bands. Thus, an applicant for such earth stations could qualify for routine licensing either by demonstrating that it will meet the off-axis EIRP density criteria or by certifying conformance with off-axis gain standards and specifying input power density and antenna size consistent with the proposed criteria.

Another example is that we see no reason to require earth station antenna gain to be measured in all directions. We therefore propose to delete language that may ambiguously imply requirements beyond the intended rules. Additionally, we propose to amend a provision to require gain to be measured at the bottom and top of each band assigned for uplink transmission, but eliminate the required measurement at the middle of the allocated frequency band. The Further NPRM also proposes to expand routine licensing eligibility to include "extended C-band" earth stations.

We propose to allow earth station operators to slightly repoint their antennas without prior approval for communication with a GSO replacement satellite within ±0.15° of the originally authorized location. We also propose to eliminate the need to license receive-only earth stations communicating with non-U.S. licensed space stations approved for U.S. market access. We propose clarifying that provisions to qualify for routine licensing for Earth station applicants proposing to transmit in the conventional C-band, the conventional Ku-band, or the 24.75-25.25 GHz band also apply to earth stations that use allocated FSS frequencies to provide feeder links for non-FSS space stations, *e.g.*, feeder links for Mobile-Satellite Service (MSS) or BSS space stations.

The Further NPRM also proposes changes to filing requirements. For example, we propose a revision such that an applicant for 20/30 GHz earth station licenses would not need to submit antenna gain plots for the receive bands. We also propose to delete requirements for portable earth station transceivers to demonstrate compliance with certain rule sections.

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

The RFA requires an agency to describe any significant, specifically small business, alternatives that it has considered in reaching its proposed approach, which may include the following four alternatives (among others): "(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 rules for such 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 such small entities."[17]

The Further NPRM seeks comment from all interested parties. The Commission is aware that some of the proposals under consideration may impact small entities. Small entities are encouraged to bring to the Commission's attention any specific concerns they may have with the proposals outlined in the Notice.

The Commission expects to consider the economic impact on small entities, as identified in comments filed in response to the Notice, in reaching its final conclusions and taking action in this proceeding.

In this Further NPRM, the Commission considers rule revisions to reflect changes and advances in the satellite industry. The Further NPRM proposes to eliminate unnecessary technical and information filing requirements, and reorganize and simplify existing requirements. All of these proposals could lessen the burden of compliance on small entities with more limited resources than larger entities.

The proposed changes for earth station licensing would clarify requirements for routine licensing and expand applicability of routine licensing standards. Each of these changes could lessen the burden in the licensing process. Specifically, this Further NPRM proposes revisions to provide alternatives for filing requirements, reduce filing requirements and clarify antenna pattern measurement requirements in such a way that applicant burden should be reduced. Thus, the proposed revisions would ultimately lead to benefits for small earth station operators in the long-term.

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

None.

[17] 5 U.S.C. § 603(c)(1)-(c)(4).

**STATEMENT OF**
**CHAIRMAN TOM WHEELER**

***Re: Comprehensive Review of Licensing and Operating Rules for Satellite Services, IB Docket No. 12-267***

Since becoming Chairman, I've spoken often about the importance of streamlining the FCC's processes. In my first week at the Commission, I asked Diane Cornell to prepare a comprehensive set of recommendations on what the FCC could do to make this agency as agile, efficient, and transparent as possible. Early this year, Diane's team released its Report on Process Reform, which provides a roadmap for improving the efficiency and effectiveness of the agency.

Today, we are advancing one of the most comprehensive rule reforms yet to emerge from the Process Reform Report -- a rulemaking proposal that would streamline, eliminate and clarify numerous provisions of the Commission's Part 25 rules governing the licensing and operation of space and earth stations providing satellite communications. These proposed changes would go a long way in making the regulatory approval process for satellite licenses easier and more efficient.

Among other things, the rulemaking notice would facilitate international coordination of satellite networks and afford licensees more operational flexibility. For example, proposed revised milestone requirements would simplify space station licensing while ensuring scarce orbital slots are only made available to those entities that are truly prepared to build and operate satellites in them.

These proposed rule changes would ultimately benefit consumers by increasing the speed and ease of introducing new satellite services, while promoting competition among service providers.

Today's Further Notice is also a great example of a process in which there was extensive input from stakeholders in advance of the NPRM, which enabled FCC staff to put a large number of detailed streamlining proposals on the table for comment. I'd also like to thank my colleagues for their thoughtful comments and edits to the item.

I'm pleased that we are taking this next step forward in our process reform initiative - making things easier and less expensive by becoming more flexible in our processes.

Thank you to all the staff for their work on this important initiative, including Mindel De La Torre, Troy Tanner, Jose Albuquerque, Bill Bell, Chip Fleming, Cassandra Thomas, Diane Garfield, Kal Krautkramer, Cindy Spiers, Jennifer Gilsenan and Steve Spaeth.

**STATEMENT OF**
**COMMISSIONER MIGNON L. CLYBURN**

***Re: Comprehensive Review of Licensing and Operating Rules for Satellite Services, IB Docket No. 12-267***

Satellite technology provides much needed communications service throughout the world and is particularly important in remote and un-served communities. It can also provide first responders with ubiquitous, reliable coverage during emergencies and natural disasters. For these reasons, the Commission seeks to revise regulations that have become outdated and impose unnecessary administrative costs on companies in order to spur greater investment and innovation.

With this Further Notice, the International Bureau continues to recommend wise proposals to update the Part 25 rules that govern satellite operations. At the top of the list is giving satellite companies the option to start the registration process with the International Telecommunications Union (ITU) before submitting a space station application to the FCC. ITU recognition is a "must" for a successful satellite network operation, and under our current rules, the International Bureau may not begin the ITU registration process for a satellite company, until that entity submits to the Commission, a detailed application for the frequency band and orbital location of its proposed space station. This application requires technical data that would not be known, until significant progress has been made in the design of a proposed satellite. In addition, it appears that the U.S. is the only administration that imposes such a restriction on ITU filings, placing our satellite companies, at a competitive disadvantage.

Even more harmful is that this enables competitors to monitor the Commission's space station applications and submit a new filing (or modify an existing one) at the ITU before the U.S. has submitted anything. Such "claim jumping" gives foreign operators the ability to secure ITU priority over their U.S.-licensed counterparts. The proposal in the Further Notice would aptly address this concern while also safeguarding the process against "warehousing" whereby a company secures ITU registration priority rights even though it has no serious intent to build satellite services.

There are a number of other proposals will also promote the goals of efficiency and modernization. Revising the two-degree spacing policy for GSO FSS satellites will facilitate individualized coordination agreements between satellite companies. Simplifying the current fleet management rule will give providers greater flexibility in implementing satellite relocations.

I wish to thank Jose Albuquerque for his excellent presentation as well as Troy Tanner, Chip Fleming, and William Bell for their work on this item. I also commend Diane Cornell and Mindel De La Torre for their leadership in this proceeding.

**STATEMENT OF**
**COMMISSIONER JESSICA ROSENWORCEL**

***Re:*** ***Comprehensive Review of Licensing and Operating Rules for Satellite Services, IB Docket No. 12-267***

We are on a roll.

Last year, the Commission amended over 150 of its Part 25 rule provisions, which govern the licensing and operation of space and earth stations providing satellite communications.

Today, our streamlining streak continues with a new rulemaking designed to further update our Part 25 rules. To this end, we propose changes to facilitate international coordination, refine spacing policies, reduce milestone requirements, and deter spectrum warehousing.

These efforts are more than ministerial. They matter. Because satellite services provide vital communications links to support routine activities for every one of us, every day. Satellite services also provide vital communications links to the most remote regions of the country. They connect our troops around the world. And critically, they provide an important backstop for public safety communications when terrestrial networks are down.

So I am pleased to support this rulemaking and grateful for the non-stop efforts of the International Bureau to update our rules to reflect new technologies, eliminate outdated requirements, and simplify our licensing procedures.

**STATEMENT OF**
**COMMISSIONER AJIT PAI**

***Re: Comprehensive Review of Licensing and Operating Rules for Satellite Services, IB Docket No. 12-267***

When the Commission first targeted Part 25 as in need of reform, the International Bureau set out with the bold objective of "re-examin[ing] the entire satellite network licensing process."[1] No doubt the FCC's staff had been listening to Dave Matthews Band's *Satellite* and took inspiration from the line that "everything good needs replacing."

Indeed, those lyrics might describe this whole proceeding, as we "look up, look down, all around" to thoroughly review our satellite licensing rules. Last year, for example, we used this proceeding to review and amend 61 separate rules, ranging from the procedural (such as who may file the Form 312EZ) to the technical (such as specifying the maximum equivalent isotropically radiated power (EIRP) spectral density for certain stations).[2] This year, we examine 48 more.

Especially important to me is that today's *Further Notice* picks up where we left off last year and tackles some of the challenges I identified then. For example, I expressed hope that the *Further Notice* would consider Boeing's recommendation to reduce the burden of our milestone review process,[3] and today's item explores several ways to do just that.[4] I am in turn grateful to my colleagues for incorporating a number of my suggestions to improve the item even further. Streamlining the licensing of small earth stations,[5] for example, is just one way we can mold our rules to make the United States the most desirable country in the world for licensing and operating satellites.

We should be clear that credit for this achievement goes not to those of us sitting at the dais, but to the Commission's dedicated staff. They have earned the laurels by painstakingly scouring the most obscure corners of Part 25. Many of these staffers have been working with these rules since the International Bureau commenced its review. So I extend my gratitude to Jose Albuquerque, Bill Bell, Tim Brennan, Mindel De La Torre, Chip Fleming, Diane Garfield, Jennifer Gilsenan, Kal Krautkramer, Steve Spaeth, Cindy Spiers, and Troy Tanner. Thank you for seeing this through, and I look forward to working with you to complete this proceeding in the coming months.

[1] Federal Communications Commission, Biennial Regulatory Review 2000 Updated Staff Report at paras. 76–77 (Jan. 17, 2000), *available at* http://go.usa.gov/jvpQ.

[2] *Comprehensive Review of Licensing and Operating Rules for Satellite Services*, IB Docket No. 12-267, Report and Order, 28 FCC Rcd 12403 (2013).

[3] *Id.* at 12515–16 (Statement of Commissioner Ajit Pai).

[4] *Further Notice* at paras. 28–34.

[5] *Id.* at paras. 87, 149.

**STATEMENT OF**
**COMMISSIONER MICHAEL O'RIELLY**

***Re:*** ***Comprehensive Review of Licensing and Operating Rules for Satellite Services, IB Docket No. 12-267***

I applaud the work of the International Bureau's Satellite Division for the preparation of the Notice of Proposed Rulemaking before the Commission today. On its face, the changes proposed may not seem to be the most significant changes to the Commission's rules governing satellite services. To the contrary, this is exactly the type of item that can be so helpful to all interested and affected parties. I recognize and acknowledge that a handful of the proposals were generated by Chairman Wheeler's process reform effort from earlier this year.

Today's document is dense and chock full of ways to modify and improve our satellite rules from the relatively benign to the overtly helpful. By clarifying our rules, we ensure that companies obligated to comply know exactly what is expected. The modifications proposed can also help reduce costs and expand opportunities in the offering of satellite services.

The Commission should continue to look for ways to update and improve our rules administered by all its bureaus and offices. I look forward to completion of the item in the near future.