

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

In the Matter of)	IB Docket No. 00-248
)	
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)	

NOTICE OF PROPOSED RULEMAKING

Adopted: December 11, 2000

Released: December 14, 2000

Comment Date: 75 Days After Publication in the Federal Register
 Reply Comment Date: 105 Days After Publication in the Federal Register

By the Commission:

TABLE OF CONTENTS

	<u>Paragraph</u>
I. Introduction	1
II. Background	2
III. Streamlining Non-Routine Earth Station Licensing Processes	7
A. Routine and Non-Routine Earth Stations	7
B. Non-Routine Antenna Gain Patterns	8
1. Introduction	8
2. Antenna Gain Patterns	9
a. Power Reductions	15
b. Affidavits	20
3. Submission of Antenna Gain Patterns	25
4. Other Non-Routine Antenna Gain Pattern Issues	27
a. Station Keeping	27
b. Interleaved Satellites	28
C. Non-Routine Power Levels	30
D. Satellite Coordination Negotiations to Reflect Non-Routine Antennas and Power Levels	34
E. Public Notice Language	37
IV. Relaxation of Current Requirements	39
A. Relaxation of Earth Station Power and Power Density Limits	39
B. Temporary Fixed Earth Stations	42

C.	License Term	44
D.	Construction Completion Requirement for Satellite Mobile Earth Stations	46
E.	Revision of Part 23	48
V.	VSAT Licensing Issues	50
A.	Background	50
B.	Establishment of Power Limits for VSAT Networks Using Random Access Techniques	51
C.	Multiple Hub Stations	58
D.	Temporary Fixed VSAT Stations	60
E.	Non-US Licensed Satellites and International VSAT Networks	63
F.	VSAT Licenses for Organizations with Multiple Members	65
VI.	Streamlining of Filing Requirements	67
A.	Streamlined Earth Station Filing Form	67
B.	Renaming Form 701 and Form 405	71
C.	Form 312, Schedule S, Space Station Technical Data Form	72
D.	Electronic Filing	76
1.	Mandatory Electronic Filing For Routine Earth Station License Applications	76
2.	Electronically Filed Petitions to Deny and Comments	77
VII.	Miscellaneous	78
A.	Earth Station License Modification Requirements	78
B.	Radiation Hazards from Co-located Antennas	82
C.	Construction Authorization	84
D.	Satellite Control Responsibilities to Resolve Harmful Interference	85
E.	Extension of Power Limits to Other FSS Bands	86
F.	Elimination of Outdated Rules	87
G.	General Part 25 Modifications	90
VIII.	Conclusion	91
IX.	Procedural Matters	92
X.	Ordering Clauses	101
Appendix A: Antenna Patterns		
Appendix B: Proposed Rules		
Appendix C: Form 312, Schedule S, and Space Station Technical Data		
Appendix D: Proposed Revisions to Form 312		
Appendix E: Technical Analysis for Proposed VSAT Multiple Access Rules		
Appendix F: Brief Summary of Current Power Limits		
Appendix G: Initial Regulatory Flexibility Act Analysis		

I. INTRODUCTION

1. In this Notice of Proposed Rulemaking (*Notice*), we continue to fulfill our statutory mandate under Section 11 of the Communications Act of 1934, as amended (Act), to streamline our rules, where

appropriate.¹ In particular, we advance proposals that will reduce the burdens on earth station operators seeking routine authorizations and streamline the process for non-routine earth station applications. We make these proposals in an effort to establish a record that will enable us to adopt rules that will encourage innovation, significantly reduce the filing burdens on applicants and licensees, expedite the process of issuing licenses, accelerate the provision of service to the public, and promote service in rural and unserved areas.

II. BACKGROUND

2. Section 11 requires that the Commission, in every even-numbered year beginning in 1998, review all regulations that apply to the operations and activities of any provider of telecommunications service and determine whether any of these regulations are no longer necessary in the public interest as the result of meaningful economic competition between providers of the service.² Section 11 further instructs the Commission to “repeal or modify any regulation it determines to be no longer necessary in the public interest.”³ Accordingly, the Commission has initiated a comprehensive review of telecommunications and other regulations to promote meaningful deregulation and streamlining where competition and other considerations warrant such action.⁴

3. The Communications Act prohibits earth station operators from operating without a license.⁵ The licensing of earth stations is not only statutorily required, satellite networks and global communications depend on the existence of licenses to establish an interference-free operating environment. Earth stations provide a critical link between satellites and terrestrial networks. Over the years, we have taken action to streamline our satellite and earth station licensing rules and procedures when warranted,⁶ and increasingly, we have looked for ways that satellite operations can share spectrum with terrestrial-based operations. In addition, the International Bureau (Bureau) issued a public notice in 1999 initiating a new licensing process for certain types of earth station applications and inviting comment on a number of additional streamlining proposals.⁷ As part of the 2000 biennial regulatory review, we are

¹ 47 U.S.C. § 161.

² 47 U.S.C. § 161(a).

³ 47 U.S.C. § 161(b).

⁴ Federal Communications Commission Biennial Regulatory Review 2000, CC Docket No. 00-175, Staff Report (released Sept. 19, 2000) (*2000 Biennial Review Staff Report*). In response to the *2000 Biennial Review Staff Report*, Hughes Network Systems (Hughes) made a number of recommendations. In this *Notice*, we invite comment on all Hughes' suggestions except one regarding the preemption of zoning regulations. Hughes Comments in Response to *2000 Biennial Review Staff Report* at 4-5. The Commission has already addressed that issue in another proceeding. Promotion of Competitive Networks in Local Telecommunications Markets, WT Docket No. 99-217 (released Oct. 25, 2000).

⁵ 47 U.S.C. § 301.

⁶ Amendment of Part 25 of the Commission's Rules and Regulations to Reduce Alien Carrier Interference Between Fixed-Satellites at Reduced Orbital Spacing and to Revise Application Processing Procedures for Satellite Communications Services, First Report and Order, CC Docket No. 86-496, 6 FCC Rcd 2806 (1991); Streamlining the Commission's Rules and Regulations for Satellite Application and Licensing Procedures, Report and Order, IB Docket No. 95-117, 11 FCC Rcd 21581 (1996) (*1996 Streamlining Order*).

⁷ Commission Launches Earth Station Streamlining Initiative, Public Notice, DA 99-1259 (released June 25, 1999) (*Ka-band Auto-grant Public Notice*).

reviewing Part 25. We have found several cases in which we believe that modifying or eliminating rules will facilitate more streamlined licensing of earth stations.

4. We expect that, if adopted, these rule changes should expedite the provision of useful satellite services to the public, including, for example, Internet services and extending satellite services to rural areas, without unreasonably increasing the risk of harmful interference to existing operators. Companies are increasingly using satellite systems to deliver Internet traffic from international points to gateway earth stations and from the public Internet along the "last mile" to earth station antennas at customers' homes. In addition, over the past year, the Commission received over 2400 earth station applications, and the number of applications has been increasing in recent years. Therefore, we expect our streamlining efforts to become more important in the future as the number of earth station applications increases further.

5. With regard to terrestrial wireless operations, none of the proposals herein affect the pre-licensing coordination requirements between earth station applicants and terrestrial operators that exist today. As a result, we do not expect any of the proposals to affect terrestrial wireless operations in frequency bands that are shared with FSS operations. Currently, Section 25.203(b) requires earth station operators in shared bands to show that they have coordinated with terrestrial wireless operations in their license applications.⁸ These coordination procedures are important, in part because some terrestrial operators in shared bands are police dispatchers and other public safety officials.⁹ Accordingly, we do not propose any revisions to these coordination requirements and procedures in this Notice. Instead, we concentrate on proposals to streamline the procedures applicable *after* coordination with terrestrial wireless operations has been completed. Furthermore, we do not anticipate that any of the proposals in this Notice, if adopted, would affect the contours of any FSS earth station operating in shared bands, and so would not affect the coordination with terrestrial wireless operators required by to Section 25.203(b). We invite comments from any terrestrial wireless operator who believes its operations might be affected in some way by any of the proposals in this Notice.

6. In Section III of this Notice, we propose rule revisions to streamline the review of license applications filed by earth station applicants planning to use "non-routine" antennas or power levels. We propose relaxing or eliminating several requirements in Section IV, including the current power and power density limits, extending earth station license terms, and allowing certain temporary fixed earth stations to begin operation on an accelerated basis. Section V proposes streamlining a number of very small aperture terminal (VSAT) rules, and extending certain VSAT provisions to other types of earth stations. Section V also proposes revising the power level rules applicable to VSAT networks, in response to issues raised in the Spacenet Inc. (Spacenet) petition and associated pleadings. In Section VI of this Notice, we propose adopting a new earth station license application form, to be used when seeking routine authorizations, which we expect to be much easier to complete than the current form.¹⁰ We also propose other revisions to license application forms, and propose expanding our electronic filing systems for earth station

⁸ 47 C.F.R. § 25.203(b). *See also* 47 C.F.R. § 25.277(c), (d), (e) (temporary fixed earth station operators in shared bands must coordinate with terrestrial wireless operators before beginning transmissions).

⁹ *See* Mobile Satellite-Based Communications Services by Crescomm Transmission Services, Inc. and Qualcomm Incorporated, Order, 11 FCC Rcd 10944, 10948 (para. 10) (Int'l Bur. and OET, 1996) (operations in the C-band "cannot tolerate" harmful interference).

¹⁰ By a "routine" earth station application, we mean an application for authority to operate consistently with the technical specifications of Part 25. *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, First Order on Reconsideration, IB Docket No. 96-111, 15 FCC Rcd 7207, 7213 n.30 (1999) (*DISCO II First Reconsideration Order*).

applications and comments. Finally, Sections VII proposes simplifying and clarifying other miscellaneous rules applicable to earth stations and space stations.

III. STREAMLINING NON-ROUTINE EARTH STATION LICENSING PROCESSES

A. Routine and Non-Routine Earth Stations

7. The Commission licensed the first commercial C-band antennas in 1973,¹¹ and the first Ku-band antennas in 1981.¹² As the satellite industry developed, the Commission, in 1983, instituted its 2° orbital spacing policy to maximize the number of satellites in-orbit.¹³ Under the 2° spacing framework, the Commission assigns adjacent in-orbit satellites to orbit locations 2° apart in longitude. This framework also established technical rules to govern earth stations communicating with these satellites to ensure that their operations do not cause unacceptable interference to adjacent satellite systems. These standards involve both the powers at which the earth stations transmit and the size of the earth station antenna. The size of the earth station antenna is important since, in general, smaller antennas produce wider transmission beams, which, in turn, create more potential interference to adjacent satellite operations. As a result, we "routinely" license earth station facilities that meet these 2° spacing technical standards, now codified in Part 25 of our rules.¹⁴ It is possible, however, for an earth station to operate without causing unacceptable interference in a 2° space station spacing environment without meeting all of the technical standards of Part 25, provided the operations are properly coordinated with all affected parties. Accordingly, we do not dismiss or deny these "non-routine" earth station applications without conducting a case-by-case review. In this section, we seek comment on specific cases where it may be possible to streamline our review of non-routine earth station applications.

B. Non-Routine Antenna Gain Patterns

1. Introduction

8. Currently, an earth station applicant seeking authority to use an antenna with a non-routine antenna gain pattern often must use a burdensome process¹⁵ to demonstrate that its antenna will not cause unacceptable interference to adjacent satellite systems. We propose replacing this process with one we expect to be simpler and less burdensome. Specifically, we propose requiring applicants to either (1) reduce their power levels to those that would be produced if the maximum allowable power level were transmitted by an antenna that complies with the 2° spacing standards of the Commission's rules, or (2)

¹¹ Western Union Telegraph Company, 38 FCC 2d 1197 (1973); Comsat General Corporation, 42 FCC 2d 677 (1973).

¹² See Assignment of Orbital Locations to Space Stations in the Domestic Fixed-Satellite Service, Memorandum Opinion and Order, 84 FCC 2d 584, 606 (para. 56).

¹³ Licensing of Space Stations in the Domestic Fixed-Satellite Service and Related Revisions of Part 25 of the Rules and Regulations, Report and Order, CC Docket No. 81-704, FCC 83-184, 54 Rad. Reg. 2d 577 (released Aug. 16, 1983); Licensing Space Stations in the Domestic Fixed-Satellite Service, 48 F.R. 40233 (Sept. 6, 1983) (*Two Degree Spacing Order*).

¹⁴ 47 C.F.R. Part 25.

¹⁵ This process is the Adjacent Satellite Interference Analysis (ASIA). We discuss ASIA in detail below.

obtain affidavits from satellite operators demonstrating that the satellite operators are aware of the proposed non-routine earth station operations and have reflected those non-routine operations in agreements with other satellite operators. Earth station applicants would be required to reduce their power levels if they sought an ALSAT earth station license. They would need affidavits from satellite operators to obtain protection from receiving interference from other satellite systems. These points are explained in more detail below.

2. Antenna Gain Patterns

9. The gain of an antenna is the ratio of the power required at the input of a loss-free reference antenna to the power supplied to the input of the given antenna to produce, in a given direction, the same field strength or the same power flux-density at the same distance. When not specified otherwise, the gain refers to the direction of maximum radiation.¹⁶ In other words, gain refers to an antenna's ability to collect, concentrate, and direct energy in a particular fashion, *i.e.*, a beam. Antennas are generally shaped like parabolas, or like large, curved bowls. The "axis," or boresight, is the line running through the center of the bowl and perpendicular to the plane of the edge of the bowl. The "off-axis" angle is the angle formed by the axis and another line running through the center of the bowl or the "boresight." The energy transmitted from an antenna forms "ripples," alternately increasing and decreasing in magnitude as the off-axis angle increases. Examples of these ripples can be seen in the antenna gain pattern diagrams in Appendix A. These ripples are called "side lobes."

10. The "gain" of any earth station antenna must fall within the limits defined by the equations set forth in Section 25.209(a) and (b). In other words, the "main lobes" and "side lobes" of an antenna must be less than the limits specified in the equations in Section 25.209. Allowing an antenna to operate with side lobes outside the Section 25.209 envelope, without making some other adjustment such as reducing power levels, creates a potential for unacceptable interference to adjacent satellite systems and, in some cases, to fixed services, *i.e.*, in low elevation angles.¹⁷ Several antenna gain patterns are illustrated in Appendix A with the Section 25.209 envelopes superimposed on them.

11. In 1983, we recognized that beginning the Section 25.209(a)(1) side lobe envelope at 1° off-axis from the boresight places a limit on the minimum size of earth station antenna that can meet this standard.¹⁸ As the diameter of an antenna decreases, the main lobe eventually will no longer be within the ±1° off-axis envelope. Consequently, the smallest diameter antenna routinely licensed at C-band is 4.5 meters, while at Ku-band the smallest antenna routinely licensed is 1.2 meters in diameter.¹⁹

¹⁶ 47 C.F.R. § 2.1.

¹⁷ We note that "small" antennas are currently coordinated by frequency coordinators on a regular basis and the report of this coordination is required to be submitted by the earth station applicant. *See* 47 C.F.R. § 25.203(b). Our proposals here do not change this requirement, and, therefore, we do not believe there is any increased risk of interference to terrestrial wireless systems in frequency bands shared with FSS earth stations.

¹⁸ *Two Degree Spacing Order*, 54 Rad. Reg. 2d at 605 (para. 93).

¹⁹ Although an antenna 1.2 meters in diameter does not fit within the envelope established in Section 25.209(a)(1) between 1° and 1.25° off-axis, the Commission found that this slight failure to meet the Commission's antenna gain standards does not generally cause unacceptable interference, and therefore created an exception for 1.2-meter antennas operating in the Ku-band. Specifically, the side lobe envelope for a 1.2 meter antenna operating in the Ku-band was revised to begin at 1.25° off-axis. *See* 47 C.F.R. § 25.209(g); Amendment of Part 25 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

12. There are strong economic and other incentives to use the smallest possible aperture earth station antenna. Smaller antennas are less expensive to manufacture, and it is easier to find suitable locations to install smaller antennas. In addition, with the improvement of transmitter and receiver technology on board satellites, satellite communications systems have been able to maintain service performance while decreasing the aperture of the earth station antennas used to deliver satellite services to end users. For these two reasons, we are receiving numerous applications to use earth station antennas that do not meet the antenna gain pattern envelope. For example, we recently adopted a Notice of Proposed Rulemaking to address certain issues raised by an application filed by Onsat Network Communications, Inc. (Onsat).²⁰ Onsat proposed operating C-band earth station antennas that are 3.7 meters in diameter, less than the diameter specified in the Commission's rules.²¹

13. An applicant seeking a license to use an earth station antenna that is non-conforming with Section 25.209(a)(1) must now rely upon "a finding by the Commission that unacceptable levels of interference will not be caused under conditions of uniform 2° orbital spacing."²² Presently, the Commission does not make such findings without the provision of earth station antenna gain patterns and a technical study demonstrating compatibility with uniform 2° orbital spacing. This technical study usually takes the form of an analysis using the Adjacent Satellite Interference Analysis (ASIA) program as described in Section 25.134(b).²³ The ASIA requirement is often difficult and time consuming to perform, for two reasons.²⁴ First, the ASIA is burdensome because the data needed for the analysis are not readily available from any one source, and the results of an ASIA can be subject to interpretation. Second, the ASIA results for the non-routine antenna's operations must be coordinated with adjacent satellite operators.²⁵ The ASIA requirement often delays the introduction of new services and technological innovation to the public.²⁶

Report and Order and Further Notice of Proposed Rulemaking, CC Docket No. 86-496, 8 FCC Rcd 1316, 1322 (paras. 38-39) (1993).

²⁰ FWCC Request for Declaratory Ruling on Partial-Band Licensing of Earth Stations in the Fixed-Satellite Service that Share Terrestrial Spectrum, Notice of Proposed Rulemaking, IB Docket No. 00-203, FCC 00-369 (released Oct. 24, 2000) (*FWCC/Onsat NPRM*). The *FWCC/Onsat NPRM* seeks comment on codifying rules and establishing fees governing blanket licensing in the C-band.

²¹ 47 C.F.R. § 25.212(d).

²² 47 C.F.R. §25.209(f).

²³ The ASIA computer program and interference assessment methodology is cited in Section 25.134(b) of our Rules. The ASIA program and methodology was originally employed to analyze the impact of 2° orbital spacings in the C and Ku bands in Appendices B and C of the *Two Degree Spacing Order*.

²⁴ Conducting an interference assessment using the ASIA program requires the collection of very specific modulation and link budget parameters for all of the communication links being analyzed. Parameters such as modulation indices, baseband frequencies, data and error correction coding rates, noise temperatures, antenna gains, powers, and sometimes carrier frequency plans are required for the interfering and desired communication links. Once these parameters are collected, the ASIA computer program computes carrier-to-interference (C/I) ratios between the desired and interfering links. Such detailed parameters are not collected in the earth station licensing process and are generally available only from the individual satellite system operators.

²⁵ See Hughes Comments in Response to 2000 Biennial Review Staff Report at 1-2 (procedures for non-routine antenna applications are burdensome).

²⁶ Hughes Comments in Response to 2000 Biennial Review Staff Report at 2-3.

14. ASIA is not the only method available, however, to ensure the compatibility of these non-compliant antennas with 2° orbital spacing. There are at least two alternatives that are not specifically recognized by our rules: (1) requiring the earth station operator to reduce its power enough to avoid potential adjacent satellite interference; and (2) requiring the earth station operator to submit affidavits from space station operators showing that they have coordinated the earth station's proposed non-routine operations with all other affected satellite systems, and that they will continue to reflect those non-routine operations in future coordination discussions. We believe that applicants seeking authority to operate non-routine antennas should be given the option of either or both approaches. Deciding not to pursue either option, however, may require other conditions to be placed on the license. We propose both options below.

a. Power Reduction

15. A reduction in the transmitted earth station power is a tool available to ensure an acceptable interference environment for adjacent satellite operations. In other words, a power reduction can reduce the side lobe energy to levels that fall within the levels that would be produced if the maximum allowable power level were transmitted by an antenna that complies with the antenna gain pattern envelope in Section 25.209(a) and (b). Accordingly, we propose creating a new Section 25.220 to effectively implement an equivalent isotropically radiated power (EIRP)²⁷ density vs. off-axis angle criterion beginning at 1° off-axis. In this way, the off-axis EIRP density would be maintained equivalent to that provided by routine earth stations at 2° and beyond. Although the Commission staff will continue to process these earth station applications to use antennas less than 4.5 meters for the C-band or 1.2 meters for the Ku-band on a case-by-case basis, our proposed rule would enable the staff to process those applications more rapidly.

16. While a power reduction by itself should be sufficient to prevent the non-routine earth station from causing interference to other satellite systems, it would not affect the potential for receiving interference from other satellite systems. Therefore, we tentatively conclude that non-routine earth station applicants taking advantage of this procedure should not be granted protection from interference from other satellite systems, unless they also obtain the affidavits discussed below. Because the power reduction should be sufficient to prevent unacceptable interference to 2° compliant satellite systems, we tentatively conclude that non-routine earth station applicants taking advantage of this procedure should be eligible for ALSAT earth station licenses for transmit-only operations, and transmit/receive operations where the earth station operator does not request any receive protection from adjacent satellite interference.²⁸

17. We believe that this proposed rule will benefit earth station applicants by reducing the uncertainty associated with licensing non-compliant earth station antennas having side lobe levels those of routinely licensed earth stations. Both the Commission staff and the earth station applicant benefit by

²⁷ EIRP is the product of the power supplied to the antenna and the antenna gain in a given direction relative to an isotropic antenna. 47 C.F.R. § 2.1.

²⁸ "ALSAT" means "all U.S.-licensed space stations." Originally, under an ALSAT earth station license, an earth station operator providing fixed-satellite service in the conventional C- and Ku-bands could access any U.S. satellite without additional Commission action, provided that those communications are in accordance with the same technical parameters and conditions established in the earth stations' licenses. *See DISCO II First Reconsideration Order*, 15 FCC Rcd at 7210-11 (para. 6). The *DISCO II First Reconsideration Order* expanded ALSAT earth station licenses to permitted access to any satellite on the Permitted List. *DISCO II First Reconsideration Order*, 15 FCC Rcd at 7215-16 (para. 19).

clearly stating the power restrictions imposed and the exhibits required in the FCC Form 312 application. Fewer incomplete earth station applications should be filed with the Commission, and we should have fewer returned or delayed applications. By clarifying Commission requirements, we hope to speed the review of these applications, and ultimately result in more rapid service to the public. In addition, the elimination of the burdens associated with the ASIA requirement in the alternative for this category of non-routine earth station applications will benefit earth station applicants, space station operators, and Commission staff.

18. Some parties may criticize this approach, believing that it might not allow some earth stations to operate at adequate power levels. We tend to disagree. While we are not proposing an explicit lower limit upon the size of earth station antennas, earth station applicants seeking authority to use a non-compliant antenna will have to reduce the earth station transmit power and power density to the extent necessary to compensate, decibel for decibel, for any shortfall in the antenna performance relative to the antenna standards of Section 25.209. We recognize that this power reduction inherently restricts the capacity of extremely small antennas. We believe this power level reduction method for extremely small antennas will likely be practical only for narrowband, relatively low data rate, digital services, and possibly systems employing spread spectrum techniques. These small antennas and low power levels, however, might be very practical for satellite-delivered Internet services.²⁹

19. We seek comment on our Section 25.220 proposals, particularly from satellite operators involved in adjacent satellite coordination, earth station operators proposing to access satellites with non-routine earth station antenna parameters, and frequency coordinators for those bands where earth stations and terrestrial wireless systems share spectrum. We note that we have not proposed streamlined procedures for all non-routine earth station antennas, but believe that our streamlining proposals will facilitate the examination of the majority of non-routine applications. We invite commenters to address these proposals and/or to propose methods for streamlining our processes for specific non-routine earth station antenna applications. In particular, we invite terrestrial wireless operators to comment, to the extent that they believe that these proposals to streamline the processing of earth station license applications in the Fixed-Satellite Service might affect their coordination and operations.

b. Affidavits

20. While an earth station operator with a non-routine antenna gain pattern can avoid causing interference to other satellite systems by reducing the earth station's power below routine levels, we do not propose limiting earth station operators to this approach. We believe that the earth station operator should be permitted to operate at higher than routine power levels if other satellite systems can and are willing to accommodate those higher power levels and the operations are properly coordinated with terrestrial systems in shared frequency bands.

21. We believe we can establish a streamlined process for licensing earth stations with antennas that do not conform to the off-axis requirements of Section 25.209(a)(1), and eliminate the burdens associated with the ASIA requirement, while still ensuring that communications with those antennas are coordinated with other operating satellites. In order to accomplish that goal, we propose a second procedure in Section 25.220.³⁰ In summary, earth station applicants will be able to expedite Commission staff review of their application by submitting information on the antennas they propose to use, and an

²⁹ Appendix A of this Notice discusses our calculations related to antenna diameter.

³⁰ We anticipate that this procedure would apply only to antennas that comply with all the applicable power level and other technical requirements in Part 25.

affidavit from the operator of each satellite with which it plans to communicate stating, among other things, that the satellite operator has coordinated the proposed earth station operations with affected satellite systems, and that the satellite operator will take the earth station into account when negotiating future coordination agreements. We would not limit this requirement to the satellite systems immediately neighboring the satellite with which the earth station applicant plans to communicate. Depending on the antenna gain pattern and uplink and downlink power levels, coordination could be required with operators of satellites as far as six degrees away.³¹ We believe that establishing a bright line rule would facilitate this affidavit process, and we believe that, in most cases, satellites located more than six degrees away will not be affected by non-routine earth station antennas. Therefore, we propose requiring a satellite operator completing an affidavit to coordinate with the operator of all other satellites located within six degrees of its satellite. The satellite operator would be permitted but not required to coordinate with the operators of satellites more than six degrees away before the earth station application is filed. This approach would enable earth station operators to begin operations and enter the market sooner than they would under our current procedure. This approach is also consistent with the approach we took with the Onsat application and other FSS applications.

22. We recognize that a non-routine antenna could affect a satellite more than six degrees away in some cases. For example, if the earth station operator's antenna gain pattern exceeds the envelop at eight degrees off-axis, or the satellite downlink power is significantly high, then it could affect a satellite located eight degrees away in the geosynchronous orbit or earth stations accessing that satellite. In such a case, if the operator of the satellite communicating with the earth station had not coordinated with the operator of the satellite eight degrees away, the operator of the satellite eight degrees away would have an opportunity to raise its concerns, pursuant to the procedure we propose in Section III.D. below.

23. Once the earth station applicant demonstrates that current and future adjacent satellite system operators will take the non-routine operations into account when negotiating coordination agreements, we will rely on this to conclude that the earth station will neither cause unacceptable interference to nor receive unacceptable interference from adjacent satellite systems. Accordingly, we propose extending protection from receiving interference to these earth stations while they operate over the particular satellites that have coordinated such operations. We do not propose issuing ALSAT earth station licenses to applicants taking advantage of the process we propose here. This is because affidavits from adjacent satellite operators in a particular segment of the geosynchronous arc by themselves do not support a conclusion that the non-routine earth station will not cause interference to or receive interference from satellite systems in other segments of the arc. This proposed process should expedite the case-by-case examination of earth station applications proposing to use antennas smaller than 4.5 meters for C-band and 1.2 meters for Ku-band. We invite comment on this tentative conclusion. We also invite comment on whether and to what extent these proposals might affect terrestrial wireless operations.

24. Alternatively, if an earth station applicant with a non-routine antenna is willing to reduce its power levels and obtains affidavits from adjacent satellite systems, we would consider granting it an ALSAT earth station license for transmit operations with conditions protecting it from receiving interference from adjacent satellite systems only where affidavits show receive protection is coordinated and agreed to. We also invite comment on this proposal from all interested parties.

3. Submission of Antenna Gain Patterns

³¹ Our experience with nonconforming earth stations operations demonstrates that, if coordination is completed with adjacent satellite operations plus or minus six degrees of the satellite that is accessed, the potential for unacceptable adjacent satellite interference is significantly reduced.

25. We currently require applicants seeking authority to use non-routine antennas to certify that certain specific radiation pattern tests have been performed, including co- and cross-polarization, at the bottom, middle, and top of each allocated frequency band, in both the vertical and horizontal planes, plus and minus nine degrees.³² We often must request copies of the antenna gain patterns for these test plots from the earth station applicant for non-conforming antennas in order for Commission staff to assess the potential for adjacent satellite interference.³³ These requests can be time-consuming, and so result in the delay of service to the public. Therefore, we propose requiring that earth station applicants submit a copy of these antenna gain patterns when they seek authority to use a non-routine antenna.

26. By directing the applicant to obtain these test plots from the manufacturer and submit them with its application, the Commission removes itself from the role of inefficient "middleman." In addition, because the earth station operator has an established relationship with its antenna manufacturer, this requirement should pose minimal additional burdens on earth station applicants. Furthermore, the satellite operators will require this information to understand the impact that the non-conforming antenna operations will have on adjacent satellite systems. Therefore, we expect this antenna gain pattern submission requirement to accelerate licensing of nonconforming antennas, thereby accelerating the provision of services to the public. In addition, we believe that this proposed filing requirement, together with the power reduction and affidavit proposals discussed above, will be less burdensome for earth station applicants than the current ASIA requirement. We invite comment on this proposal from all potentially affected parties, and we also invite other proposals to streamline this process.

4. Other Non-Routine Antenna Gain Pattern Issues

a. Station Keeping

27. We note that, as an antenna gets smaller, its mainbeam gets wider. As a result, there may be more occurrences of interference to or from adjacent geostationary satellite systems if those satellites drift away from their assigned orbital location. We do not anticipate that interference resulting from drifting satellites will be a serious concern in most cases, because Section 25.210(j)(1) establishes station-keeping requirements for satellites that preclude all but very minor drifting.³⁴ The Commission has authority to relax its station-keeping requirements in particular cases, however,³⁵ and some non-U.S.-licensed satellites may not have the same station-keeping capabilities as U.S.-licensed satellites. Therefore, we solicit comment on whether an increase in the number of authorized earth stations with antennas that do not conform to the off-axis requirements of Section 25.209(a)(1) would unreasonably increase the likelihood of unacceptable interference given the station keeping tolerances of current satellite systems.

b. Interleaved Satellites

28. In 1983, we determined that earth station antennas that comply with the Section 25.209(a)(1) antenna gain pattern envelope at and beyond 2° off-axis from boresight could successfully operate within a

³² 47 C.F.R. § 25.132(a).

³³ 47 C.F.R. § 25.132(b)(1).

³⁴ 47 C.F.R. § 25.210(j)(1) (space stations must be designed with the capability of being maintained in orbit within 0.05° of their assigned orbital longitude).

³⁵ 47 C.F.R. §§ 25.210(j)(2), (3).

uniform 2° spacing environment.³⁶ In other words, an earth station with a routine antenna gain pattern envelope at and beyond 2° off-axis communicating with a particular satellite will not cause unacceptable interference to adjacent satellites located at or beyond 2° away from the particular satellite, provided that both satellite systems comply with all the Commission's routine 2° spacing standards. As a result, there is no need for any other protection from mutual interference, such as, for example, requiring adjacent satellite systems to maintain geographic spatial isolation between the two networks (*i.e.*, precluding the satellites from operating with overlapping footprints).³⁷

29. Several U.S.-licensed satellites are closer than 2° away from their adjacent satellite systems, however.³⁸ Satellites licensed by other countries, in particular South American countries, have often been interleaved at 1° between U.S. satellites that are spaced 2° apart. This situation has given rise to an adjacent satellite spacing of approximately 1° between a U.S. satellite serving North America and a foreign-licensed satellite serving South America.³⁹ These satellite systems do not currently cause interference into each other, however, because the footprints of the U.S. and South American satellites do not overlap (*i.e.*, the satellites are not co-coverage).⁴⁰ However, if there is an increase in the number of earth stations with antennas that fail to meet our antenna gain pattern envelope less than 2° off-axis, the fact that the footprints of these satellites do not overlap may no longer be sufficient to prevent interference. This is illustrated by our discussion and antenna gain patterns in Appendix A.

³⁶ *Two Degree Spacing Order*, 54 Rad. Reg. 2d at 605-06 (para. 95). Operation of such small antennas, however, must also conform to our power and power density standards established in Sections 25.211 and 25.212. These very small antennas will most likely carry only narrowband traffic, as they may not provide an adequate noise margin for full transponder traffic.

³⁷ Other sources of isolation are frequency offset between carrier channels and cross-polarization. Satellite radio waves can be oriented, or "polarized," in several ways, including parallel to the equatorial plane of the earth, and perpendicular to the earth's equatorial plane. Under certain technical conditions, horizontally polarized transmissions will not interfere with vertically polarized transmissions while they are transmitted simultaneously. When both senses of polarization are transmitted simultaneously, the signals are "cross-polarized." The Commission's rules require satellites to be designed to transmit cross-polarized signals to promote spectrum efficiency. 47 C.F.R. § 25.210(i).

³⁸ INTELSAT satellites are generally spaced at least 2.5° away from non-INTELSAT satellites. However, the Commission recently granted INTELSAT waivers of several 2° spacing rules. *See* INTELSAT LLC, Memorandum Opinion, Order, and Authorization, FCC 00-287 (released Aug. 8, 2000) (*INTELSAT Order*).

³⁹ Several U.S. satellites located in the eastern part of the orbital arc (*i.e.*, east of approximately 105° W.L.), are adjacent to South American satellites located 1° or less away. Moreover, while U.S. satellites located in the western part of the geostationary orbital arc (*i.e.*, west of approximately 120° W.L.) are generally not currently interleaved with foreign satellites, they may become interleaved in the future as South American nations bring more satellites into operation.

⁴⁰ In other words, when the Administrations originally coordinated use of the geostationary arc over the Americas, South American satellites, namely, served only the Southern Hemisphere, while U.S. satellites served only the Northern Hemisphere. Geographic isolation is accomplished by isolating satellite antenna coverage areas or "footprints." The magnitude of satellite antenna pattern isolation depends upon where the service area for the other satellite network is located. For example, a satellite serving Argentina will provide more isolation to a satellite network serving the United States than will a satellite serving Venezuela because the satellite coverage areas are further separated from those of satellites serving the United States. Likewise, an earth station located in Kansas will have more isolation from a satellite serving South America than an earth station located in Puerto Rico based on earth station or space station antenna isolation. This arrangement permitted 1° spacing between the U.S. and non-U.S. satellites.

30. The 3.7-meter antenna proposed by Onsat exceeds the Commission's antenna gain pattern envelope between 1° and 2° off-axis.⁴¹ Our proposed affidavit process would allow other earth station operators to exceed the Commission's antenna gain pattern envelope between 1° and 2° off-axis. This would affect primarily operators of satellites that have been interleaved with satellites with non-overlapping footprints located between 1° and 2° away. Accordingly, we seek comment particularly from satellite network operators with existing coordination agreements on whether earth station antennas that do not comply with Section 25.209(a)(1) at 1° to 2° off-axis would adversely impact existing coordination agreements if the Commission adopts these proposed processing rules for non-routine antennas.

C. Non-Routine Power Levels

31. In addition to establishing requirements for antenna gain patterns, the Commission's 2° spacing rules establish power limits for different kinds of earth stations operating in the FSS.⁴² As we explained above, earth station applicants are not prohibited from seeking authority to operate at higher power levels, but the Commission reviews those applications on a case-by-case basis rather than processing them routinely. Section 25.134 requires earth station applicants seeking a VSAT license to submit an ASIA if they plan to operate at non-routine power levels.⁴³ Other power level rules do not explicitly set forth any procedure for demonstrating that a higher power level will not cause interference in a particular case. As a result, applicants requesting authority to operate at power levels higher than those specified in those rules often submit an ASIA. This analysis, as explained earlier, is very burdensome for earth station applicants because it requires a substantial amount of time to complete.

32. Accordingly, we seek comment on replacing the ASIA requirement for non-routine power levels with a self-certification process. Under this process, an earth station applicant would provide, as exhibits to its application, affidavits of its own and the operator of each satellite with which the non-routine earth station power and power density levels will be implemented. The earth station operator would be authorized to use the non-routine power and power density levels only over those satellites for which affidavits are provided (*i.e.*, we would not issue ALSAT earth station licenses⁴⁴ pursuant to this process). These affidavits shall include:

- A statement from the satellite operator acknowledging the proposed operation of the subject non-routine earth station with its satellite;
- A statement from the satellite operator that the operation of the non-routine earth station accessing its satellite(s) is consistent with any existing coordination agreement for its satellite(s);
- A statement from the satellite operator that the satellite operator will include the non-conforming earth station power and power densities in all future satellite network coordination for the specific satellite at the desired orbital location;

⁴¹ See Onsat Petition, Exhibit B.

⁴² 47 C.F.R. §§ 25.134 (VSAT networks), 25.211 (video transmissions), 25.212 (narrowband transmissions).

⁴³ See 47 C.F.R. §25.134(b).

⁴⁴ We explain above that an ALSAT earth station license authorizes the earth station to communicate with all U.S. licensed satellites and all non-U.S.-licensed satellites on the Permitted List.

- A statement from the earth station applicant certifying that the earth station operations will comply with all coordination agreements reached by the satellite operator(s), or the earth station operator will reduce its power to routine levels.

33. Our proposal will reduce regulatory and administrative burdens on the Commission and earth station applicants and create a more efficient application process. It will however, require greater cooperation between earth station and space station operators, and among space station operators. We invite comment on our proposal. We also invite comment on the effects this proposal might have, if any, on terrestrial wireless operations.

D. Satellite Coordination Negotiations to Reflect Non-Routine Antennas and Power Levels

34. Satellite operators must maintain a cooperative working relationship with each other to help resolve coordination issues that come up from time to time. Therefore, we expect that, in most cases, satellite operators will be able to coordinate with operators of other affected satellites to accommodate an earth station's non-conforming operations fairly easily, and we do not expect this affidavit process to be very burdensome for earth station operators or space station operators. To facilitate this coordination process further, however, we propose establishing a procedure to expedite the affidavit process. Specifically, we propose describing the non-conforming earth station operations in enough detail in public notices so that all satellite operators can determine for themselves immediately whether they are potentially affected by the proposed non-conforming earth station operations. In addition, we propose establishing a time schedule to ensure that the satellite operators address these coordination issues in a timely fashion. We explain this procedure in more detail below.

35. First, we propose retaining two elements of our current procedure. We propose continuing to place non-routine applications on Public Notice with frequency bands, antenna diameters, power and power density information describing each antenna, and the satellite or satellites intended to be used. The public will also continue to have 30 days to comment, and to notify the Commission of any potential interference from the proposed earth station or, in the case of VSAT applications, network of stations. In addition to those current requirements, our new proposed procedure would establish a deadline of 60 days from the date comments are due for satellite operators to notify the Commission staff that they have resolved all outstanding coordination issues that may be identified in the 30-day comment period. As noted above, coordination issues could be raised with respect to any potentially affected satellite, even if the satellite it is located more than six degrees away, depending on the antenna gain pattern and power level. After the 60-day deadline, the Commission will act upon the earth station to communicate at its requested higher power levels with all satellites for which it has submitted affidavits, and for which there are no unresolved objections to the application.⁴⁵

36. We seek comment on this approach, particularly from satellite operators and any other operators, including terrestrial operators. We believe that this approach will support our goals to have satellite services delivered to consumers more quickly by decreasing delays in processing earth station applications. Specifically, the Commission will not need to delay action on a license application merely because the space station operator has not completed coordination agreements with all potentially affected adjacent satellite system operators.

E. Public Notice Language

⁴⁵ This ten-day deadline assumes that there are no other defects in the application that warrant denial or dismissal of the application.

37. If the benefits of streamlined processing are to be fully realized -- getting satellite communications services to the public faster -- we must place earth station applications on the required 30-day public notice as quickly as possible. To facilitate that process, we invite comment on whether we should require applicants to submit the language that will appear in the public notice with their applications.

38. We believe that this requirement to provide specific language for the public notice will strike a reasonable balance between minimizing the small increase in filing burden for applicants with other interested parties' need to make an adequately informed decision regarding whether to file a petition to deny an application. Specifically, we propose to require applicants to provide the following minimum set of information for the public notice.

- A detailed description of the service to be provided, including frequency bands and satellites to be used.
- The diameter of the antenna.
- Proposed power and power density levels.
- Identification of any random access technique, such as the Aloha multiple access technique, if applicable, listed in our proposed revisions to Section 25.134(a) of the Commission's rules.⁴⁶
- Identification of any rule or rules for which a waiver is requested.

Since our proposals will require greater attention to public notices by satellite operators and fixed wireless operators in order to assess the impact of non-conforming operations, we specifically seek guidance from commenters on the most relevant and minimum amount of information we should require in our public notices.

IV. RELAXATION OF CURRENT REQUIREMENTS

A. Relaxation of Earth Station Power and Power Density Limits

39. We seek comment on increasing the power level limits contained in Sections 25.134, 25.211, and 25.212.⁴⁷ Since the 1980s, the Commission has dramatically decreased its earth station antenna diameter requirements to reflect technical advances. They were initially 9 meters and later reduced to 4.5 meters for operations in the C-band.⁴⁸ In the Ku-band, antennas had to be 5 meters in diameter, but were later reduced to 1.2 meters.⁴⁹ The power spectral density requirements from the earth station, however, have remained unchanged. The current power limits and the Orders in which we adopted those limits are summarized in Appendix F.

40. Today's technology allows smaller diameter antennas to meet the side lobe requirements of our antenna performance rules in Section 25.209, which previously required the larger antennas.

⁴⁶ See Appendix B. Random access techniques are used primarily in VSAT systems. We discuss them in more detail in Section V.B. and Appendix E of this Notice.

⁴⁷ 47 C.F.R. §§ 25.134, 25.211, 25.212.

⁴⁸ See *1987 VSAT Order*, 2 FCC Rcd at 2149 (para. 2).

⁴⁹ See *1987 VSAT Order*, 2 FCC Rcd at 2150 (para. 8).

Decreasing antenna size decreases mainbeam antenna gain. Therefore, more input power into the antenna may be required to achieve the same output EIRP to complete the satellite communication link. Accordingly, we invite interested parties to propose higher power limits in Part 25 to reflect technological advances and smaller antenna requirements. Commenters should provide an analysis to demonstrate that the proposed levels are adequate to protect existing and future users from receiving and causing harmful interference to or from adjacent satellite networks, especially as smaller and smaller diameter antennas are being deployed. In addition, commenters should show that their recommended power levels would be consistent with radiofrequency emission exposure limits in Part 1, Subpart I of the Commission's rules. Accordingly, we solicit comment on this proposal from all potentially affected parties, including terrestrial wireless operators.

41. We also seek comment on the terms “narrowband” and “wideband.” Currently, we use these terms in our rules to categorize applications such as analog voice and digital video. In particular, Section 25.212 establishes power limits for narrowband transmissions in the Fixed-Satellite Service. We invite comment on whether the use of these terms is still appropriate and, if so, whether or how these terms should be defined or clarified.

B. Temporary Fixed Earth Stations

42. We invite comment on establishing a procedure to enable operators of temporary fixed earth stations in the Ku-band to begin operation immediately upon placement of the application on public notice. We propose that this procedure to be limited to applications filed electronically. We further propose to limit this procedure to "routine" temporary fixed earth stations operating in the conventional Ku-band. Finally, we expect to limit the points of communication for temporary fixed earth stations to U.S.-licensed satellites and non-U.S.-licensed satellites on the “Permitted List.” Parties are invited to comment on this proposal. Section 309(b)(2) of the Communications Act lists several types of licenses for which the Commission must allow at least 30 days for comment.⁵⁰ The narrow class of temporary fixed earth station is not included on this list. Therefore, we tentatively conclude that we have legal authority to adopt this proposal, provided that there is adequate support for it in the record developed in this proceeding. We seek comment on this tentative conclusion.

43. Parties supporting this approach may also propose applying this procedure or similar procedures to other types of earth stations. If we were to extend this procedure to temporary fixed earth stations in shared bands, however, we would retain the existing coordination requirements for those bands. Currently, operators of temporary fixed earth stations in the C-band, for example, must coordinate any operations prior to initiating service.⁵¹ Furthermore, applicants that have completed coordination prior to submitting applications are permitted to include the coordination reports in their applications. Accordingly, we do not contemplate revising the coordination requirements at this time for this frequency band for temporary fixed earth stations. Rather, we invite comment only on expediting the process for temporary fixed earth stations in shared bands.

C. License Term

44. Section 25.121 currently states that earth station license terms may be at most 10 years.⁵² We invite comment on revising Section 25.121 to permit longer license terms for earth station licenses. We

⁵⁰ 47 U.S.C. § 309(b)(2).

⁵¹ 47 C.F.R. § 25.277(c), (d), (e).

⁵² 47 C.F.R. § 25.121.

propose extending the license term for all earth stations to 15 years. In the *2 GHz Report and Order*, we observed that the Telecommunications Act of 1996 granted the Commission authority to establish longer license terms for particular classes of satellites, and established 15-year terms for earth stations operating in the 2 GHz band.⁵³ Accordingly, we seek comment on establishing a 15-year term for all earth station licenses.

45. We also solicit comment on extending the term for receive-only earth station registrations from 10 years to 15 years. We note, however, that most receive-only earth stations are residential users. It is not clear how many registrants currently use their earth stations for the full ten-year term. Allowing unused receive-only earth stations to remain registered for an additional five years may make it more difficult to for other spectrum users to coordinate their operations, particularly in bands that are shared with terrestrial operations. Therefore, we solicit comment, particularly from terrestrial wireless operators, on whether to extend the terms of receive-only earth station registrations, either in all frequency bands or in bands that are shared with terrestrial operations.

D. Construction Completion Requirement for Satellite Mobile Earth Stations

46. Currently, Section 25.133(a) of the Commission's rules requires each earth station licensee to complete construction of its earth station within one year of the date the license is granted.⁵⁴ In cases where we have authorized multiple satellite mobile earth station terminals (METs), it is not clear that any policy goal is served by requiring the licensee to construct all the METs authorized within a year of the grant of the license, provided that a reasonable number of METs have been constructed and the licensee has started to offer service within a year.⁵⁵ Accordingly, we propose revising Section 25.133(a) to require MET licensees only to bring their networks of earth stations into operation within a year. We also propose revising Section 25.133(b) to require MET licensees to certify that they have brought their networks of earth stations into operation within a year of receiving their licenses. If a MET licensee has not brought all the earth stations permitted by its license into operation at the time of renewal, we would renew its license only for those earth stations that have been brought into operation. We currently have a similar requirement for VSAT networks.⁵⁶ We seek comment on this approach.

47. Interested parties are also invited to discuss whether there is any need to review the number of terminals brought into operation at various points in the license term. For example, should MET licensees be required to file periodic reports stating the number of terminals in use? Should MET licensees be required to bring a certain percentage of their authorized terminals into use within a certain time after they receive their licenses? If so, what percentage would be reasonable, and what time period would be appropriate?

⁵³ The Establishment of Policies and Service Rules for the Mobile Satellite Service in the 2 GHz Band, Report and Order, IB Docket No. 99-81, FCC 00-302 (released Aug. 25, 2000) at para. 101 n.359, *citing* Telecommunications Act of 1996, Pub. L. No. 104-104, Title II, § 203, 110 Stat. 56, 112 (1996) (amending Section 307 of the Communications Act to eliminate ten-year term and creating new Section 307(c)(1) granting the Commission authority to determine licenses for particular classes of stations, including satellite space and earth stations).

⁵⁴ 47 C.F.R. § 25.133(a).

⁵⁵ Originally, the Commission required VSAT operators to construct their networks within four years, but later eliminated that requirement in the *1996 Streamlining Order*, 11 FCC Rcd at 21592 (para. 26).

⁵⁶ 47 C.F.R. § 25.134(d).

E. Part 23

48. We also request that interested parties propose revision or elimination of any provision in Part 23, governing International Fixed Public Radiocommunication Services (IFPRS). These services are defined simply as a publicly available fixed service between the United States and foreign points.⁵⁷ The Commission has not adopted any extensive revisions to its Part 23 rules since 1973.⁵⁸ In addition, there are currently only three IFPRS licensees.⁵⁹ Because of the few licensees that remain subject to Part 23 rules, and the time that has passed since we have reviewed these rules, it seems likely that some of these requirements can be streamlined or eliminated.

49. We have not developed specific proposals for revising Part 23 as we have Part 25. We see no reason at this time to limit attention to any particular provisions in Part 23. Rather, we invite interested parties to examine Part 23 in its entirety, without any restrictions on their examinations. We will consider proposals to revise or eliminate any Part 23 requirement, provided that the commenter explains why those rules are no longer necessary in the public interest.

V. VSAT LICENSING ISSUES

A. Background

50. The Commission's rules permit parties to obtain a license for a large number of technically identical small aperture antenna earth stations. These networks are referred to as very small aperture antenna terminal (VSAT) networks. VSAT networks are currently permitted only in the Ku-band, and are comprised of a hub station transmitting to transponders on a satellite and then down to multiple technically identical remote small aperture antennas.⁶⁰

B. Establishment of Power Limits for VSAT Networks Using Random Access Techniques

51. VSAT networks employ different techniques to prevent or limit the transmissions to and from the multiple remote earth stations from interfering with each other, and to prevent them from interfering with other adjacent satellite networks. The original VSAT systems used a Single Channel Per Carrier (SCPC) channelization approach, in which each remote earth station was assigned its own block of spectrum. Subsequently, VSAT system operators developed techniques that enabled some remote earth stations to share frequency bands. One sharing technique is known as time division multiple access (TDMA). Using this technique, each remote earth station is assigned a different time to transmit and receive information. Another technique is, frequency division multiple access (FDMA). The FDMA technique assigns different frequency bands to different remote earth stations. A third approach, code division multiple access (CDMA), prevents interference between remote earth stations by assigning a

⁵⁷ 47 C.F.R. § 23.1.

⁵⁸ Amendment of Part 23 of the Commission's Rules and Regulations, International Fixed Public Radiocommunications Services, Report and Order, Docket No. 19073, FCC 73-859, 28 Rad. Reg. 2d 313 (released Aug. 15, 1973).

⁵⁹ Our records show that the only IFPRS providers still in operation are AT&T of the Virgin Islands, Inc., Broadcast Media Satellite, Inc.; and Interisland Telephone Corporation.

⁶⁰ Routine Licensing of Large Networks of Small Antenna Earth Stations Operating in the 12/14 GHz Frequency Bands, 51 Fed. Reg. 15067 (Apr. 22, 1986) (*1986 VSAT Order*). See also 47 C.F.R. §25.134(a).

different digital code to different earth stations. We discuss each of these methods in more detail in Appendix E to this Notice.

52. On April 5, 2000, Spacenet, Inc. (Spacenet) filed a petition for declaratory ruling or rulemaking, requesting a ruling that random access schemes such as its Aloha access technique, explained further below, in which "collisions" of transmissions from two or more earth stations are statistically infrequent, do not violate Section 25.134's prohibition merely because the power levels produced by such "collisions" exceed the power levels specified for tens of milliseconds.⁶¹

53. As an alternative to a declaratory ruling, Spacenet sought the initiation of a rulemaking to amend Section 25.134 to state that Aloha-type multiple access systems are permissible as long as the probability of one or more collisions is less than an amount specified by a statistical equation.⁶² In summary, the probability of a transmission collision can be derived from the traffic load or average transmissions per time period, and the utilization or throughput per time period.⁶³ Therefore, a VSAT operator can limit the number of transmission collisions by adjusting the average transmissions per time period, and the information throughput per time period.

54. We decide not to solicit comment on the statistical equation that Spacenet recommended for our rules. Although Spacenet claims that its proposed equation could be applied to a variety of multiple access techniques to limit transmission collisions,⁶⁴ we believe that a more general and simplified approach will better facilitate the licensing of earth stations that use these techniques. In response to Spacenet's petition, Hughes Network Systems (Hughes) suggested an alternative rule revision. Hughes asserted that it would be better to develop a rule requiring that the total average power radiated toward the target satellite by all the remote earth stations in the network, using an averaging period of one second, is less than that of a single remote earth station transmitting continuously.⁶⁵ We also decide not to seek further comment on Hughes's revision, because it would not adequately address cases where the bandwidth used for an earth station causing interference is wider than the bandwidth used by an earth station impacted by the

⁶¹ See Spacenet Petition at 5-7. The Bureau recently denied Spacenet's petition for declaratory ruling because Sections 25.134(a) and (b) specify maximum input power density limits for each earth station in a VSAT network. 47 C.F.R. § 25.134(a), (b). When signals from two or more earth stations collide, the resulting power level exceeds the limits specified in Sections 25.134(a) and (b), and so the Aloha method, and variants such as slotted Aloha, cannot be construed to comply with the letter of Section 25.134 if each terminal transmits at the maximum power density limit. The Bureau, however, concluded that Spacenet adequately showed that its slotted Aloha method may not cause unacceptable interference to other satellite systems. Accordingly, the Bureau granted Spacenet and other VSAT operators that employ various multiple access techniques a waiver of Section 25.134 for purposes of continuing to use existing multiple access methods while this rulemaking is pending. Petition of Spacenet, Inc. for a Declaratory Ruling that Section 25.134 of the Commission's Rules Permits VSAT Remote Stations in the Fixed Satellite Service to Use Network Access Schemes that Allow Statistically Infrequent Overlapping Transmissions of Short Duration, or, in the Alternative, For Rulemaking to Amend that Section, RM-9864, Order, DA 00-2664 (Int'l Bur., released Dec. 7, 2000) (*Spacenet Order*), at para. 5.

⁶² The rule recommended by Spacenet would require the probability P of k stations transmitting, for k greater than 1, to be below the limit defined $P[k] = (0.38^k/k!) * e^{-(0.38)}$. Spacenet Petition at 9. Hughes also recommended addressing issues raised by the Aloha multiple access technique. Hughes Comments in Response to 2000 Biennial Review Staff Report at 4.

⁶³ Spacenet Petition at 7.

⁶⁴ Spacenet Petition at 6 n.7.

⁶⁵ Hughes Comments at 4-5.

interference.⁶⁶ In response to Spacenet's petition for declaratory ruling, ALOHA Networks, Inc. claimed that Spacenet erred by basing its calculations on a "Poisson" probability function rather than a binomial probability function. The Bureau did not reach this issue in its Order.⁶⁷ Because we do not base our proposed rule revision directly on Spacenet's probability calculations, we need not determine at this time whether a Poisson or binomial distribution is preferable for the Aloha technique. For reasons explained in Appendix E, however, we find that use of the Poisson distribution is reasonable.

55. Instead of seeking comment on Spacenet's or Hughes's proposals, we invite comment on a slightly different proposal. We propose revising Sections 25.134(a) and 25.212(d) to include the following language: "The maximum transmitter power spectral density of a digital modulated carrier into any GSO FSS earth station antenna shall not exceed $-14.0 - 10\log(N)$ dB(W/4 kHz)." Section 25.134(a) would also specify different values of "N" for systems using FDMA, TDMA, CDMA, or Aloha multiple access techniques. This proposal is substantially similar to the rules we adopted for blanket licensing in the Ka-band in the *18 GHz Order*.⁶⁸ We explain how we derived this equation, and our proposals for the "N" values for each multiple access technique, in Appendix E.

56. We observe that our proposal would require Aloha earth stations to reduce the power spectral density emitted by as much as 3 dB from the existing limits specified in Section 25.134(a).⁶⁹ We tentatively find that this reduction in power would minimize the interference to adjacent satellite networks to an acceptable level during the collision period of a typical Aloha operation and, at the same time, would provide a technically viable service. In the conservative case of protecting adjacent satellite networks from unacceptable interference beyond the present limits, the reduction in the power spectral density level should be at least 5 to 6 dB to accommodate the low probability that more than two earth stations' transmissions will collide. (Five to six dB represents a collision of 3 to 4 simultaneous transmissions in a typical Aloha network.)⁷⁰ A 5 to 6 dB reduction in earth station power density, however, may not be practicable to provide a viable service for users situated in high rain regions such as the lower East Coast and the Gulf States. In high rain regions, a reduction of 5 to 6 dB in a VSAT satellite link budget could reduce the availability of the service to an unacceptable level, in particular for Internet service.

57. We further observe that, until recently, we permitted VSAT networks only in the Ku-band. We are considering expanding our VSAT rules to the C-band in the *FWCC/Onsat NPRM*. Here, we tentatively conclude that we should extend the multiple access rules to C-band VSAT networks, called CSAT networks in the *FWCC/Onsat NPRM*, in the event that we adopt such rules in this instant proceeding. We further invite comment from all interested parties on whether the proposed rules would need any revision to become applicable to CSAT systems, and if so, the type of revisions that would be

⁶⁶ *Spacenet Order* at para. 10.

⁶⁷ *Spacenet Order* at para. 13-14.

⁶⁸ See 47 C.F.R. §25.138(a), *adopted in* 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, Report and Order, IB Docket No. 98-172, FCC 00-212 (released June 22, 2000) (*18 GHz Order*) (*petition for review pending*).

⁶⁹ See Appendix E.

⁷⁰ See *Spacenet Order* at App. A.

appropriate.⁷¹ Finally, we invite comment on revising the Ka-band blanket license rules to incorporate requirements for the Aloha access technique.

C. Multiple Hub Stations

58. The Commission’s staff has received a number of informal inquiries concerning the installation and operation of more than one hub station under a single VSAT network blanket license. One use of a second hub station could be as a backup to the primary hub station. In this configuration, the secondary hub station would only be used intermittently. In a second configuration, used to provide Internet service, multiple hub stations would be used for the distribution of network traffic to various traffic switching and control centers. In this configuration, numerous hub stations would be located in several cities throughout the United States and would all be in simultaneous operation. The total network traffic load to and from the VSAT remote units would be balanced across all of these hub stations.

59. Given all these beneficial uses for multiple-hub VSAT networks, we have always considered applications for licenses for such networks. Accordingly, we propose revising Section 25.134 to permit multiple hub stations under a single VSAT network license. Given our experience with multiple hub station systems, we believe that it is appropriate to expand the scope of our licensing provisions. We seek comment on this proposal.

D. Temporary Fixed VSAT Stations

60. Some confusion exists concerning whether temporary fixed earth stations can be licensed under a VSAT network blanket license. We tentatively conclude that there is no technical reason to prohibit such licensing of temporary fixed facilities either as a hub or as a remote unit in the conventional Ku-band, which is not shared with terrestrial services. Accordingly, we invite comment on revising Section 25.277 to clarify the conditions under which we should consider licensing a temporary fixed VSAT network.

61. First, we tentatively conclude that we should grant temporary-fixed VSAT applications only in the conventional Ku-band at this time. The conventional Ku-band does not raise the same potentially complex coordination issues as operations in the C-band. In addition, we do not yet allow VSATs of any kind in the C-band. We have proposed, however, licensing C-band VSAT networks in the *FWCC/Onsat NPRM*.⁷² Second, we propose requiring applicants to specify in their applications that they are seeking authority to use a temporary fixed earth station as part of a VSAT network.⁷³ Finally, we invite comment on extending the requirements for VSAT hubs currently in our rules, such as the Section 25.134 hub EIRP limit of 78.3 dBW,⁷⁴ to temporary fixed VSAT hubs.

⁷¹ In the *FWCC/Onsat NPRM*, we sought comment on revisions to Section 25.134 separate from the revisions we propose here. It is confusing to try to include the proposed revisions in the *FWCC/Onsat NPRM* in our proposed rules in this proceeding. Accordingly, in Appendix B to this Notice, we state our rule revisions we propose in this proceeding as revisions to the current Section 25.134.

⁷² *FWCC/Onsat NPRM* at paras. 84-96.

⁷³ For example, a VSAT network consisting of one fixed hub station, one temporary fixed hub station, one 1.2 meter fixed remote variant, and one 1.2 meter temporary fixed remote variant should be reported as four separate sites on Schedule B of Form 312. Even if the same make and model of antenna and transmitter equipment are used in fixed and temporary fixed variants within the VSAT network, each variant should be reported as a separate site.

⁷⁴ See 47 C.F.R. § 25.134(a), (b).

62. We also invite comment on our decision not to adopt rules for temporary fixed VSAT earth stations in the C-band at this time. Parties advocating rules for such VSAT stations should propose specific rule revisions, and should explain exactly how operators can be expected not to cause harmful interference to services sharing the frequency bands. Should there be a specific procedure to follow similar to the one suggested in the *FWCC/Onsat NPRM*?⁷⁵

E. Non-US Licensed Satellites and International VSAT Networks

63. Section 25.115(c) limits the service provided by the Ku-band VSAT network communicating with U.S.-licensed or non-U.S.-licensed satellites to domestic service.⁷⁶ Subsequently, in the *DISCO I Order*, we adopted a policy to permit all U.S.-licensed fixed satellite systems to offer both domestic and international services.⁷⁷ In the *DISCO II Order*, we further amended our policy to allow non U.S.-licensed satellites to provide domestic and international services in the United States.⁷⁸

64. We, therefore, propose revising Section 25.115(c) to allow applicants to apply for a license for Ku-band VSAT networks for both domestic and international services to access both U.S.-licensed and non-U.S.-licensed satellites. This would make the Ku-band VSAT rules consistent with the policy established in *DISCO I* and *DISCO II*. We also propose applying the power limitation and licensing procedure for VSAT networks set forth in Section 25.134 to VSAT network applications for international service to and from the United States. Finally, we propose issuing licenses only for those VSAT facilities located in the United States.⁷⁹ VSAT network facilities in other nations would be required to comply with the licensing requirements, if any, of the nations where they are located. We invite comment on these proposals.

F. VSAT Licenses for Organizations with Multiple Members

65. We seek comment on the feasibility of providing VSAT-style blanket licensing of other earth station networks. For example, would it be feasible to license systems such as the Alaska Bush⁸⁰ network, or the National Public Radio (NPR)⁸¹ network under a blanket license? Both of these networks operate in

⁷⁵ *FWCC/Onsat NPRM* at para. 66.

⁷⁶ 47 C.F.R. § 25.115(c).

⁷⁷ Amendment to the Commission's Regulatory Policies Governing Domestic Fixed Satellites and Separate International Satellite Systems, Report and Order, IB Docket No. 95-41, 11 FCC Rcd 2429 (1996) (*DISCO I*). International service is service to or from points in the United States to or from points outside of the United States.

⁷⁸ Amendment of the Commission's Regulatory Policies to Allow Non-U.S. Licensed Satellites Providing Domestic and International Service in the United States, Report and Order, IB Docket No. 96-111, 12 FCC Rcd 24094 (1997) (*DISCO II*).

⁷⁹ We use the definition of "United States" in Section 3(51) of the Communications Act, 47 U.S.C. § 153(51), which includes U.S. territories.

⁸⁰ The Alaska Bush network is a large network of technically similar earth stations that provide digital telephony to many remote villages in Alaska.

⁸¹ The National Public Radio (NPR) network is a large network of technically similar earth stations that provide for the collection and distribution of broadcast quality analog audio programming. The individual earth

the C-band with each earth station being individually licensed. Both of these networks were also licensed long before the advent of our VSAT licensing policies. If similar networks were installed today, they could be licensed under a single blanket license, either as a VSAT or CSAT⁸² network. In bands shared with terrestrial services such as the conventional C-band, we could implement the notification procedure proposed in the *FWCC/Onsat NPRM*.⁸³ We also note that we recently adopted blanket-licensing rules for the Ka-band.⁸⁴

66. From a technical standpoint, we do not see any difficulties with this approach. It appears that such networks could be operated exactly the same as other VSAT networks in operation today or proposed in the *FWCC/Onsat NPRM*. From a regulatory or legal standpoint, however, this approach would be feasible only if we could place responsibility for complying with Commission rules on the umbrella organization holding the blanket license rather than individual members of the organization. With respect to these legal issues, we note that we have recently adopted similar rules for Guard Band Managers, who were licensed to lease spectrum in the 700 MHz band to terrestrial wireless operators.⁸⁵ We seek general comment, therefore, on the feasibility of this approach from all potentially affected parties.

VI. EARTH STATION FILING FORMS

A. Streamlined Earth Station Filing Form

67. Before 1996, the Commission used several different forms, designed for several different kinds of earth station and space station authorizations. In the *1996 Streamlining Order*, the Commission replaced most of those forms with a single form, known as Form 312.⁸⁶

68. We propose adopting a new, streamlined version of our Form 312, attached as Appendix D to this Notice, that would enable applicants to complete routine earth station applications⁸⁷ more easily than the current Form 312. We would retain the current Form 312 for non-routine earth station applications and all space station applications. Recently, the International Bureau (Bureau) released a public notice announcing the adoption of an "auto-grant" procedure for certain routine C-band and Ku-band earth station applications.⁸⁸ In that public notice, the Bureau explained that, based on its experience with C-band and

stations operating in the network are licensed to the various radio stations and universities that comprise the NPR network.

⁸² Onsat requested authority to license a VSAT network to operate in the C-band. In the *FWCC/Onsat NPRM*, we called such networks "CSAT" networks to distinguish them from existing VSAT operations in the Ku-band. *FWCC/Onsat NPRM* at para. 13.

⁸³ *FWCC/Onsat NPRM* at para. 66.

⁸⁴ See 47 C.F.R. § 25.138; *18 GHz Order* at paras. 87-88.

⁸⁵ Service Rules for the 746-764 and 776-794 MHz Bands, and Revisions to Part 27 of the Commission's Rules, Second Report and Order, WT Docket No. 99-168, 15 FCC Rcd 5299 (2000).

⁸⁶ *1996 Streamlining Order*, 11 FCC Rcd at 21598 (para. 40).

⁸⁷ By "routine," we mean consistent with all the 2° spacing standards in Part 25. We discussed "routine" earth stations in more detail in Section III.A. above.

⁸⁸ Commission Launches Earth Station Streamlining Initiative, Public Notice, DA 99-1259 (released June 25, 1999) (*Ku-Band Auto-grant Public Notice*); Commission Launches C-Band Earth Station Streamlining Initiative, Public Notice, DA 00-2761 (released Dec. 7, 2000) (*C-Band Auto-grant Public Notice*).

Ku-band operations over the past 20 years, earth stations operating in those bands will not cause harmful interference to other authorized terrestrial and satellite systems if those earth stations meet certain criteria. The criteria include: (i) operating only in the C-band and Ku-band, (ii) operating within the power limits specified in the Commission's rules, and (iii) using antennas that comply with Section 25.209 of the Commission's rules.⁸⁹ Pursuant to the "auto-grant" policy, earth station applications meeting these criteria are granted automatically after the comment period, assuming that no oppositions have been filed.⁹⁰

69. If the applicant could answer "yes" to all the questions on the first two pages of the proposed new Form 312, it would be eligible for the auto-grant process. All of the earth station technical information needed for the auto-grant process is requested on the third and fourth page of the form. The proposed new Form 312 is only four pages long. This new form is much shorter than the current ten-page form, including Schedules A and B. The streamlined Form 312 should substantially reduce the amount of time required for applicants to complete and should expedite the process of determining whether an application qualifies for the auto-grant process. We envision the new form to be an optional, easier form available for the convenience of routine earth station license applicants. The current Form 312 would still be available for non-routine earth station license applications. We invite comment on whether we should continue to accept the current FCC Form 312 for routine earth station applications, or whether the current Form 312 should be phased out for routine earth station applications after a particular date.

70. We invite comment on whether we should adopt a streamlined Form 312 for routine earth stations eligible for the auto-grant process. We propose to implement this short form application process for routine earth stations operating in the conventional C- and Ku-band frequencies in an effort to further streamline our auto-grant processes.⁹¹ We also invite comment on the particular form proposed in Appendix D. We seek comment on whether there are any questions that we can eliminate or add on the first two pages. We also seek comment on whether there are any technical information requirements we should add or remove on page two of the new Form 312. We note that if we do not collect the technical information in the current Form 312, it may require commercial frequency coordinators to collect more information as part of private coordinations. We tentatively conclude that having private coordinators collect more information will make coordination easier and more efficient by enabling private coordinators to collect the information directly from the applicants, eliminating the intermediate step of filing that information with the Commission. We seek comment on this tentative conclusion. We further invite commenters to estimate the reduction in burden that will result if we adopt a streamlined Form 312. Finally, we invite comment on allowing applicants to request licenses to use bands other than the conventional C- and Ku-band frequencies, such as the Ka-band.⁹²

B. Renaming Form 701 and Form 405

71. Currently, the Commission accepts several forms that relate to satellite network authorizations. These include FCC Form 701 (Application for Additional Time to Construct), FCC Form 405 (Application for Renewal of Radio Station License in Specified Services) and FCC Form 312 (Authorization of New

⁸⁹ 47 C.F.R. §§ 25.134, 211, 212 (power level rules), 47 C.F.R. § 25.209 (antenna rules); *Ku-Band Auto-grant Public Notice*; *C-Band Auto-grant Public Notice*.

⁹⁰ *Ku-Band Auto-grant Public Notice*; *C-Band Auto-grant Public Notice*.

⁹¹ *Ku-Band Auto-grant Public Notice*; *C-Band Auto-grant Public Notice*.

⁹² For purposes of this Notice, the Ka-band is 19.7-20.2 GHz and 27.5-30.0 GHz.

Stations). We propose renaming these forms to make clear that they relate to satellite authorizations. Specifically, we propose to rename FCC Form 701 as Form 312-M, to signify milestone extension requests, and to rename FCC Form 405 as Form 312-R, to signify renewal requests. We do not propose eliminating Forms 405 and 701 because they are not used exclusively for earth station applications. Rather, we propose creating forms identical to Forms 405 and 701 except for their names. We believe that this proposal will reduce current regulatory and administrative burdens by clarifying the form needed for different earth station requests.

C. Form 312, Schedule S, Space Station Technical Data Form

72. FCC Form 312 is the filing form used for filing both space and earth station applications. With earth station applications, both administrative and technical data that is then entered into the IBFS computerized licensing database. The information in IBFS provides Commission staff and the public with substantial query and reporting capability. Queries and reports can be generated based on parameters such as earth station location, antenna size, and power level, to name a few. We do not presently have the same capability with respect to space station applications.

73. Space station applications are often voluminous collections of text, tables, and graphics related to legal, financial, and technical aspects of the satellite system. Only the Main Form of Form 312 is used with respect to space station applications to capture a limited amount of administrative data for our licensing database. The Main Form is used for earth station applications, but, in addition, Form 312, Schedule B, is used to collect technical data for earth station applications. Substantially complete FCC Form 312 applications are an important factor in the ability to file earth station applications in electronic form. We do not currently have a schedule for space station applications, however, that enables the Commission to collect any technical data from space station applicants in a uniform format that would facilitate developing a database like we have for earth station applications.

74. With the rapid growth of the satellite industry, we are now receiving approximately 125 to 175 space station applications each year.⁹³ Without computerized tracking of proposed and licensed space station technical parameters, we cannot quickly respond to basic queries concerning the spectrum usage and coverage of particular U.S.-licensed satellites.

75. Accordingly, we propose to adopt a new space station technical data form for Form 312, Schedule S. Schedule S is comparable to the earth station Schedule B, but requests much of the information required in space station applications by Section 25.114. Schedule S organizes many of the existing data requirements into a standard format that can be captured in our licensing database. It will also assist in the process toward complete electronic filing for the satellite industry. Space station applicants would continue to provide the remaining information required by Section 25.114 in narrative form because it seems easier for space station applicants to allow flexibility in provision of that information. Our proposed Schedule S appears as Appendix C to this *Notice*. We invite comment on our proposed Schedule S. In particular, we seek comment on whether any of the information in Schedule S should continue to be provided in narrative form, or whether any other information requirements in Section 25.114 should be included in Schedule S. Finally, in the event we adopt Schedule S in some form, we propose revising Section 25.114 accordingly.⁹⁴

⁹³ We receive about 175 space station applications in years with processing rounds, and about 125 in other years.

⁹⁴ Because Schedule S may be revised before it is adopted, we do not set forth specific proposals for revising Section 25.114 in Appendix B.

D. Electronic Filing

1. Mandatory Electronic Filing for Routine Earth Station License Applications

76. We propose accepting only electronically filed applications for routine C-band, and routine Ku-band applications (*i.e.*, those applications that are processed by the C-band and Ku-band auto-grant process) after June 1, 2002. If these applications were filed electronically, their processing could become totally automated, eliminating delays associated with manual processing. We also propose to require electronic filing of applications for assignments and transfers. Such applications would be requested by the registrant via an Internet request form and automatically printed. Our experience has shown that electronically filed applications are processed in about half the time of paper applications. This approach will be less burdensome on Commission staff and result in services to consumers being delivered more quickly.

2. Electronically Filed Petitions to Deny or Comments

77. In any automated licensing system, we must have timely notification of any objections or concerns with a particular application. Consequently, we propose to create an Internet filing form that would be used to accept electronically filed petitions to deny or comments. The petitioner or commenter would supply identifying information such as the file number, complete the descriptive information about the petition, and any attachments (in an appropriate graphical format) to the electronic copy of the petition. The International Bureau Filing System (IBFS) database would then be automatically updated with this information. We seek comment from the industry on this proposal as well as other areas where the Commission could automate its satellite earth station licensing process.

VII. MISCELLANEOUS

A. Earth Station License Modification Requirements

78. In the *1996 Streamlining Order*, the Commission adopted Section 25.118, permitting earth station operators to make certain "minor" modifications to their licenses without prior Commission authorization.⁹⁵ An applicant is required only to notify the Commission within 30 days of a minor modification of operations.⁹⁶ In some cases, applicants have expressed confusion regarding whether their planned modification is a major or minor modification, particularly with respect to Sections 25.117(b) and 25.118(c)(5). Section 25.117(b) states that the addition of a new antenna, identical in all ways to an existing antenna, is a minor modification, not requiring prior authorization from the Commission. On the other hand, Section 25.118(c)(5) says that the addition of a new antenna is not a minor modification, but does not state explicitly that identical equipment is excluded from this provision.⁹⁷

79. Accordingly, we propose revising Sections 25.117 and 25.118 to clarify the distinction between major and minor modifications. Specifically, our proposed Section 25.118(a) lists the types of modifications permitted without prior authorization, but that require the earth station operator to notify the

⁹⁵ *1996 Streamlining Order*, 11 FCC Rcd at 21594 (para. 32).

⁹⁶ *1996 Streamlining Order*, 11 FCC Rcd at 21594 (para. 32).

⁹⁷ *See 1996 Streamlining Order*, 11 FCC Rcd at 21595 (para. 34) (explaining that Section 25.118(c)(5) does not apply to replacement equipment identical to existing equipment).

Commission within 30 days. Section 25.118(b) lists the types of modifications permitted without notification or prior authorization from the Commission, including modifications currently incorporated in Section 25.117.⁹⁸ Our proposed Section 25.117 would define "major modifications" as all modifications not specifically identified in Section 25.118.

80. We do not intend the reorganization of Sections 25.117 and 25.118 to reclassify any modifications, or to change the requirements for major and minor modifications.⁹⁹ We will, however, consider substantive revisions. First, the current Section 25.117(a)(1) states that a license modification is not required if a U.S.-licensed fixed satellite seeks to access another U.S.-licensed fixed satellite if the parties have completed consultations pursuant to Article XIV(d) of the INTELSAT Agreement. INTELSAT is in the process of transforming from an intergovernmental organization to a private company. The INTELSAT Agreement currently in force will be amended when the privatization process is complete, and many Articles, including Article XIV(d), will be deleted. In addition, the ORBIT Act requires INTELSAT to conduct technical coordination "under International Telecommunication Union procedures and not under Article XIV(d) of the INTELSAT Agreement."¹⁰⁰ Accordingly, we invite comment on eliminating the reference to Article XIV(d) of the INTELSAT Agreement.

81. In addition, we propose eliminating Section 25.117(a)(2). The Commission adopted that rule in 1991 to streamline review of "transborder" service, between the United States and Canada or Mexico.¹⁰¹ Our transborder policy has been subsumed by our *DISCO I Order*, which permits all U.S.-licensed fixed satellite systems to offer both domestic and international services.¹⁰² Therefore, it appears that Section 25.117(a)(2) is no longer necessary, and we propose eliminating it.

B. Radiation Hazards from Co-located Antennas

82. We invite comment on revising Section 25.117 to make clear to earth station operators that they must comply with the Commission's radiofrequency (RF) radiation limits. The National Environmental Policy Act of 1969 (NEPA) requires agencies of the Federal Government to evaluate the effects of their actions on the quality of the human environment.¹⁰³ To satisfy in part its responsibilities under NEPA, the Commission has adopted Maximum Permissible Exposure (MPE) limits RF radiation

⁹⁸ See 47 C.F.R. §§ 25.117(a)(1), (a)(2), (b).

⁹⁹ In particular, our proposed revisions to Sections 25.117 and 25.118 do not affect the requirement to complete coordination prior to filing a modification application. Section 25.203(c) requires earth station applicants planning to operate in bands that are shared with terrestrial operators to complete coordination prior to filing any application, including modification applications.

¹⁰⁰ See Section 622 of the Satellite Act, as amended by the ORBIT Act, 47 U.S.C. § 763a. Congress recently amended the Satellite Communications Act of 1962, 47 U.S.C. §§ 701 *et seq.* (Satellite Act) by adopting the Open-Market Reorganization for the Betterment of International Telecommunications Act, Pub. L. No. 106-180, 114 Stat. 48 (2000), *to be codified at* 47 U.S.C. § 761 *et seq.* (ORBIT Act). The ORBIT Act adds Title VI to the Satellite Act, entitled "Communications Competition and Privatization."

¹⁰¹ Amendment of Part 25 of the Commission's Rules and Regulations to Reduce Alien Interference Between Fixed-Satellites at Reduced Orbital Spacings and to Revise Application Processing Procedures for Satellite Communications Services, First Report and Order, CC Docket No. 86-496, 6 FCC Rcd 2806, 2811 (paras. 33-34) (1991).

¹⁰² *DISCO I Order*, 11 FCC Rcd 2429.

¹⁰³ National Environmental Policy Act of 1969, 42 U.S.C. § 4321 *et seq.*

emitted by Commission-regulated transmitters and facilities.¹⁰⁴ Currently, Section 1.1307(b)(3)(i) requires applicants proposing additional transmitters, facilities, or modifications to submit an environmental assessment if the resulting emissions causes the power density in a geographic area to exceed five percent of the RF exposure limits specified in the Commission's rules.¹⁰⁵

83. Part 25 explicitly directs earth station applicants' attention to the RF emission rules when applying for an earth station license¹⁰⁶ and when seeking authority to amend a pending license application.¹⁰⁷ The RF requirements applicable to earth station operators seeking a license modification, however, are left implicit. To remove any possible confusion surrounding RF requirements regarding modifications, we propose amending Section 25.117 to cross-reference the RF rules explicitly, including, but not limited to, modifications to add transmitters at a particular site.

C. Construction Authorization

84. In 1996, the Commission eliminated the requirement that space station operators and earth station operators obtain authorization prior to beginning construction of their stations.¹⁰⁸ The rule revisions adopted in 1996 to implement this decision are potentially confusing. Section 25.113(a) states that construction authorization is required in all cases except those listed in Section 25.113(b). Then, Section 25.113(b) lists all possible cases, thereby mooted Section 25.113(a). We propose simplifying Section 25.113 to state explicitly that prior authorization for construction is not required. We do not anticipate that this revision will have any substantive change, but rather will merely clarify current requirements.

D. Satellite Control Responsibilities to Resolve Harmful Interference

85. Section 25.274 sets forth procedures for resolving harmful interference. In cases where an earth station receives interference, and determines that the source is not a terrestrial operator or another earth station communicating with the satellite system with which it is communicating, Section 25.274(c) directs the earth station operator to contact the control center of the satellite system.¹⁰⁹ Section 25.274(g) states that "a representative of the earth station suffering undue interference" has the responsibility to contact the control center for satellite system suspected of causing the interference.¹¹⁰ If Section 25.274(g) is not read in conjunction with Section 25.274(c), it may appear that earth station operators suffering

¹⁰⁴ See 47 C.F.R. § 1.1310. See also Guidelines for Evaluating the Environmental Effects of Radiofrequency Radiation, Report and Order, ET Docket No. 93-62, 11 FCC Rcd 15123 (1996); Second Memorandum Opinion and Order, 12 FCC Rcd 13494 (1997).

¹⁰⁵ 47 C.F.R. § 1.1307(b)(3)(i). For the information required in an environmental assessment, see Section 1.1311 of the Commission's rules, 47 C.F.R. § 1.1311. For the RF radiation exposure limits, see Section 1.1310 of the Commission's rules, 47 C.F.R. § 1.1310.

¹⁰⁶ See 47 C.F.R. § 25.113(b).

¹⁰⁷ See 47 C.F.R. § 25.116(b)(2).

¹⁰⁸ 1996 Streamlining Order, 11 FCC Rcd at 21583-85 (paras. 6-9) (space station construction); 21590-91 (para. 23) (earth station construction).

¹⁰⁹ 47 C.F.R. § 25.274(c).

¹¹⁰ 47 C.F.R. § 25.274(g).

interference must contact the control center for satellite system suspected of causing the interference directly.¹¹¹ Such a requirement would be burdensome. While satellite operators have little incentive to cooperate with earth station operators using competing satellite systems, satellite operators have more incentive to cooperate with each other. This is because satellite operators must maintain a good working relationship with each other to resolve coordination issues that come up from time to time. Accordingly, we seek comment on revising Section 25.274(g) to clarify that earth station operators are permitted to contact the control centers for the satellite systems with which they communicate in cases of harmful interference, and to rely on the satellite system operators to contact the control centers of the potentially interfering satellite systems and resolve the interference.

E. Extension of Power Limits to Other FSS Bands

86. Currently, Sections 25.211 and 25.212 establish power limits for the conventional C-band and Ku-band.¹¹² Other FSS bands are not explicitly included or excluded from the scope of these rules.¹¹³ Our staff often incorporates the power limits in Sections 25.211 and 25.212 into the earth station authorizations it grants for use of those other FSS bands. The lack of explicit power limits, however, often creates a procedural hurdle that impedes the processing of applications for authority in those other bands. To streamline the processing of earth station applications to use these other FSS frequency bands, we propose amending Sections 25.211 and 25.212 to state explicitly that the Commission may apply the power limits in those sections to the extent that power limits have not been established elsewhere in Part 25. We invite comment on this proposal from all potentially affected parties.

F. Elimination of Outdated Rules

87. Part 25 includes a number of satellite service rules that have become obsolete. We seek comment on the following tentative conclusions. First, we tentatively conclude that we should revise Section 25.144(a) as shown in Appendix B. Section 25.144 includes the licensing provisions for the 2.3 GHz satellite digital audio radio service (DARS). When the Commission adopted rules for the DARS license auctions, it listed the four applicants eligible to participate in the auction in Section 25.144(a).¹¹⁴ Now that the auction has been completed, we tentatively conclude that it is no longer necessary to memorialize the auction participants in our rules.

88. Second, we tentatively conclude that we can eliminate Section 25.141 of our rules, governing applications for licenses to provide radio-determination satellite service (RDSS). RDSS systems are designed to determine the location of radio transmitters for the purpose of tracking cargo or other items. Shortly after the Commission adopted RDSS rules in 1986,¹¹⁵ parties began to develop Mobile-Satellite

¹¹¹ See Weinhouse Letter at 3-4.

¹¹² 47 C.F.R. §§ 25.211, 25.212.

¹¹³ One example of such a frequency band is the 10.95-11.2 GHz band.

¹¹⁴ The auction was limited to four applicants because they were the only applicants to file their applications by the "cut-off" date. See Establishment of Rules and Policies for the Digital Audio Radio Service in the 2310-2360 MHz Band, Report and Order, Memorandum Opinion and Order and Further Notice of Proposed Rulemaking, IB Docket No. 95-91, GEN Docket No. 90-357, RM No. 8610, 12 FCC Rcd 5754, 5812 (para. 143) (1997).

¹¹⁵ Amendment to the Commission's Rules to Allocate Spectrum for, and to Establish Other Rules and Policies Pertaining to, a Radiodetermination Satellite Service, Second Report and Order, Gen. Docket No. 84-689, 104 FCC 2d 650 (1986).

Service (MSS) systems capable of providing voice and data services in addition to RDSS.¹¹⁶ Accordingly, in 1994, the RDSS spectrum was reallocated to the MSS.¹¹⁷ In addition, no licensee ever implemented a dedicated RDSS system, and the last remaining licensee declared bankruptcy in 1991.¹¹⁸ Therefore, we tentatively conclude that Section 25.141 is no longer necessary, and that elimination of these rules is in the public interest.

89. Third, we propose eliminating Part 25, Subpart H. Subpart H was adopted to implement Section 304 of the Communications Satellite Act of 1962 (Satellite Act),¹¹⁹ which governs ownership of Comsat. The ORBIT Act eliminates Section 304 of the Satellite Act.¹²⁰ Thus, we tentatively conclude that Subpart H of the Commission's rules is no longer necessary, and we seek comment on this conclusion.

G. General Part 25 Modifications

90. We also consider here a number of miscellaneous revisions to Part 25. For example, we propose updating the current address of Federal Communication Commission in Sections 25.110(a) and 25.110(b). In addition, we propose adding several definitions for terms that appear in Part 25 to Section 25.201. We seek comment on eliminating references to the INTELSAT Agreement and INMARSAT Convention in Section 25.111(b). Rather than list all the proposed corrections to cross-references and similar revisions, we illustrate the proposed revisions in Appendix B. We invite comment on these proposals to make general changes to Part 25.

VIII. CONCLUSION

91. We invite comment on our proposals and tentative conclusions. We also invite commenters to make additional proposals and suggestions for streamlining our rules. Finally, commenters are encouraged to comment on the effects our proposals might have on the time it takes for them to comply with our filing requirements.

IX. PROCEDURAL MATTERS

92. **Initial Regulatory Flexibility Analysis.** Appendix G to this document contains the analysis required by the Regulatory Flexibility Act of 1980, 5 U.S.C. § 603.

93. **Paperwork Reduction Act.** This NPRM contains proposed new and modified information collections. As part of its continuing effort to reduce paperwork burdens, we invite the general public and the Office of Management and Budget (OMB) to take this opportunity to comment on the information

¹¹⁶ Amendment of Section 2.106 of the Commission's Rules to Allocate the 1610-1626.5 MHz and the 2483.5-2500 MHz Bands for Use by the Mobile-Satellite Service, Including Non-geostationary Satellites, RM-7771, Report and Order, 9 FCC Rcd 536, 538-39 (paras. 17-18) (1993) (*RDSS Reallocation Order*).

¹¹⁷ *RDSS Reallocation Order*, 9 FCC Rcd at 536 (para. 1).

¹¹⁸ See Amendment of the Commission's Rules to Establish Rules and Policies Pertaining to a Mobile Satellite Service in the 1610-1626.5/2483.5-2500 MHz Frequency Bands, Report and Order, CC Docket No. 92-166, 9 FCC Rcd 5936, 5948 n.37 (1994).

¹¹⁹ 47 U.S.C. § 734. See also 47 C.F.R. § 25.501 (scope of Subpart H).

¹²⁰ See Section 645(1) of the Satellite Act, as amended by the ORBIT Act, 47 U.S.C. § 765d(1).

collections contained in this NPRM, as required by the Paperwork Reduction Act of 1995, Public Law 104-13. Public and agency comments are due at the same time as other comments on this NPRM; OMB comments are due 105 days from date of publication of this NPRM in the Federal Register. Comments should address: (a) whether the proposed collection of information is necessary for the proper performance of the functions of the Commission, including whether the information shall have practical utility; (b) the accuracy of the Commission's burden estimates; (c) ways to enhance the quality, utility, and clarity of the information collected; and (d) ways to minimize the burden of the collection of information on the respondents, including the use of automated collection techniques or other forms of information technology.

94. **Ex Parte Presentations.** This is a permit-but-disclose rulemaking proceeding. *Ex parte* presentations are permitted, provided they are disclosed as provided in Sections 1.1202, 1.1203, and 1.1206(a) of the Commission's Rules, 47 C.F.R. Sections 1.1202, 1.1203, and 1.1206(a).

95. **Comment.** Pursuant to Sections 1.415 and 1.419 of the Commission's Rules, 47 C.F.R. Sections 1.415 and 1.419, interested parties may file comments on or before 75 days following publication in the Federal Register, and reply comments on or before 105 days following publication in the Federal Register. Comments may be filed using the Commission's Electronic Comment Filing System (ECFS) or by paper copies. See *Electronic Filing of Documents in Rulemaking Proceedings*, 63 Fed. Reg. 24,121 (1998).

96. Comments filed through the ECFS can be sent as an electronic file via the Internet to <<http://www.fcc.gov/e-file/ecfs.html>>. Generally, only one copy of an electronic submission must be filed. If multiple docket or rulemaking numbers appear in the caption of this proceeding, however, commenters must transmit one electronic copy of the comments to each docket or rulemaking number referenced in the caption. In completing the transmittal screen, commenters should include their full name, Postal Service mailing address, and the applicable docket or rulemaking number. Parties may also submit an electronic comment by Internet e-mail. To obtain filing instructions for e-mail comments, commenters should send an e-mail to ecfs@fcc.gov, and should include the following words in the body of the message, "get form <your e-mail address.>" A sample form and directions will be sent in reply.

97. 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, commenters must submit two additional copies for each additional docket or rulemaking number. All filings must be sent to the Commission's Secretary, Magalie Roman Salas, Office of the Secretary, Federal Communications Commission, The Portals, 445 Twelfth Street, S.W., Room TW-A325, Washington, D.C. 20554.

98. Parties who choose to file by paper should also submit their comments on diskette. These diskettes should be submitted to: Commission's Secretary, Magalie Roman Salas, Office of the Secretary, Federal Communications Commission, The Portals, 445 Twelfth Street, S.W., Room TW-A325, Washington, D.C. 20554. Such a submission should be on a 3.5-inch diskette formatted in an IBM compatible format using Word for Windows or compatible software. The diskette should be accompanied by a cover letter and should be submitted in "read only" mode. The diskette should be clearly labeled with the commenter's name, the docket number of this proceeding, type of pleading (comment or reply comment), date of submission, and the name of the electronic file on the diskette. The label should also include the following phrase "Disk Copy - Not an Original." Each diskette should contain only one party's pleading, preferably in a single electronic file. In addition, commenters must send diskette copies to the Commission's copy contractor, International Transcription Service, Inc., 1231 20th Street, N.W., Washington, D.C. 20037.

99. Written comments by the public on the proposed new and modified information collections are due on or before 75 days following publication in the Federal Register. Written comments must be submitted by the Office of Management and Budget (OMB) on the proposed new and modified information collections on or before 105 days after date of publication in the Federal Register. In addition to filing comments with the Secretary, a copy of any comments on the information collection(s) contained herein should be submitted to Judy Boley, Federal Communications Commission, Room 1-C804, 445 12th Street, SW, Washington, DC 20554, or via the Internet to jboley@fcc.gov and to Edward Springer, OMB Desk Officer, Room 10236 NEOB, 725 17th Street, N.W., Washington, DC 20503 or via the Internet to edward.springer@omb.eop.gov.

100. *Additional Information.* For general information concerning this rulemaking proceeding, contact Steven Spaeth, International Bureau, at (202) 418-1539, International Bureau; Federal Communications Commission, Washington, DC 20554.

X. ORDERING CLAUSES

101. 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 Notice of Proposed Rulemaking is hereby ADOPTED.

102. IT IS FURTHER ORDERED that the Commission's Consumer Information Bureau, Reference Information Center, SHALL SEND a copy of this Notice of Proposed Rulemaking, including the Initial Regulatory Flexibility Analysis, to the Chief, Counsel for Advocacy of the Small Business Administration.

FEDERAL COMMUNICATIONS COMMISSION

Magalie Roman Salas
Secretary

Appendix A

Antenna Patterns

In this NPRM, we propose two approaches for streamlining our review of earth station applications seeking authority to use non-routine antennas: (1) power reduction, or (2) submission of affidavits. Under our proposal, earth station applicants would be allowed to pursue either or both approaches. The applicant would be required, however, to lower its power to obtain an ALSAT earth station license with authority to conduct transmit/receive or transmit-only operations. The applicant would also be required to submit the affidavits discussed in the text of this Notice from satellite operators to obtain protection from receiving interference from adjacent satellite systems.

This power reduction requirement, if adopted, would effectively establish a new lower limit on antenna size (3.2 meters for C-band and 1.0 meters for Ku-band) that can be licensed for transmit and receive operations and still be two-degree-compliant. The power reduction would also effectively establish a new lower limit on antenna size (2.0 meters at C-band and 0.85 meters at Ku-band) that can be licensed for transmit operations only. The calculations supporting these diameter conclusions are set forth below.

Theoretical Antenna Patterns: The directional nature of the antennas used by fixed satellite earth stations is the main factor that makes it possible to reuse the same frequency band at each satellite spread out across the geostationary satellite orbit. If earth station antennas were not highly directional (i.e. omnidirectional), only one or, at most, two geostationary satellites could serve the same service area in each frequency band.¹ Thus, the earth station antenna and its radiation pattern are of great importance in achieving and maintaining 2° orbital spacing assignments.

Large parabolic reflector antennas² commonly used at microwave frequencies exhibit a radiation pattern consisting of a main lobe on the axis of the antenna and a series of sidelobes that generally decrease in amplitude when moving farther away from the main lobe. The radiation pattern produced by any particular antenna depends upon a number of factors. These include frequency, surface smoothness of the reflector, the shape and edge taper of the illumination function, and the amount of aperture blockage present.

¹ With omnidirectional earth station antennas, a second satellite in a particular frequency band could only be accomplished through polarization isolation. One satellite would be horizontally polarized while the second satellite would be vertically polarized.

² Large in terms of wavelength. Typical earth station antennas licensed today have D/λ (diameter to wavelength) ratios on the order of 50 or larger. A 1.2 meter antenna at 14.0 GHz has a $D/\lambda = 56.0$ and at 11.7 GHz it has a $D/\lambda = 46.8$. A 4.5 meter antenna at 5925 MHz has a $D/\lambda = 88.9$ and at 3700 MHz it has a $D/\lambda = 55.5$. Smaller antennas that we propose to make routine, have smaller D/λ ratios. A 3.2 meter antenna at 3700 MHz has a $D/\lambda = 39.5$ and a 2.0 meter antenna at 5925 MHz has a $D/\lambda = 39.5$. A 1.0 meter antenna at 11.7 GHz has a $D/\lambda = 39.0$ and a 0.85 meter antenna at 14.0 GHz has a $D/\lambda = 39.67$.

As discussed in the body of this NPRM, we recognize that strict compliance with the §25.209(a) antenna standard in the range of 1° to 2° off-axis is not necessary in order for earth station antennas to successfully operate in a uniform 2° spacing environment. What is important is the gain of the antenna's sidelobes toward the adjacent satellites. For uniform 2° orbital spacing, the range of primary interest is the 2° - 9° off-axis portion of the antenna radiation pattern. C-band antennas smaller than 4.5 meters and Ku-band antennas smaller than 1.2 meter can readily meet the §25.209(a) antenna standard at off-axis angles of 2° and greater.

In certain instances, very small antennas where the main lobe of the radiation pattern extends beyond 2° off-axis can successfully operate in a uniform 2° spacing environment. Such small antennas, however, have limitations placed upon them to mitigate potential interference to and from adjacent satellite operations. When the main lobe of these antennas extends out to and beyond 2° off-axis, these earth station systems must reduce their power levels and use robust modulation schemes to compensate for the reduced power.

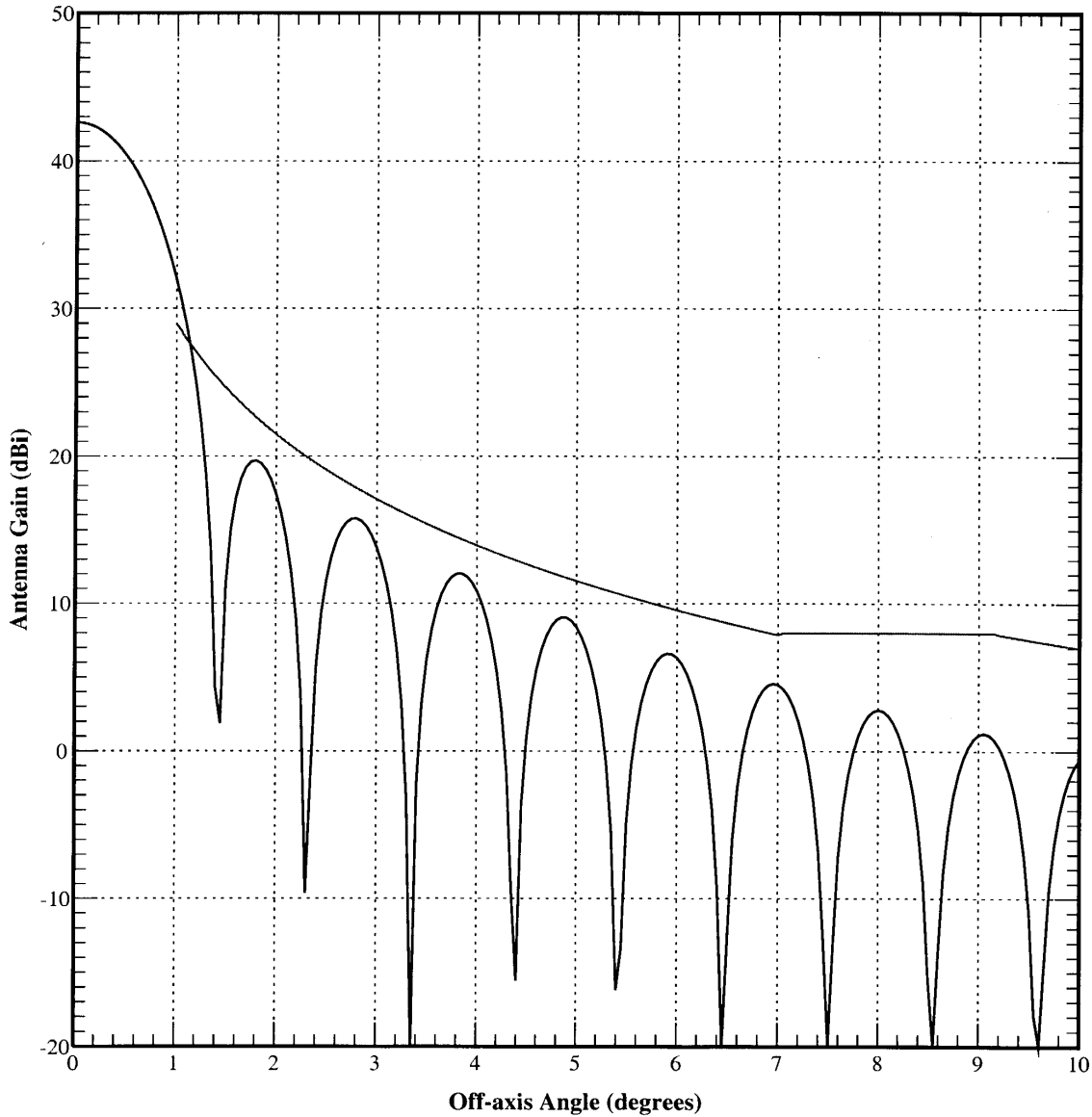
Our proposed rule changes in Section 25.209 are based upon the licensing of non-conforming antennas that are still large enough to have their main lobes entirely contained within the ±2.0° off-axis range. We are certain that antennas of a particular diameter or larger can satisfactorily operate in a uniform 2° spacing environment. In our proposals for Section 25.209, we select the smallest diameter antenna where the first null of its radiation pattern falls within the ±2° off-axis point. We chose this point to allow for a certain degree of antenna pointing error and other degradations such as station keeping tolerance.

The angular location of the first null of an antenna radiation pattern, as well as the angular width of the antenna's main lobe depend upon a number of antenna design parameters. For illustrative purposes, we have computed a number of theoretical antenna radiation patterns for various antenna diameters and frequencies. These patterns are given in figures 1-12 along with the §25.209(a) antenna standard superimposed on the pattern. In all of these figures, we assume a cosine illumination function, a 3.0 dB edge taper, and no aperture blockage. These computed radiation patterns were generated using a slightly modified version of an accepted Fortran subroutine.³ The antenna diameter was adjusted until the first null between the main lobe and the first sidelobe fell within +/- 2° off-axis. For these theoretical patterns, the following results.

<u>Frequency (MHz)</u>	<u>Diameter (meters)</u>
3700	3.2
5925	2.0
11700	1.0
14000	0.85

³ W.A. Kissick, D.N. Rebol, "A Program Description of 'Orbit-Prints': Contours of Power Density at the Geostationary Orbit", U.S. Department of Commerce, Office of Telecommunications, OT Report 77-126, June, 1977. The "CIR" subroutine was modified to allow variable taper Cosine^N illumination functions. This subroutine computes the gain as the surface integral of the illumination function. A numerical integration is carried out on a polynomial approximation to the Bessel function.

Figure 1: Theoretical Antenna Pattern

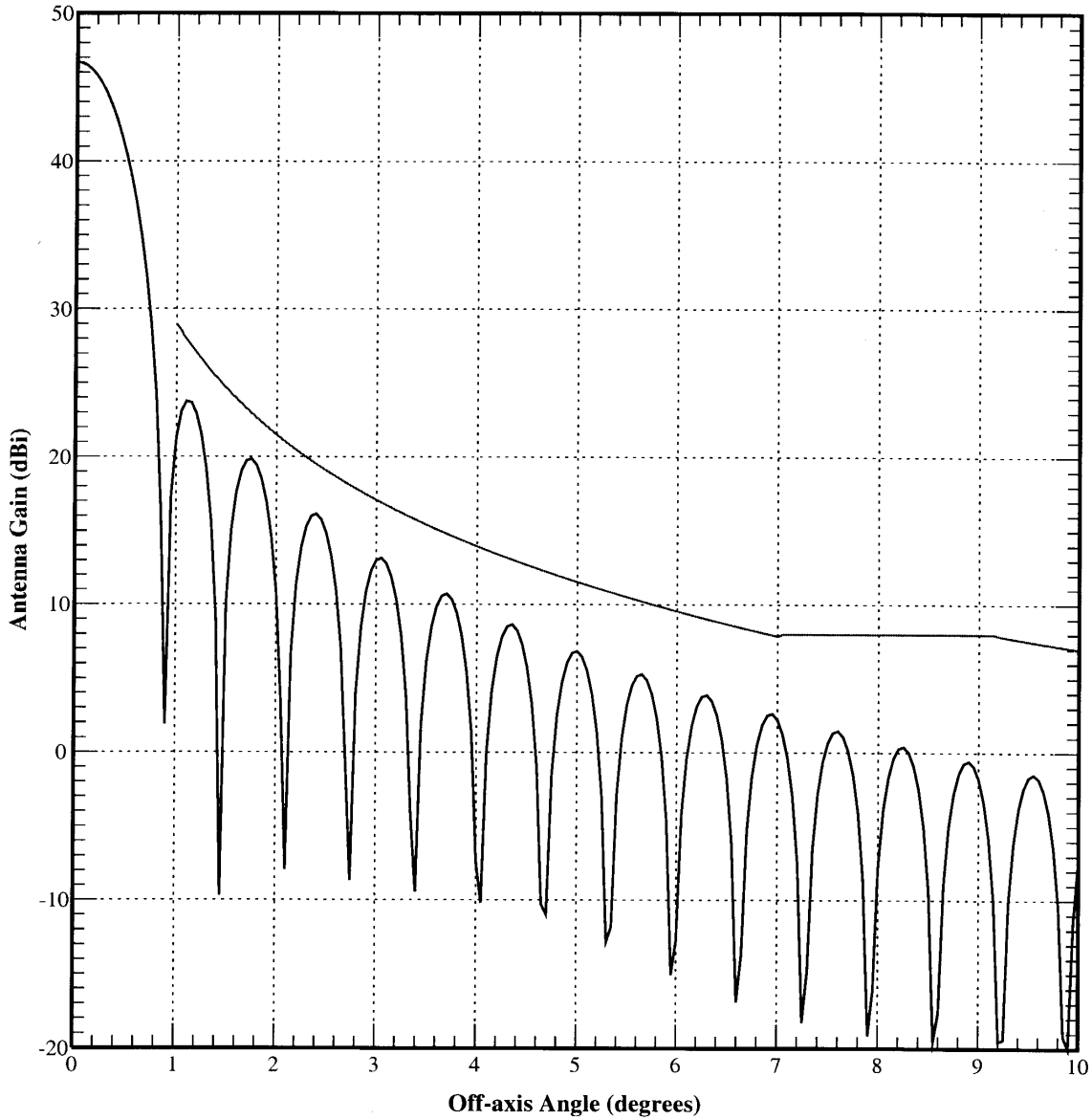


Theoretical Circular Aperture Antenna Pattern

Diameter = 4.500 Meter
 Frequency = 3.700 GHz
 Diameter/Wavelength Ratio = 55.500
 COSINE Illumination
 3.00 dB Edge Taper
 0.00 % Aperture Blockage
 Maximum Antenna Gain = 42.610 dBi
 Antenna Efficiency = 60.0%

Also plotted is FCC Sec. 25.209(a)(1) antenna standard

Figure 2: Theoretical Antenna Pattern

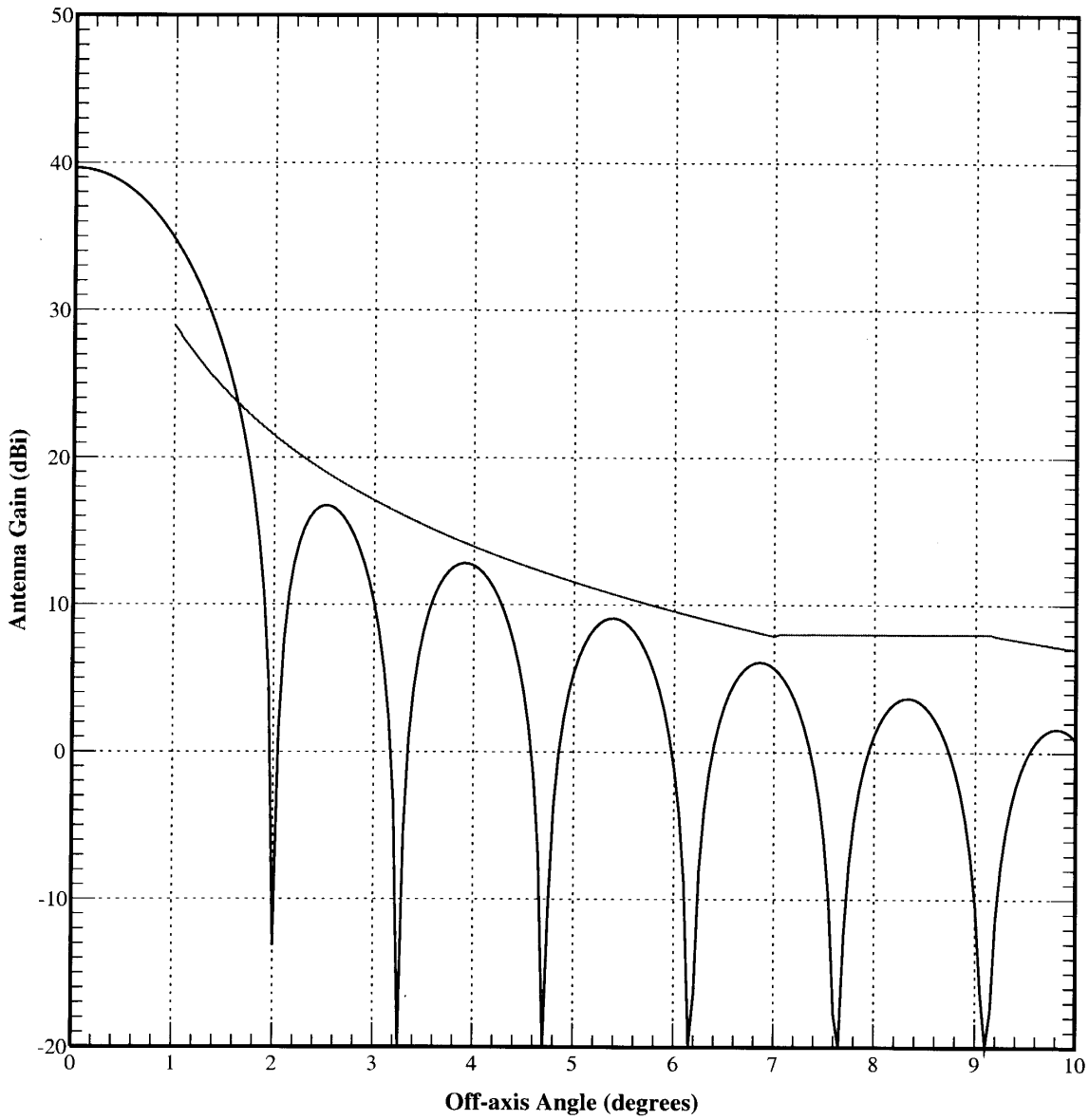


Theoretical Circular Aperture Antenna Pattern

Diameter = 4.500 Meter
 Frequency = 5.925 GHz
 Diameter/Wavelength Ratio = 88.875
 COSINE Illumination
 3.00 dB Edge Taper
 0.00 % Aperture Blockage
 Maximum Antenna Gain = 46.700 dBi
 Antenna Efficiency = 60.0%

Also plotted is FCC Sec. 25.209(a)(1) antenna standard

Figure 3: Theoretical Antenna Pattern

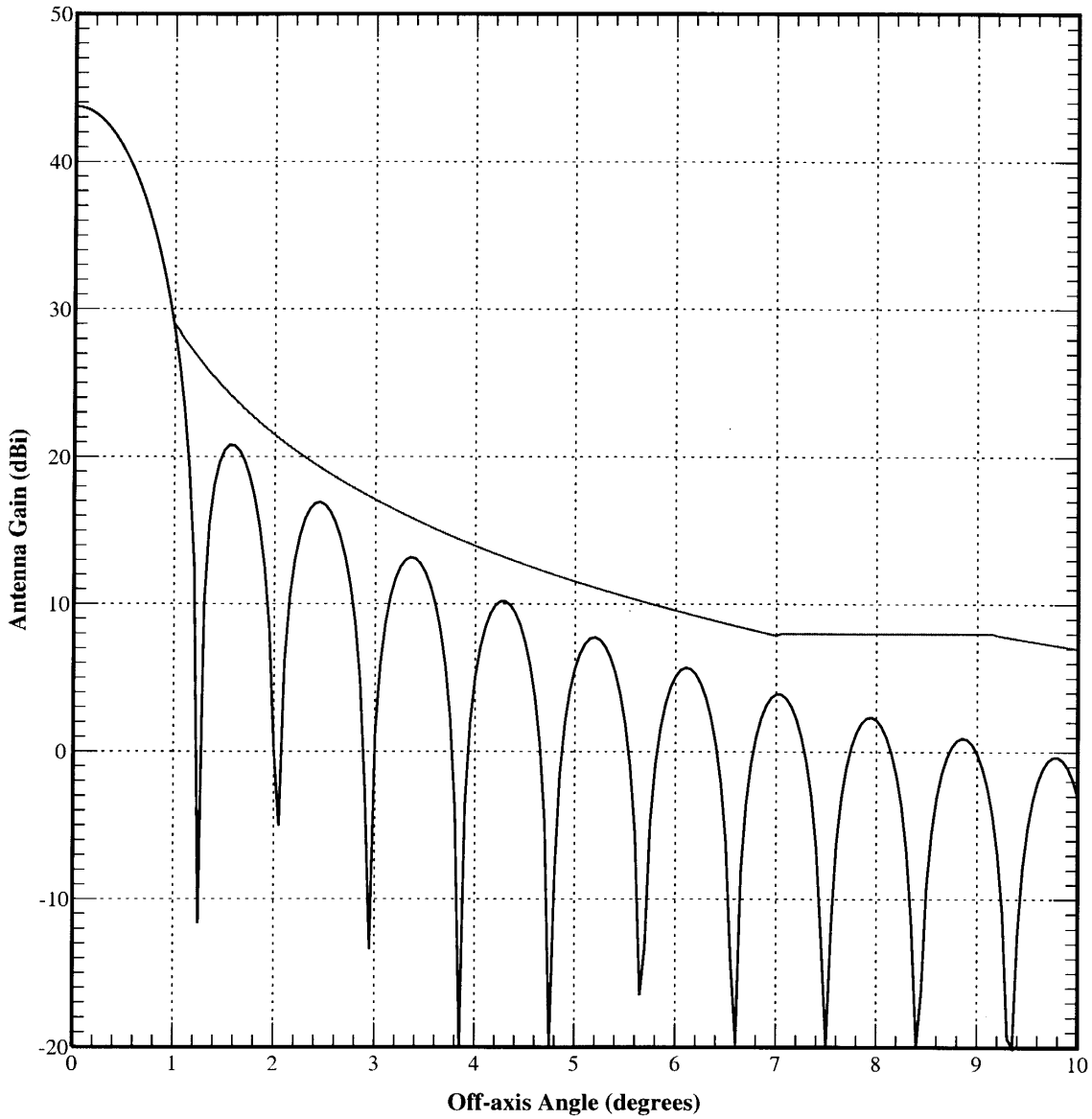


Theoretical Circular Aperture Antenna Pattern

Diameter = 3.200 Meter
 Frequency = 3.700 GHz
 Diameter/Wavelength Ratio = 39.467
 COSINE Illumination
 3.00 dB Edge Taper
 0.00 % Aperture Blockage
 Maximum Antenna Gain = 39.649 dBi
 Antenna Efficiency = 60.0%

Also plotted is FCC Sec. 25.209(a)(1) antenna standard

Figure 4: Theoretical Antenna Pattern

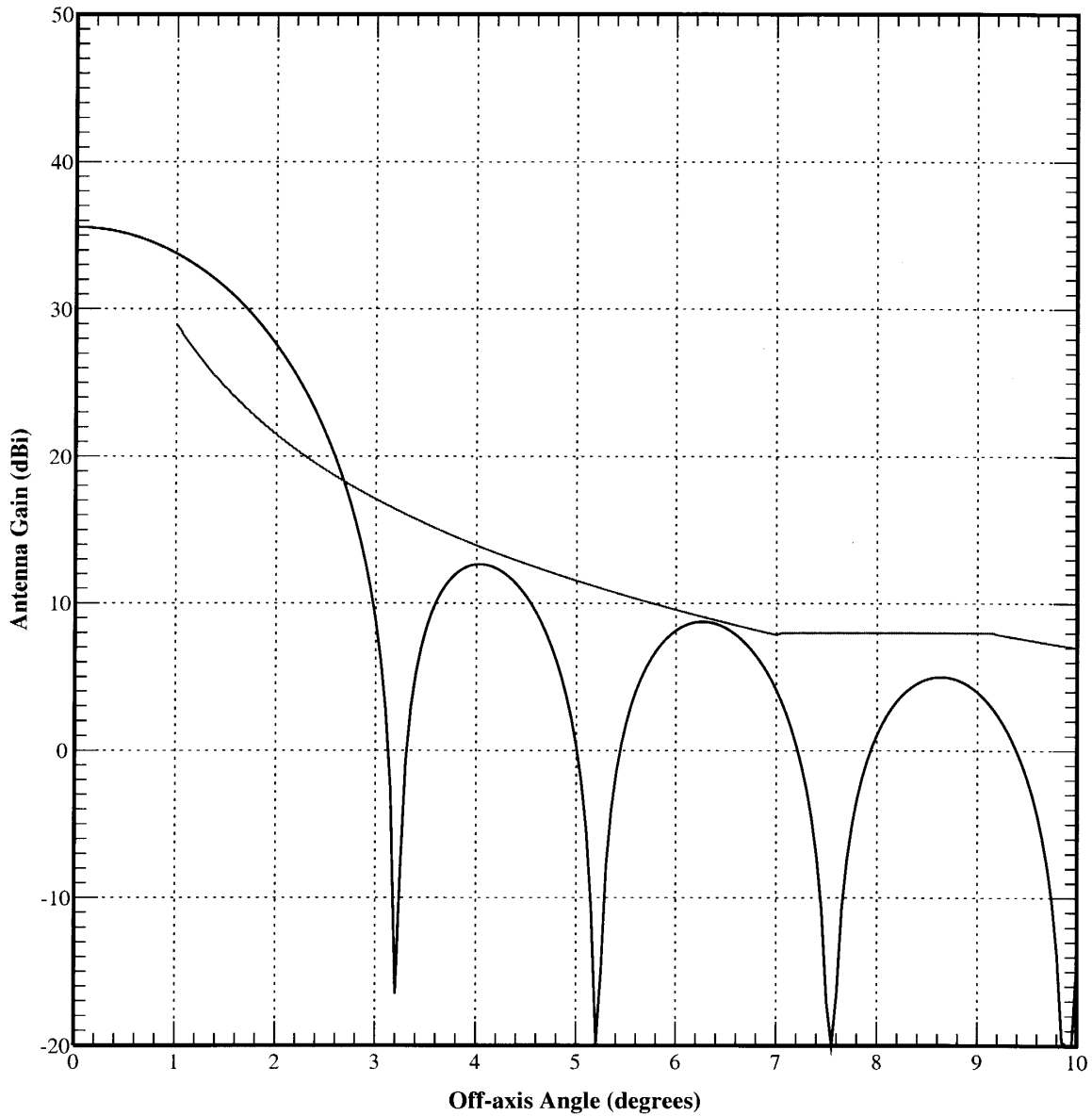


Theoretical Circular Aperture Antenna Pattern

Diameter = 3.200 Meter
 Frequency = 5.925 GHz
 Diameter/Wavelength Ratio = 63.200
 COSINE Illumination
 3.00 dB Edge Taper
 0.00 % Aperture Blockage
 Maximum Antenna Gain = 43.739 dBi
 Antenna Efficiency = 60.0%

Also plotted is FCC Sec. 25.209(a)(1) antenna standard

Figure 5: Theoretical Antenna Pattern

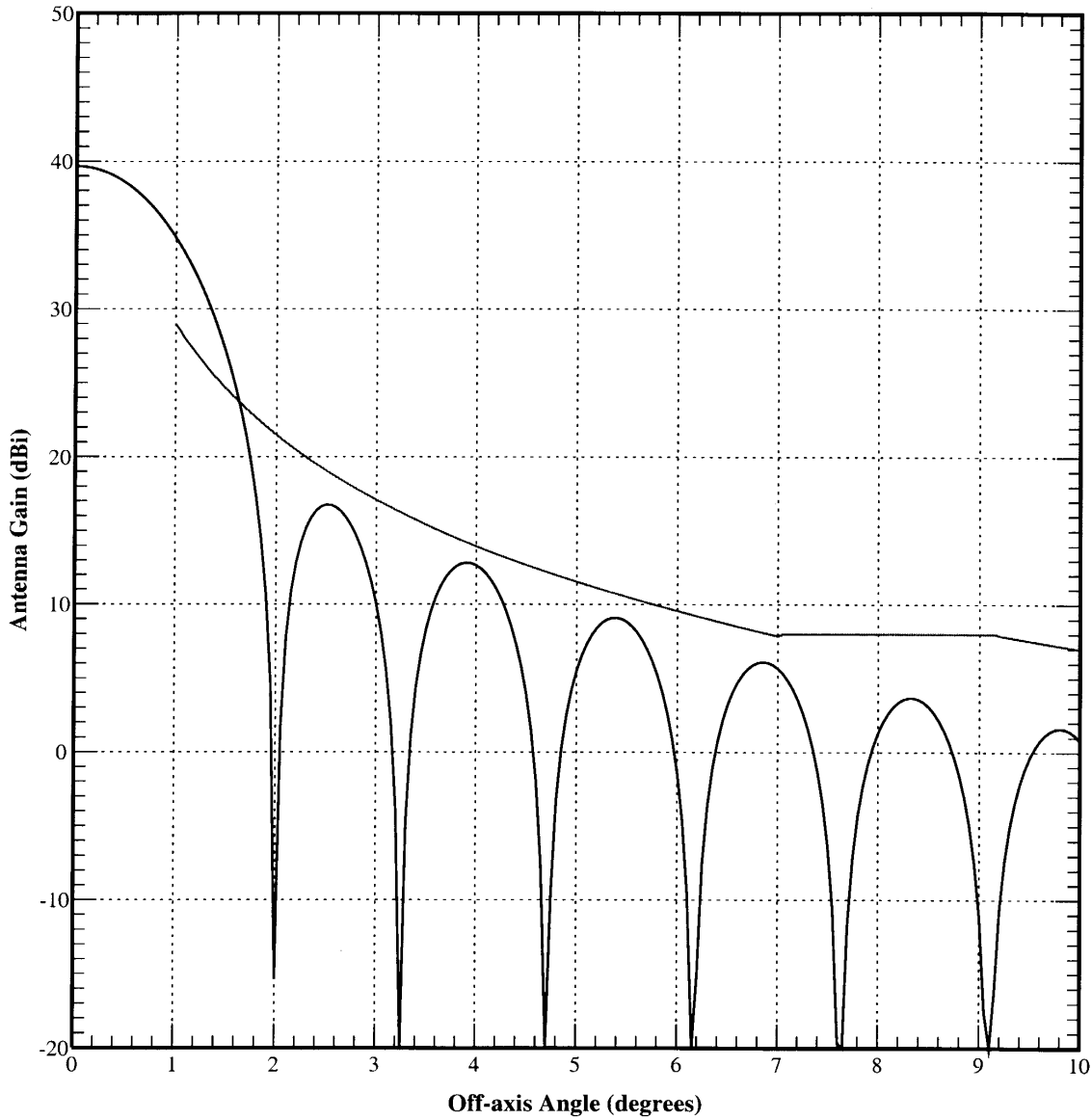


Theoretical Circular Aperture Antenna Pattern

Diameter = 2.000 Meter
 Frequency = 3.700 GHz
 Diameter/Wavelength Ratio = 24.667
 COSINE Illumination
 3.00 dB Edge Taper
 0.00 % Aperture Blockage
 Maximum Antenna Gain = 35.567 dBi
 Antenna Efficiency = 60.0%

Also plotted is FCC Sec. 25.209(a)(1) antenna standard

Figure 6: Theoretical Antenna Pattern

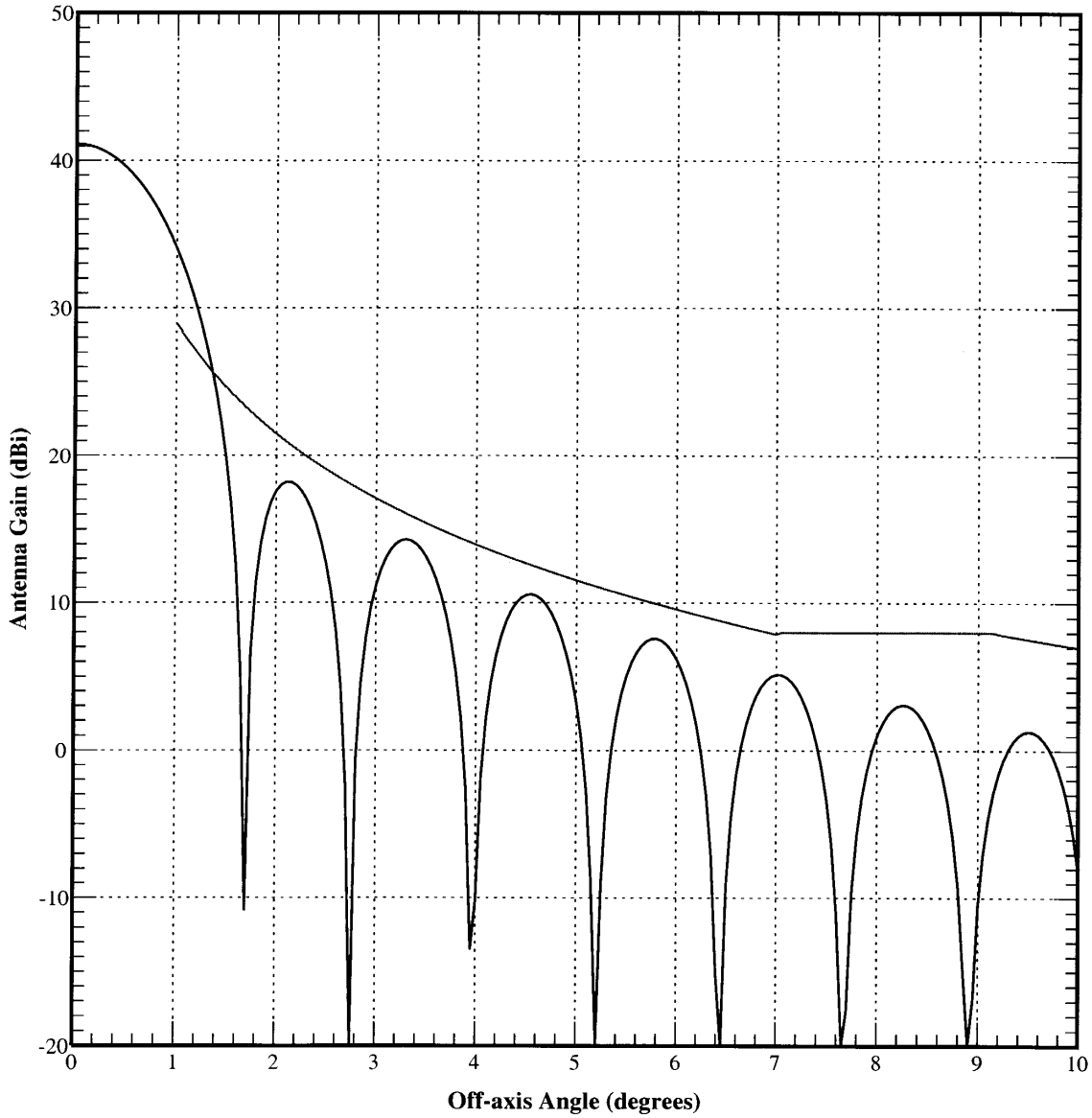


Theoretical Circular Aperture Antenna Pattern

Diameter = 2.000 Meter
 Frequency = 5.925 GHz
 Diameter/Wavelength Ratio = 39.500
 COSINE Illumination
 3.00 dB Edge Taper
 0.00 % Aperture Blockage
 Maximum Antenna Gain = 39.656 dBi
 Antenna Efficiency = 60.0%

Also plotted is FCC Sec. 25.209(a)(1) antenna standard

Figure 7: Theoretical Antenna Pattern

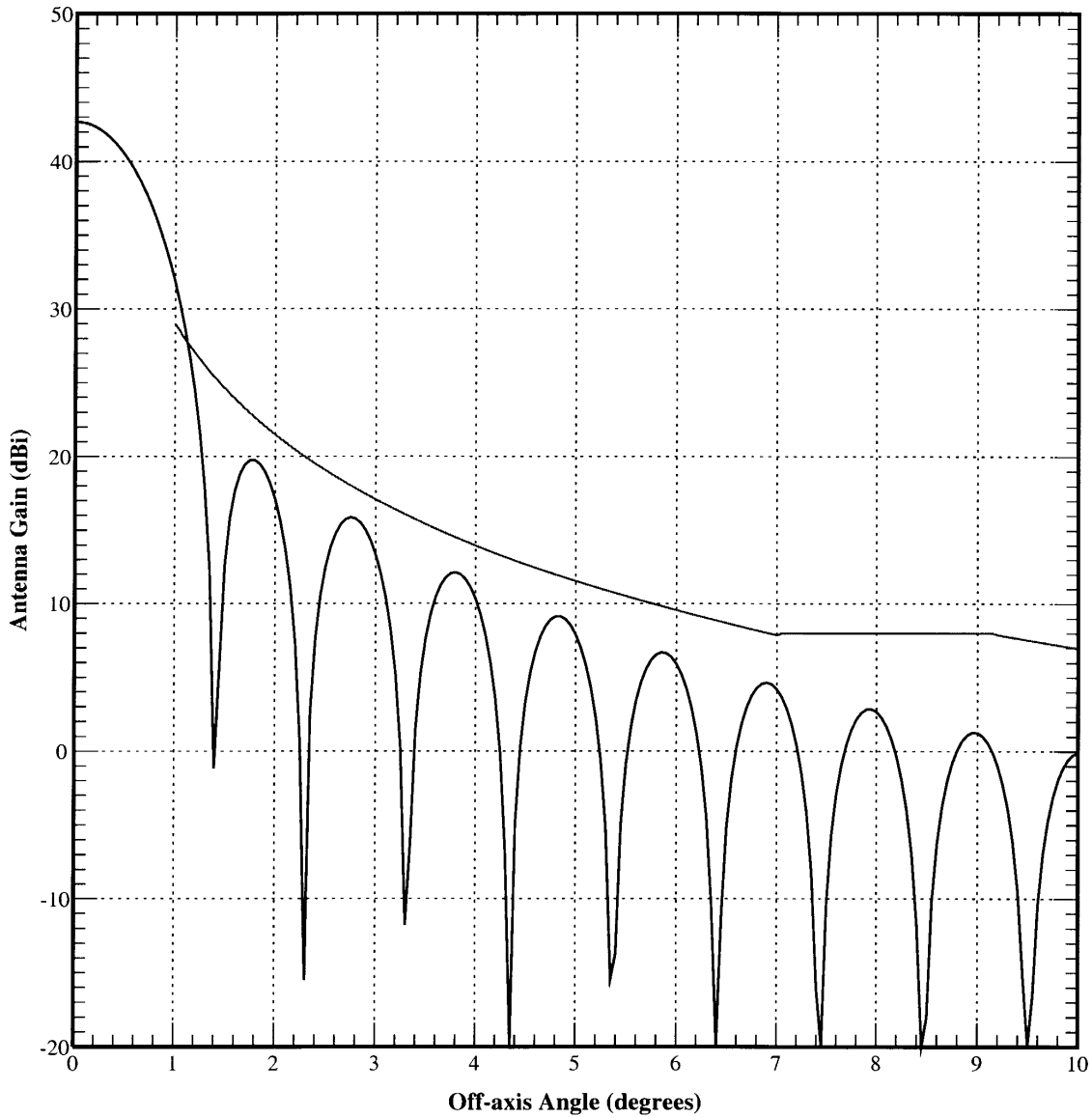


Theoretical Circular Aperture Antenna Pattern

Diameter = 1.200 Meter
 Frequency = 11.700 GHz
 Diameter/Wavelength Ratio = 46.800
 COSINE Illumination
 3.00 dB Edge Taper
 0.00 % Aperture Blockage
 Maximum Antenna Gain = 41.129 dBi
 Antenna Efficiency = 60.0%

Also plotted is FCC Sec. 25.209(a)(1) antenna standard

Figure 8: Theoretical Antenna Pattern

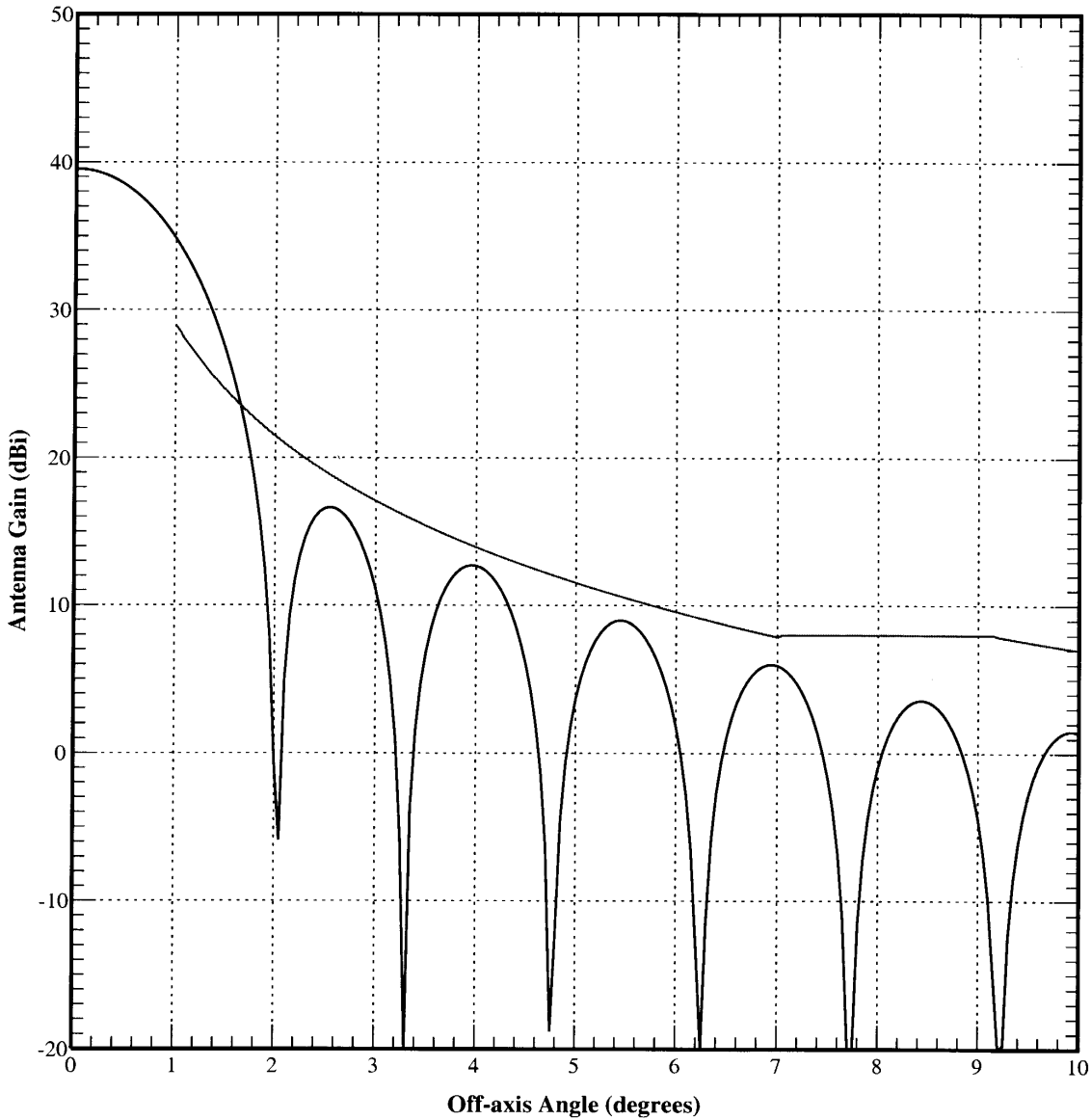


Theoretical Circular Aperture Antenna Pattern

Diameter = 1.200 Meter
 Frequency = 14.000 GHz
 Diameter/Wavelength Ratio = 56.000
 COSINE Illumination
 3.00 dB Edge Taper
 0.00 % Aperture Blockage
 Maximum Antenna Gain = 42.688 dBi
 Antenna Efficiency = 60.0%

Also plotted is FCC Sec. 25.209(a)(1) antenna standard

Figure 9: Theoretical Antenna Pattern

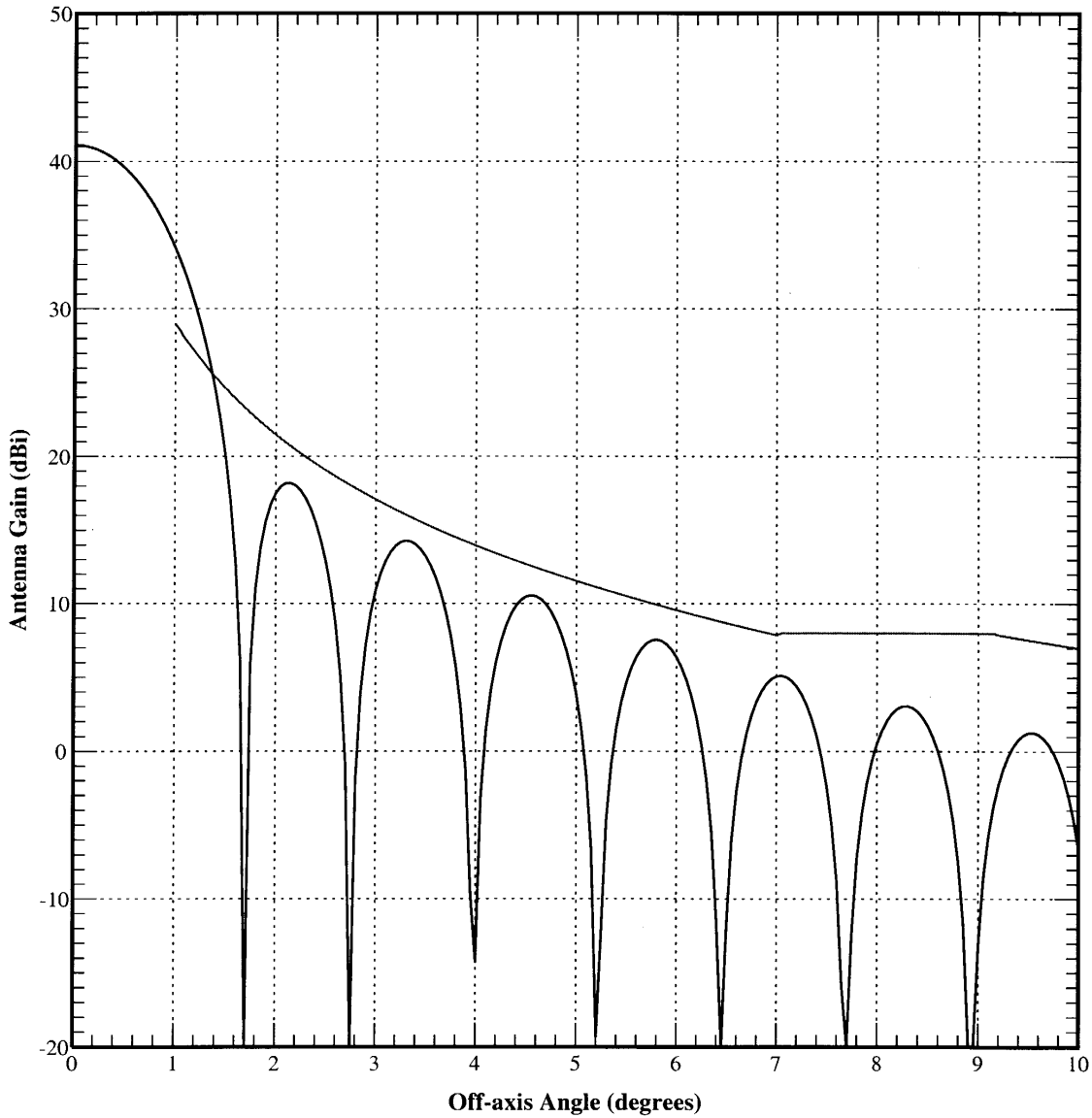


Theoretical Circular Aperture Antenna Pattern

Diameter = 1.000 Meter
 Frequency = 11.700 GHz
 Diameter/Wavelength Ratio = 39.000
 COSINE Illumination
 3.00 dB Edge Taper
 0.00 % Aperture Blockage
 Maximum Antenna Gain = 39.546 dBi
 Antenna Efficiency = 60.0%

Also plotted is FCC Sec. 25.209(a)(1) antenna standard

Figure 10: Theoretical Antenna Pattern

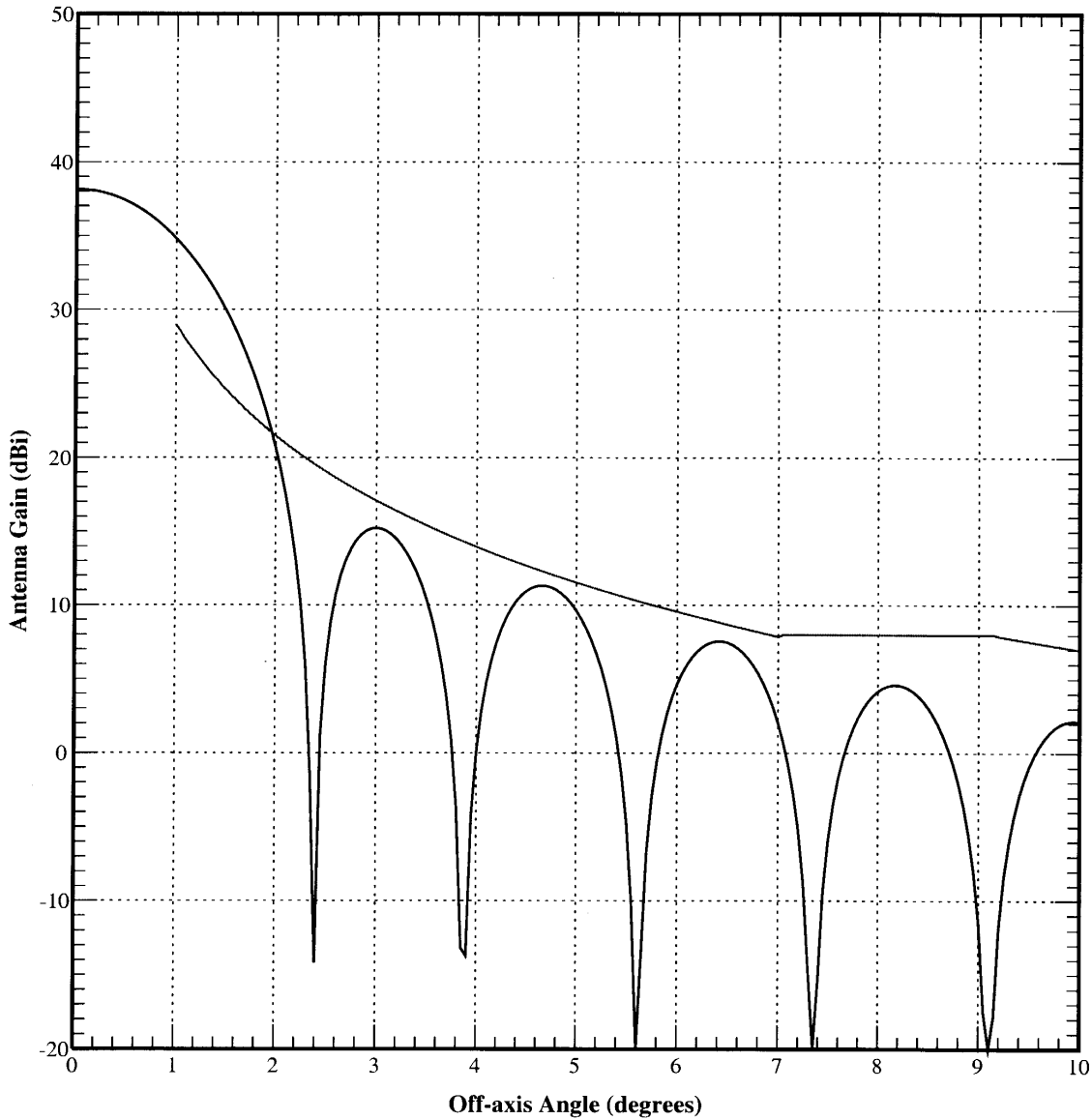


Theoretical Circular Aperture Antenna Pattern

Diameter = 1.000 Meter
 Frequency = 14.000 GHz
 Diameter/Wavelength Ratio = 46.667
 COSINE Illumination
 3.00 dB Edge Taper
 0.00 % Aperture Blockage
 Maximum Antenna Gain = 41.105 dBi
 Antenna Efficiency = 60.0%

Also plotted is FCC Sec. 25.209(a)(1) antenna standard

Figure 11: Theoretical Antenna Pattern

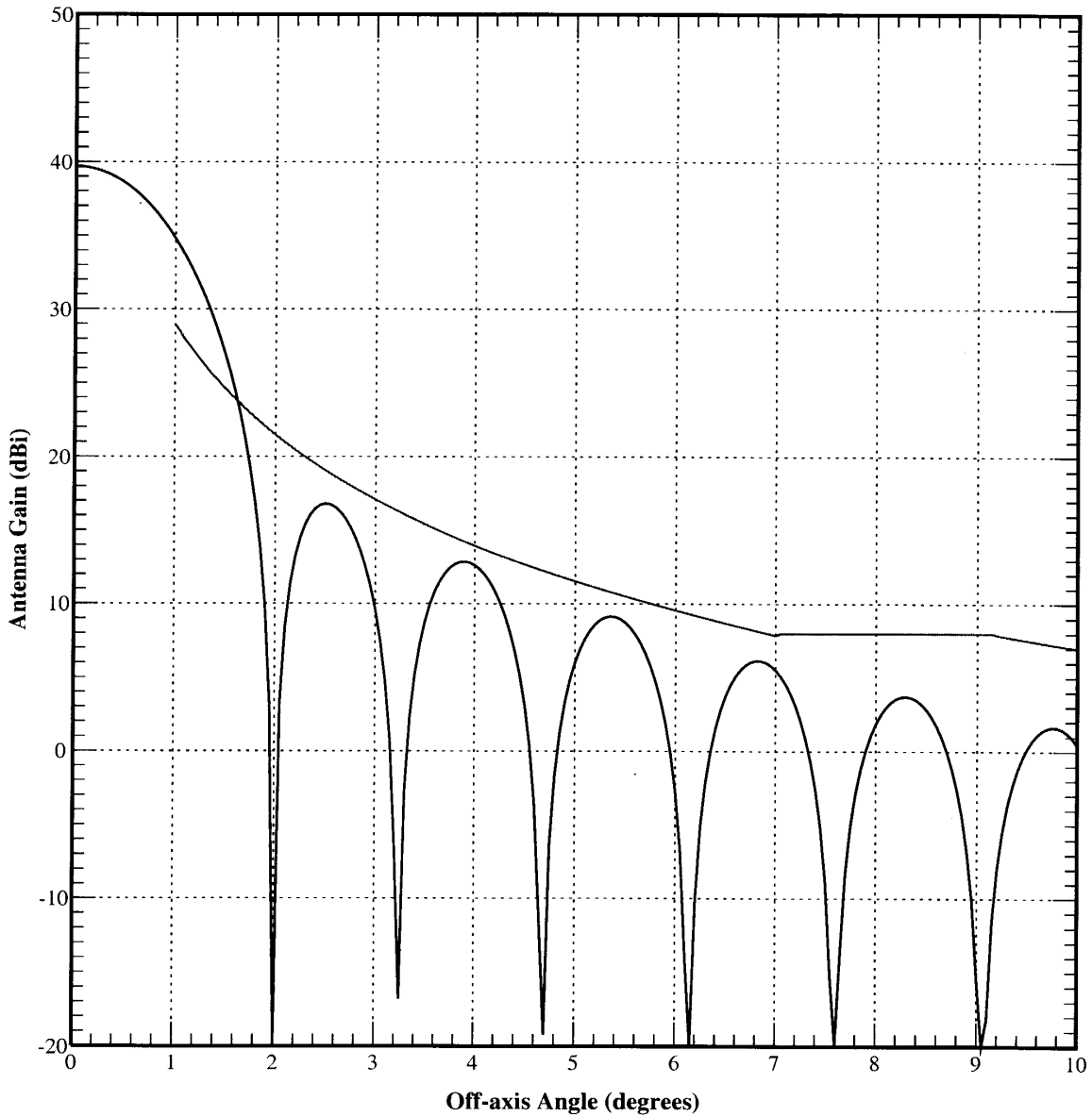


Theoretical Circular Aperture Antenna Pattern

Diameter = 0.850 Meter
 Frequency = 11.700 GHz
 Diameter/Wavelength Ratio = 33.150
 COSINE Illumination
 3.00 dB Edge Taper
 0.00 % Aperture Blockage
 Maximum Antenna Gain = 38.134 dBi
 Antenna Efficiency = 60.0%

Also plotted is FCC Sec. 25.209(a)(1) antenna standard

Figure 12: Theoretical Antenna Pattern



Theoretical Circular Aperture Antenna Pattern

Diameter = 0.850 Meter

Frequency = 14.000 GHz

Diameter/Wavelength Ratio = 39.667

COSINE Illumination

3.00 dB Edge Taper

0.00 % Aperture Blockage

Maximum Antenna Gain = 39.693 dBi

Antenna Efficiency = 60.0%

Also plotted is FCC Sec. 25.209(a)(1) antenna standard

Appendix B

Proposed Rule Changes

Title 47 of the Code of Federal Regulations, Part 25, is proposed to be amended as follows:

1. The authority citation for Part 25 continues to read as follows:

Authority: 47 U.S.C. 701-744. Interprets or applies Sections 4, 301, 302, 303, 307, 309, and 332 of the Communications Act, as amended, 47 U.S.C. Sections 154, 301, 302, 303, 307, 309, 332, unless otherwise noted.

2. Amend §25.103 by revising paragraphs (b) and (c)(2) to read as follows:

§25.103 Definitions.

(b) Authorized carrier. The term "authorized carrier" means a communications common carrier which is authorized by the Federal Communications Commission under the Communications Act of 1934, as amended, to provide services by means of communications satellites.

(c) ***

(2) The corporation shall be deemed to be a common carrier within the meaning of section 3(10) of the Communications Act of 1934, as amended.

3. Amend §25.109 by revising paragraph (c) to read as follows:

§25.109 Cross-reference.

(c) Ship earth stations in the Maritime Mobile Satellite Service, see 47 CFR part 80.

4. Amend §25.110 by revising paragraphs (a) and (b) to read as follows:

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

(a) Standard application forms applicable to this part may be obtained from the Federal Communications Commission, Forms Distribution Center, by calling 1-800-418-FORM (3676).

(b) Manually filed applications for satellite radio station authorizations governed by this part and requiring a fee shall be mailed or hand-delivered to the locations specified in Part 1, subpart G of this chapter. The addresses for filing and fee amounts for the applications are also listed in the International and Satellite services fee filing guide from the Commission's Forms Distribution Center or by calling 1-800-418-

FORM (3676). All other applications shall be submitted to the Secretary, Federal Communications Commission, 445 12th Street, S.W., Washington, DC 20554.

5. Amend §25.111 by revising paragraph (b) to read as follows:

§25.111 Additional information.

* * * * *

(b) Applicants, permittees and licensees of radio stations governed by this part shall provide the Commission with all information it requires for the Advance Publication, coordination and notification of frequency assignments pursuant to the international Radio Regulations. No protection from interference caused by radio stations authorized by other Administrations is guaranteed unless coordination procedures are timely completed or, with respect to individual administrations, by successfully completing coordination agreements. Any radio station authorization for which coordination has not been completed may be subject to additional terms and conditions as required to effect coordination of the frequency assignments with other Administrations.

6. Amend § 25.113 by revising the section name, revising paragraph (a), and removing and reserving paragraph (b), to read as follows:

§ 25.113 Station licenses and launch authority.

(a) Construction permits are not required for satellite earth stations. Construction of such stations may commence prior to grant of a license at the applicant's own risk. Applicants must comply with the provisions of 47 CFR 1.1312 relating to environmental processing prior to commencing construction.

(b) [Reserved].

* * * * *

7. Amend § 25.115 by revising paragraphs (a) and (c) to read as follows:

§ 25.115 Application for earth station authorizations.

(a) Transmitting earth stations. Commission authorization must be obtained for authority to operate a transmitting earth station. Applications shall be filed on FCC Form 312 and include the information specified in §25.130.

* * * * *

(c) Large Networks of Small Antennas operating in the 12/14 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 12/14 GHz frequency band under blanket operating authority shall be filed on FCC Form 312 and Schedule B, for each large (5 meters or larger) hub station, and Schedule B for each representative type of small antenna (less than 5 meters) operating within the network.

* * * * *

8. Revise Section 25.117 to read as follows:

§25.117 Modification of station license.

(a) Except as provided for in Sec. 25.118 (Modifications not requiring prior authorization), no modification of a radio station governed by this part which affects the parameters or terms and conditions of the station authorization shall be made except upon application to and grant of such application by the Commission.

(b) [Reserved]

(c) Applications for modification of earth station authorizations shall be submitted on FCC Form 312, Main Form and Schedule B, except as set forth in paragraph (e) of this section.

(d) Applications for modifications of space station authorizations shall be filed in accordance with Sec. 25.114, but only those items of information listed in Sec. 25.114(c) that change need to be submitted, provided the applicant certifies that the remaining information has not changed.

(e) Any application for modification of authorization to extend a required date of completion (*e.g.*, begin construction, complete construction, launch, bring into operation) shall be filed on FCC Form 312M (Application for Additional Time to Construct). The application must include a verified statement from the applicant:

(1) That states the additional time is required due to unforeseeable circumstances beyond the applicant's control, describes these circumstances with specificity, and justifies the precise extension period requested; or

(2) That states there are unique and overriding public interest concerns that justify an extension, identifies these interests and justifies a precise extension period.

(f) Applications for modification of earth station authorizations shall be submitted on FCC Form 312, Main Form and Schedule B, whenever the resulting radiofrequency emissions that would be caused by the modification would cause the power density in a given area to exceed five percent of the radiofrequency exposure limits, such that an environmental assessment statement would be required under Section 1.1307(b)(3)(i) of this Title.

9. Revise Section 25.118 to read as follows:

§25.118 Modifications not requiring prior authorization.

(a) *Notification Required.* Authorized earth station operators may make the following modifications to their licenses without prior Commission authorization, provided that the operators notify the Commission, using FCC Form 312 and Schedule B, within 30 days of the modification:

(1) Licensees may make changes to their authorized earth stations without obtaining prior Commission authorization, provided that they have complied with all applicable frequency coordination procedures in accordance with § 25.251, and the modification does not involve:

(i) An increase in EIRP or EIRP density (both main lobe and side lobe);

(ii) An increase in transmitted power;

(iii) A change in coordinates of more than 1 second in latitude or longitude for stations operating in frequency bands that are shared with terrestrial systems; or

(iv) A change in coordinates of 10 seconds or greater in latitude or longitude for stations operating in frequency bands that are not shared with terrestrial systems.

(v) A change in operations from private carrier to common carrier status.

(2) Equipment in an authorized earth station may be replaced without prior authorization if the new equipment is electrically identical to the existing equipment.

(3) 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, and such modifications do not require prior authorization under § 25.121(e)(3) of this part. (VSAT hub earth stations and all remote terminals that are not part of a U.S.-licensed VSAT network are treated like other earth stations for purposes of determining whether they can be modified without prior authorization.)

(b) *Notification not required.* An authorized earth station licensee may add, change or replace transmitters or antenna facilities without prior authorization, provided:

(1) The added, changed, or replaced facilities conform to Section 25.209 of this Chapter;

(2) The particulars of operations remain unchanged;

(3) Frequency coordination is not required; and

(4) The maximum power and power density delivered into any antenna at the earth station site shall not exceed the values calculated by subtracting the maximum antenna gain specified in the license from the maximum authorized e.i.r.p. and e.i.r.p. density values.

10. Amend § 25.121 by revising paragraphs (a), (c), and (e) to read as follows:

§ 25.121 License term and renewals.

(a) *License Term.* Except as provided in paragraphs (b) and (c) of this section, licenses for facilities governed by this part will be issued for a period of 10 years.

* * * * *

(c) *Earth Stations.* For earth stations, the license term will be specified in the instrument of authorization. In no case shall this term exceed 15 years.

* * * * *

(e)(1) *Renewal of licenses.* Applications for renewals of earth station licenses must be submitted on FCC Form 312R no earlier than 90 days, and no later than 30 days, before the expiration date of the license. Applications for space station system replacement authorization for non-geostationary orbit satellites shall be filed no earlier than 90 days, and no later than 30 days, prior to the end of the seventh year of the existing license term.

(2) In addition to the requirements of paragraph (e)(1) of this section, applicants seeking renewal of a MET license must include as an attachment to FCC Form 312R a statement of the number of MET units in its network placed into operation.

(3) In addition to the requirements of paragraph (e)(1) of this section, applicants seeking renewal of a VSAT license must include as an attachment to FCC Form 312R a statement of the number of VSAT units in its network placed into operation. If a VSAT licensee does not bring all the VSAT units specified in its license into operation by the time the licensee is renewed, subsequent modification applications to add VSAT units will require prior Commission authorization.

11. Amend § 25.130 by revising paragraph (a) to read as follows:

§ 25.130 Filing requirements for transmitting earth stations.

(a) Applications for a new or modified transmitting earth station facility shall be submitted on FCC Form 312, Main Form and Schedule B, accompanied by any required exhibits. In addition, the applicant shall submit the following information to be used as an "informative" in the public notice issued under Section 25.151 of this part:

- (1) A detailed description of the service to be provided, including frequency bands and satellites to be used.
- (2) The diameter of the antenna.
- (3) Proposed power and power density levels.
- (4) Identification of any random access technique, if applicable, as listed in Section 25.134(a) in this Chapter.
- (5) Identification of any rule or rules for which a waiver is requested.

12. Amend § 25.131 by revising paragraphs (a), (b), (h), (i), and (j) to read as follows:

§ 25.131 Filing requirements for receive-only earth stations.

(a) Except as provided in paragraphs (b) and (j) of this section, applications for a license for a receive-only earth station shall be submitted on FCC Form 312, Main Form and Schedule B, accompanied by any required exhibits and the information described in Sections 25.130(a)(1) through (5) of this chapter.

(b) Except as provided in paragraph (j) of this section, receive-only earth stations in the fixed-satellite service that operate with U.S.-licensed satellites 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 of this part.

* * * * *

(h) Registration term: Registrations for receive-only earth stations governed by this section will be issued for a period of 15 years from the date on which the application was filed. Applications for renewals of registrations must be submitted on FCC Form 312R (Application for Renewal of Radio Station License in Specified Services) no earlier than 90 days and no later than 30 days before the expiration date of the registration.

(i) Applications for modification of license or registration of receive-only earth stations shall be made in conformance with Sections 25.117 and 25.118 of this part. In addition, registrants are required to notify the Commission when a receive-only earth station is no longer operational or when it has not been used to provide any service during any 6-month period.

(j) Receive-only earth stations operating with non-U.S. licensed space stations shall file an FCC Form 312 requesting a license or modification to operate such station. Receive-only earth stations used to receive INTELNET I service from INTELSAT space stations need not file for licenses. See Deregulation of Receive-Only Satellite Earth Stations Operating with the INTELSAT Global Communications Satellite System, Declaratory Ruling, RM No. 4845, FCC 86-214 (released May 19, 1986) available through the International Reference Center, FCC, identified in Section 0.453(m) of this Title.

13. Amend § 25.132 by revising paragraph (a) and adding new paragraph (b)(3) to read as follows:

§ 25.132 Verification of earth station antenna performance standards.

(a) All applications for transmitting earth stations must be accompanied by a certificate pursuant to § 2.902 of the chapter from the manufacturer of each antenna that the results of a series of radiation pattern tests performed on representative equipment in representative configurations by the manufacturer demonstrates that the equipment complies with the performance standards set forth in § 25.209. The licensee must be prepared to demonstrate the measurements to the Commission on request.

* * * * *

(b) * * *

(3) Applicants seeking authority to use an antenna that does not meet the standards set forth in Sections 25.209(a) and (b) of this Chapter, pursuant to the procedure set forth in Section 25.220 of this Chapter, are required to submit a copy of the manufacturer's range test plots of the antenna gain patterns specified in paragraph (b)(1) of this section.

14. Amend § 25.133 by revising paragraphs (a) and (b) and adding paragraph (e) to read as follows:

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

(a)(1) Each license for an earth station governed by this part, except for mobile satellite earth station terminals (METs), shall specify as a condition therein the period in which construction of facilities must be completed and station operation commenced. Construction of the earth station must be completed and the station 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.

(2) Each license for mobile satellite earth station terminals (METs) shall specify as a condition therein the period in which station operation must be commenced. The networks in which the METs 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.

(b)(1) Each license for a transmitting earth station included in this part shall also specify as a condition therein that upon the completion of construction, each licensee must file with the Commission a certification containing the following information:

- (i) The name of the licensee;
- (ii) File number of the application; call sign of the antenna;
- (iii) Date of the license;
- (iv) A certification that the facility as authorized has been completed and that each antenna facility has been tested and is within 2 dB of the pattern specified in Sec. 25.209, Sec. 25.135 (NVNG MSS earth stations), or Sec. 25.213 (1.6/2.4 GHz Mobile-Satellite Service earth stations). MET licenses shall specify as a condition that the licensee must file a certification that it has begun to provide service;
- (v) The date on which the station became operational; and
- (vi) A statement that the station will remain operational during the license period unless the license is submitted for cancellation.

(2) For stations authorized under Sec. 25.115(c) of this part (Large Networks of Small Antennas operating in the 12/14 GHz bands) and Sec. 25.115(d) of this part (User Transceivers in the Mobile-

Satellite Service), and for mobile satellite earth station terminals (METs), a certificate must be filed when the network is put into operation.

* * * * *

(d) An application for MET authorization shall be filed on FCC Form 312, Main Form and Schedule B. A MET licensee applying to renew its license must follow the procedures provided in § 25.121(e)(2) of this part.

15. Amend § 25.134 by revising paragraphs (a), (b), and (d) to read as follows:

§ 25.134 Licensing provisions of very small aperture terminal (VSAT) networks.

(a) All applications for VSAT service in the 12/14 GHz band that meet the following requirements will be routinely processed:

(1) The maximum transmitter power spectral density of a digital modulated carrier into any GSO FSS earth station antenna shall not exceed $-14.0 - 10\log(N)$ dB(W/4 kHz).

- (i) For a VSAT network using frequency division multiple access (FDMA) or time division multiple access (TDMA) technique, N is equal to one.
- (ii) For a VSAT network using code division multiple access (CDMA) technique, N is the likely maximum number of co-frequency simultaneously transmitting earth stations in the same satellite receiving beam.
- (iii) For a VSAT network using contention Aloha multiple access technique, N is equal to two.
- (iv) For a VSAT network using contention CDMA/Aloha multiple access technique, N is twice the likely maximum number of co-frequency simultaneously transmitting earth stations in the same satellite-receiving beam without contention.

(2) The maximum GSO FSS satellite EIRP spectral density of the digital modulated emission shall not exceed 6 dB (W/4kHz) for all methods of modulation and accessing techniques.

(3) The maximum hub earth station EIRP shall not exceed 78.3 dBW for all methods of multiple access techniques and supporting VSAT network identified in paragraph (a)(1) of this section.

(4) The maximum transmitter power spectral density of an analog carrier into any GSO FSS earth station antenna shall not exceed -8.0 dB(W/4kHz) and the maximum GSO FSS satellite EIRP spectral density shall not exceed $+13.0$ dB(W/4kHz).

(b) Each applicant for digital and/or analog VSAT network authorization proposing to use transmitted satellite carrier EIRP densities and/or maximum antenna input power in excess of those specified in paragraph (a) of this Section must comply with the procedures set forth in § 25.220 of this Chapter.

* * * * *

(d) An application for VSAT authorization shall be filed on FCC Form 312, Main Form and Schedule B. A VSAT licensee applying to renew its license must follow the procedures provided in § 25.121(e)(3) of this part.

16. Amend § 25.138 by adding language at the end of paragraphs (a)(1) and (a)(2) to read as follows:

§ 25.138 Blanket licensing provisions of GSO FSS earth stations in the 18.58-18.8 GHz (space-to-Earth), 19.7-20.2 GHz (space-to-Earth), 28.35-28.6 GHz (Earth-to-space) and 29.5-30.0 GHz (Earth-to-space) bands.

(a) * * *

(1) * * * N = two for Aloha systems. N = 2 times the likely maximum number of co-frequency simultaneously transmitting earth stations in the receive beam of the satellite for CDMA/Aloha systems.

(2) * * * N = two for Aloha systems. N = 2 times the likely maximum number of co-frequency simultaneously transmitting earth stations in the receive beam of the satellite for CDMA/Aloha systems.

§ 25.141

17. Remove §25.141.

§ 25.144

18. Remove and reserve paragraph §25.144(a)(1).

19. Amend § 25.151 by revising paragraphs (c)(2) and (d), and adding new paragraph (e) to read as follows:

§ 25.151 Public notice period.

* * * * *

(c) * * *

(2) For temporary authorization pursuant to § 25.120 of this Chapter.

(d) Except as specified in paragraph (e) of this section, no application that has appeared on public notice will be granted until the expiration of a period of thirty days following the issuance of the public notice listing the application, or any major amendment thereto. Any comments or petitions must be delivered to the Commission by that date in accordance with §25.154.

(e)(1) Applicants seeking authority to operate a temporary fixed earth station pursuant to §25.277 of this part may consider their applications "provisionally granted," and may initiate operations upon the placement of the complete FCC Form 312 application on public notice, provided that

(i) The temporary fixed earth station will operate only in the conventional Ku-band;

(ii) The temporary fixed earth station's operations will be consistent with all routine-licensing requirements for the conventional Ku-band; and

(iii) The temporary fixed earth station's operations will be limited to satellites on the Permitted Space Station List.

(2) Applications for authority granted pursuant to paragraph (e)(1) of this section shall be placed on public notice pursuant to paragraph (a)(1) of this section. If no comments or petitions are filed within 30 days of the public notice date, the authority granted will be considered a regular temporary fixed earth station authorization as of 30 days after the public notice date. If a comment or petition is filed within 30 days of the public notice date, the applicant must suspend operations immediately pending resolution of the issues raised in that comment or petition.

20. Amend § 25.154 by revising paragraphs (c) and (d) and adding paragraph (e) to read as follows:

§ 25.154 Oppositions to applications and other pleadings.

* * * * *

(c) Except for opposition to petitions to deny an application filed pursuant to § 25.220 of this Chapter, oppositions to petitions to deny an application or responses to comments and informal objections may be filed 10 days after the petition, comment, or objection is filed and must be in accordance with other applicable provisions of §§ 1.41 through 1.52 of this chapter.

(d) Except for opposition to petitions to deny an application filed pursuant to § 25.220 of this Chapter, reply comments by the party that filed the original petition may be filed with respect to pleadings filed pursuant to paragraph (c) of this section within 5 days after the time for filing oppositions has expired unless the Commission otherwise extends the filing deadline and must be in accordance with other applicable provisions of §§ 1.41 through 1.52 of this chapter.

(e) If petition to deny an application filed pursuant to § 25.220 of this Chapter is filed, the applicant must file a statement with the Commission explaining whether the applicant has resolved all outstanding coordination issues raised by the petitioner, within 30 days of the date the petition for deny is filed. This statement must be in accordance with the provisions of §§ 1.41 through 1.52 of this chapter applicable to oppositions to petitions to deny.

21. Revise § 25.201 to read as follows:

§25.201 Definitions.

(a) Definitions for terms in subpart C of this part appear in paragraph (b) of this section, and in Section 2.1 of this Chapter.

(b)(1) *Active satellite.* An earth satellite carrying a station intended to transmit or re-transmit radiocommunication signals.

(2) *Base Earth Station.* An earth station in the fixed-satellite service or, in some cases, in the land mobile-satellite service, located at a specified fixed point or within a specified area on land to provide a feeder link for the land mobile-satellite service. (RR)

(3) *C-band.* For purposes of this part, the C-band refers specifically to the 3700-4200 MHz downlink and 5925-6425 MHz uplink frequency bands. These paired bands are allocated to the Fixed-Satellite Service and are also referred to as the 4/6 GHz band(s).

(4) *Coordination distance.* For the purposes of this part, the expression "coordination distance" means the distance from an earth station, within which there is a possibility of the use of a given transmitting frequency at this earth station causing harmful interference to stations in the fixed or mobile service,

sharing the same band, or of the use of a given frequency for reception at this earth station receiving harmful interference from such stations in the fixed or mobile service.

(5) *Earth station.* A station located either on the Earth's surface or within the major portion of the Earth's atmosphere intended for communication:

(i) With one or more space stations; or

(ii) With one or more stations of the same kind by means of one or more reflecting satellites or other objects in space.

(6) *Electronic filing.* The submission of applications, exhibits, pleadings, or other filings to the Commission in an electronic form using *Internet* or *World Wide Web* on-line filing forms.

(7) *Equivalent diameter.* When circular aperture reflector antennas are employed, the size of the antenna is generally expressed as the diameter of the antenna's main reflector. When non-reflector or non-circular aperture antennas are employed, an equivalent diameter can be computed for the antenna. The equivalent diameter is the diameter of a hypothetical circular aperture antenna with the same aperture area as the actual antenna. For example, an elliptical aperture antenna with major axis, *a*, and minor axis, *b*, will have an equivalent diameter of $[\mathbf{a \times b}]^{1/2}$. A rectangular aperture antenna with length, *l*, and width, *w*, will have an equivalent diameter of $[(\mathbf{l \times w})/\pi]^{1/2}$.

(8) *Fixed earth station.* An earth station intended to be used at a specified fixed point.

(9) *Fixed-Satellite Service.* A radiocommunication service between earth stations at given positions, when one or more satellites are used; the given position may be a specified fixed point or any fixed point within

specified areas; in some cases this service includes satellite-to-satellite links, which may also be operated in the inter-satellite service; the fixed-satellite service may also include feeder links of other space radiocommunication services. (RR)

(10) *Full transponder.* Radio emissions or transmissions that occupy, or nearly occupy, the entire satellite transponder. C-band and Ku-band satellite systems typically have transponder bandwidths on the order of 36 MHz or more. Single carrier full transponder transmissions can include full motion analog video, thousands of multiplexed voice channels, or high data rates on the order of 50 Mb/s.

(11) *Geostationary satellite.* A geosynchronous satellite whose circular and direct orbit lies in the plane of the Earth's equator and which thus remains fixed relative to the Earth; by extension, a satellite which remains approximately fixed relative to the Earth.

(12) *Inter-Satellite Service.* A radiocommunication service providing links between artificial earth satellites.

(13) *Ku-band.* In this rule part, the Ku-band refers specifically to the 11700-12200 MHz downlink and 14000-14500 MHz uplink frequency bands. These paired bands are allocated to the Fixed-Satellite Service and are also referred to as the 12/14 GHz band(s).

(14) *Land Earth Station.* An earth station in the fixed-satellite service or, in some cases, in the mobile-satellite service, located at a specified fixed point or within a specified area on land to provide a feeder link for the mobile-satellite service. (RR)

(15) *Land Mobile Earth Station.* A mobile earth station in the land mobile-satellite service capable of surface movement within the geographical limits of a country or continent. (RR)

(16) *Mobile earth station.* An earth station intended to be used while in motion or during halts at unspecified points.

(17) *Mobile-Satellite Service.* A radiocommunication service:

(i) Between mobile earth stations and one or more space stations, or between space stations used by this service; or

(ii) Between mobile earth stations, by means of one or more space stations.

This service may also include feeder links necessary for its operation. (RR)

(18) *Narrowband.* Radio emissions or transmissions with narrow or limited spectral bandwidths. Narrowband satellite transmissions generally provide a single channel or a very limited number of channels. Narrowband satellite transmissions generally have bandwidths of 40 kHz to 5 MHz.

- (19) *Non-Voice, Non-Geostationary Mobile-Satellite Service.* A mobile-satellite service reserved for use by non-geostationary satellites in the provision of non-voice communications which may include satellite links between land earth stations at fixed locations.
- (20) *1.6/2.4 GHz Mobile-Satellite Service.* A mobile-satellite service that operates in the 1610-1626.5 MHz and 2483.5-2500 MHz frequency bands, or in any portion thereof.
- (21) *Passive satellite.* An earth satellite intended to transmit radio communication signals by reflection.
- (22) *Permitted Space Station List.* A list of satellites including all U.S.-licensed satellites and those non-U.S.-licensed satellites for which the Commission has authorized U.S.-licensed earth stations to communicate with that satellite, and the satellite operator has requested the Commission to place its satellite on the Permitted Space Station List.
- (23) *Power flux density.* The amount of power flow through a unit area within a unit bandwidth. The units of power flux density are those of power spectral density per unit area, namely watts per hertz per square meter. These units are generally expressed in decibel form as dB(W/Hz/m²), dB(W/m²) in a 4 kHz band, or dB(W/m²) in a 1 MHz band.
- (24) *Power spectral density.* The amount of an emission's transmitted carrier power falling within the stated reference bandwidth. The units of power spectral density are watts per hertz and are generally express in decibel form as dB(W/Hz), dB(W/4kHz), or dB(W/1MHz).
- (25) *Protection areas.* The geographic regions on the surface of the Earth where United States Department of Defense ("DoD") meteorological satellite systems or National Oceanic and Atmospheric Administration ("NOAA") meteorological satellite systems, or both such systems, are receiving signals from low earth orbiting satellites.
- (26) *Radiodetermination-Satellite Service.* A radiocommunication service for the purpose of radiodetermination involving the use of one of more space stations. This service may also include feeder links necessary for its own operation. (RR)
- (27) *Routine processing or licensing.* A licensing process whereby applications are processed in an expedited fashion. Such applications must be complete in all regards and consistent with all Commission Rules and must not raise any policy issues. With respect to earth station licensing, an application is "routine" only if it conforms to all antenna, power, coordination, radiation hazard, and FAA notification rules, and accesses only "Permitted Space Station List" satellites in the C-band or Ku-band frequency bands.
- (28) *Satellite Digital Audio Radio Service ("DARS" or "SDARS").* A radiocommunication service in which audio programming is digitally transmitted by one or more space stations directly to fixed, mobile, and/or portable stations, and which may involve complementary SDARS repeaters, telemetry, tracking and control facilities.
- (29) *Satellite system.* A space system using one or more artificial earth satellites.
- (30) *Spacecraft.* A man-made vehicle which is intended to go beyond the major portion of the Earth's atmosphere.
- (31) *Space operation service.* A radiocommunication service concerned exclusively with the operation of spacecraft, in particular space tracking, space telemetry and space telecommand. These functions will normally be provided within the service in which the space station is operating.
- (32) *Space radiocommunication.* Any radiocommunication involving the use of one or more space stations or the use of one or more reflecting satellites or other objects in space.
- (33) *Space station.* A station located on an object which is beyond, is intended to go beyond, or has been beyond, the major portion of the Earth's atmosphere.
- (34) *Space system.* Any group of cooperating earth stations and/or space stations employing space radiocommunication for specific purposes.
- (35) *Space telecommand.* The use of radiocommunication for the transmission of signals to a space station to initiate, modify or terminate function of the equipment on a space object, including the space station.
- (36) *Space telemetering.* The use of telemetering for the transmission from a space station of results of measurements made in a spacecraft, including those relating to the functioning of the spacecraft.

(37) *Space tracking.* Determination of the orbit, velocity or instantaneous position of an object in space by means of radiodetermination, excluding primary radar, for the purpose of following the movement of the object.

(38) *Temporary fixed earth station.* An earth station operating in the Fixed Satellite Service at a fixed location for less than 6 months. Temporary fixed earth stations are transportable facilities that are moved to the point of operation before communicating. They are often used for emergency restoration of service and news gathering functions. Temporary fixed earth stations do not operate while in motion.

(39) *Terrestrial radiocommunication.* Any radiocommunication other than space radiocommunication or radio astronomy.

(40) *Terrestrial station.* A station effecting terrestrial radiocommunication.

(41) *Wideband.* See *Full Transponder.*

22. Amend § 25.202 by removing and reserving paragraph (a)(2) to read as follows:

§ 25.202 Frequencies, frequency tolerance and emission limitations.

* * * * *

(2) [Reserved.]

* * * * *

23. In §25.204, revise paragraphs (a) and (b) to read as follows:

§ 25.204 Power limits.

(a) In bands shared coequally with terrestrial radio communication services, the equivalent isotropically radiated power transmitted in any direction towards the horizon by an earth station operating in frequency bands between 1 and 15 GHz, shall not exceed the following limits except as provided for in paragraph (c) of this section:

- +40 dBW in any 4 kHz band for $\theta < 0^\circ$
- +40+3 θ dBW in any 4 kHz band for $0^\circ < \theta \leq 5^\circ$

where θ is the angle of elevation of the horizon viewed from the center of radiation of the antenna of the earth station and measured in degrees as positive above the horizontal plane and negative below it.

(b) In bands shared coequally with terrestrial radio-communication services, the equivalent isotropically radiated power transmitted in any direction towards the horizon by an earth station operating in frequency bands above 15 GHz shall not exceed the following limits except as provided for in paragraph (c) of this section:

- +64 dBW in any 1 MHz band for $\theta < 0^\circ$
- +64+3 θ dBW in any 1 MHz band for $0^\circ < \theta < 5^\circ$

where θ is as defined in paragraph (a) of this section.

24. In § 25.209, revise paragraph (f) to read as follows:

§25.209 Antenna performance standards.

* * *

(f) An earth station with an antenna not conforming to the standards of paragraphs (a) and (b) of this section will be authorized after February 15, 1985 upon finding by the Commission that unacceptable levels of interference will not be caused under conditions of uniform 2° orbital spacing. An earth station antenna initially authorized on or before February 15, 1985 will be authorized by the Commission to continue to operate as long as such operations are found not to cause unacceptable levels of adjacent satellite interference. In either case, the Commission will impose appropriate terms and conditions in its authorization of such facilities and operations. The applicant has the burden of demonstrating that its antenna not conforming to the standards of paragraphs (a) and (b) of this section will not cause unacceptable interference. This demonstration must comply with the procedures set forth in § 25.220 of this Chapter.

25. In § 25.211, revise paragraph (d) and add paragraphs (e), (f), and (g) to read as follows:

§25.211 Video transmissions in the Fixed-Satellite Services.

* * * * *

(d) An earth station may be routinely licensed for transmission to full transponder services provided:

- (1) In the 6 GHz band, with an antenna equivalent diameter 4.5 meters or greater, the maximum power into the antenna does not exceed 26.5 dBW; or
- (2) In the 14 GHz band, with an antenna equivalent diameter 1.2 meters or greater, the maximum power into the antenna does not exceed 27 dBW.

(e) Antennas with an equivalent diameter smaller than those specified in paragraph (d) of this section are subject to the provisions of Section 25.220 of this Chapter, which may include power reduction requirements. These antennas will not be routinely licensed for transmission of full transponder services.

(f) Each applicant for authorization for video transmissions in the fixed-satellite service proposing to use transmitted satellite carrier EIRP densities, and/or maximum power into the antenna in excess of those specified in Section 25.211(d), must comply with the procedures set forth in § 25.220 of this Chapter.

(g) The Commission has authority to apply the power level limits in this section to earth station applications for authority to operate in any other FSS frequency band to the extent it deems necessary to prevent unacceptable interference into adjacent satellite systems, to the extent that power limits have not been established elsewhere in this Part.

26. In § 25.212, revise paragraph (c) by adding language to the end of the paragraph, redesignate paragraph (d) as paragraph (d)(1), adding language to the end of paragraph (d)(1), and adding new paragraphs (d)(2), (e), and (f) to read as follows:

§ 25.212 Narrowband transmissions in the Fixed-Satellite Service.

(c) * * * Antennas with an equivalent diameter smaller than 1.2 meters in the 14 GHz band are subject to the provisions of §25.220 of this chapter, which may include power reduction requirements.

(d)(1) * * * Antennas with an equivalent diameter smaller than 1.2 meters in the 14 GHz band are subject to the provisions of §25.220 of this chapter, which may include power reduction requirements.

(d)(2) In the 6 GHz band, an earth station with an equivalent diameter antenna of 4.5 meters or greater may be routinely licensed for transmission of SCPC services if the maximum power spectral densities into the antenna do not exceed + 0.5 dB(W/4kHz) for analog SCPC carriers with bandwidths up to 200 kHz and do not exceed $-2.7 - 10\log(N)$ dB (W/4kHz) for narrow and/or wideband digital SCPC carriers.

- (i) For digital SCPC using frequency division multiple access (FDMA) or time division multiple access (TDMA) technique, N is equal to one.
- (ii) For digital SCPC using code division multiple access (CDMA) technique, N is the likely maximum number of co-frequency simultaneously transmitting earth stations in the same satellite receiving beam.
- (iii) For digital SCPC using contention Aloha multiple access technique, N is equal to two.
- (iv) For digital SCPC using contention CDMA/Aloha multiple access technique, N is twice the likely maximum number of co-frequency simultaneously transmitting earth stations in the same satellite-receiving beam without contention.

(e) Each applicant for authorization for narrowband transmissions in the fixed-satellite service proposing to use transmitted satellite carrier EIRP densities, and/or maximum antenna input power densities in excess of those specified in paragraph (c) of this Section for Ku-band service, or paragraph (d) of this Section for C-band service, respectively, must comply with the procedures set forth in § 25.220 of this Chapter.

(f) The Commission has authority to apply the power level limits in this section to earth station applications for authority to operate in any other FSS frequency band to the extent it deems necessary to prevent unacceptable interference into adjacent satellite systems, to the extent that power limits have not been established elsewhere in this Part.

27. Revise Part 25 by adding new § 25.220 to read as follows:

§ 25.220 Non-conforming transmit/receive earth station operations.

- (a)(1) This section applies to earth station applications in which:
 - (i) the proposed antenna does not conform to the standards of §25.209(a) and (b) of this Chapter, and/or
 - (ii) the proposed power density levels are in excess of those specified in §25.134, §25.211, or §25.212 of this Chapter, or those derived by the procedure set forth in paragraph (c)(1) of this Section, whichever is applicable.
- (2) Paragraphs (b) through (e) of this section apply to the earth station applications described in paragraph (a)(1) of this section, in which the applicant seeks transmit/receive authority.

(3) Paragraph (f) of this section applies to the earth station applications described in paragraph (a)(1) of this section in which the applicant seeks transmit-only or receive-only authority.

(4) The requirements for petitions to deny applications filed pursuant to this section are set forth in Section 25.154 of this Chapter.

(b) If an antenna proposed for use by the applicant does not comply with the antenna performance standards contained in §25.209(a) and (b), the applicant must provide, as an exhibit to its FCC Form 312 application, the antenna gain patterns specified in §25.132(b) of this Chapter.

(c) If an antenna proposed for use by the applicant does not comply with the performance standards contained in §25.209(a) and (b), the applicant must meet the requirements of either paragraph (c)(1) or (c)(2) of this Section to obtain protection from receiving interference from adjacent satellite operators. The applicant must meet the requirements of either paragraph (c)(1) or (c)(3) of this Section to obtain authority to transmit.

(1) The applicant must provide in its Form 312, Schedule B, the power and power density levels that result by reducing the values stated in §25.134, §25.211, or §25.212, whichever is applicable, by the number of decibels that the non-compliant antenna fails to meet the antenna performance standard of §25.209(a) and (b), or

(2) The applicant will not receive protection from adjacent satellite interference from any satellite unless the applicant has provided the affidavits listed in paragraph (d)(1) of this Section from the operator of that satellite(s).

(3) The applicant will not be permitted to transmit to any satellite unless the applicant has provided the affidavits listed in paragraph (e)(1) of this Section from the operator of that satellite(s).

(d)(1) If an antenna proposed for use by the applicant does not comply with the performance standards contained in §25.209(a) and (b), the applicant must submit the affidavits listed in paragraphs (d)(1)(i) through (d)(1)(iv) of this Section to qualify for protection from receiving interference from other satellite systems. The applicant will be granted protection from receiving interference only with respect to the satellite systems included in the coordination agreements referred to in the affidavit required by paragraph (d)(1)(ii) of this section, and only to the extent that protection from receiving interference is afforded by those coordination agreements.

(i) a statement from the satellite operator acknowledging that the proposed operation of the subject non-conforming earth station with its satellite(s) has the potential to receive interference from adjacent satellite networks that may be unacceptable.

(ii) a statement from the satellite operator that it has coordinated the operation of the subject non-conforming earth station accessing its satellite(s), including its required downlink power density based on the information contained in the application, with all adjacent satellite networks within 6° of orbital separation from its satellite(s), and the operations will not violate any existing coordination agreement for its satellite(s) with other satellite systems.

(iii) a statement from the satellite operator that it will include the subject non-conforming earth station operations in all future satellite network coordinations, and

(iv) a statement from the Earth station applicant certifying that it will comply with all coordination agreements reached by the satellite operator(s).

(2) A license granted pursuant to paragraph (d)(1) of this section will include, as a condition on that license, that if no good faith agreement can be reached between the satellite

operator and the operator of a future 2° compliant satellite, the earth station operator shall accept the power density levels that would accommodate the 2° compliant satellite.

(e)(1) An earth station applicant proposing to use transmitted satellite carrier EIRP densities, and/or maximum power into the antenna in excess of the levels in §25.134, §25.211, §25.212, or the power density levels derived through the procedure set forth in paragraph (c)(1) of this Section, whichever is applicable, shall provide the following affidavits as an exhibit to its earth station application:

(i) a statement from the satellite operator acknowledging that the proposed operation of the subject non-conforming earth station with its satellite(s) has the potential to create interference to adjacent satellite networks that may be unacceptable.

(ii) a statement from the satellite operator that it has coordinated the operation of the subject non-conforming Earth Station accessing its satellite(s), and its corresponding downlink power density requirements (based on the information contained in the application) with all adjacent satellite networks within 6° of orbital separation from its satellite(s), and the operations will not violate any existing coordination agreement for its satellite(s) with other satellite systems.

(iii) a statement from the satellite operator that it will include the subject non-conforming Earth Station power and power densities in all future satellite network coordinations, and

(iv) a statement from the Earth station applicant certifying that it will comply with all coordination agreements reached by the satellite operator(s).

(2) A license granted pursuant to paragraph (e)(1) of this section will include, as a condition on that license, that if no good faith agreement can be reached between the satellite operator and the operator of a future 2° compliant satellite, the earth station operator shall reduce its power to those levels that would accommodate the 2° compliant satellite.

(f)(1) If an earth station applicant requests transmit-only authority, and its proposed antenna does not conform to the standards of §25.209(a) and (b) of this Chapter, it must meet the requirements of paragraphs (b) and (c) of this section.

(2) If an earth station applicant requests transmit-only authority, and its proposed proposed power density levels are in excess of those specified in §25.134, §25.211, or §25.212 of this Chapter, or those derived by the procedure set forth in paragraph (c)(1) of this section, it must meet the requirements of paragraph (e) of this section.

(3) If an earth station applicant requests receive-only authority, and its proposed antenna does not conform to the standards of §25.209(a) and (b) of this Chapter, it must meet the requirements of paragraphs (b) and (d) of this section.

28. In § 25.274, revise paragraph (g) to read as follows:

§25.274 Procedures to be followed in the event of harmful interference.

* * * * *

(g) Where the earth station suspected of causing interference to the operations of another earth station cannot be identified or is identified as an earth station operating on a satellite system other than the one on which the earth station suffering undue interference is operating, it is the responsibility of a representative

of the earth station suffering harmful interference to contact the control center of other satellite systems. The operator of the earth station suffering undue interference is free to choose any representative to make this contact, including but not limited to the operator of the satellite system on which the earth station is operating. The operator of the earth station suffering undue interference is also free to contact the control center of the other satellite systems directly.

29. Amend § 25.277 by adding paragraph (f) to read as follows:

§25.277 Temporary fixed earth station operations.

* * * * *

(f) Filing requirements concerning applications for new temporary fixed earth station facilities operating in frequency bands shared co-equally with terrestrial fixed stations.

(1) When the initial location of the temporary fixed earth station's operation is known, the applicant shall provide, as part of the Form 312 application, a frequency coordination report in accordance with §25.203 for the initial station location.

(2) When the initial location of the temporary fixed earth station's operation is not known at the time the application is filed, the applicant shall provide, as part of the Form 312 application, a statement by the applicant acknowledging its coordination responsibilities under §25.277.

30. Subpart H
Remove Subpart H

Appendix C

*** DRAFT ***

FCC Form 312 Schedule S
Satellite Space Station Authorizations
(Technical and Operational Description)

General Information

- 1. Space Station or Satellite Network Name.....
2. Construction Commencement Date.....
3. Construction Completion Date.....
4. Estimated Launch Date.....
5. Estimated Date of Placement into Service.....
6. Estimated Lifetime of Satellite(s)..... Years
7. Administration Responsible for the station(s).....
8. Other Participating Administrations.....
9. Operating Agency or Company....
10. Will the space station(s) operate on a Common Carrier basis? ___ Yes ___ No
10a. Total number of transponders: _____
10b. Total transponder bandwidth (no. transponders x bandwidth) = _____ MHz
10c. Number of transponders offered on a noncommon carrier basis: _____
10d. Total noncommon carrier transponder bandwidth = _____ MHz
11. Orbit Type: ___ Geostationary Orbit ___ Non-Geostationary Orbit

Orbital Information For Geostationary Satellites Only

- 12. Nominal Orbital Longitude (Degrees E/W).....
12a. Alternate Orbital Locations (Degrees E/W)..._____, _____, _____, _____
13. Longitudinal Tolerance or E/W Station-Keeping To West..... Degrees
14. Longitudinal Tolerance or E/W Station-Keeping To East..... Degrees
15. Inclination Excursion or N/S Station-Keeping Tolerance..... Degrees
16. Visibility Arc (Degrees E/W): From West.....
To East.....
17. Service Arc (Degrees E/W): From West.....
To East.....

*Transponder gain between output of receiving antenna and input of transmitting antenna.

25. Typical Emissions For each planned type of emission provide:

Asso- ciated Trans- ponder (ID Range)	Emission Designat or	Emis- sion Band- width (kHz)	Receive Band (Emission from Associated Transmitting Station)					Transmit Band (Emission from This Space Station)				Total Clear Sky C/N Objec- tive (dB)	
			Maximu m Antenna Gain (dBi)	Transmit Power (dBW)		Power Density (dBW/Hz)		EIRP (dBW)		EIRP Density (dBW/Hz)			
				Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.		

In addition to the information required in this Form, the space station applicant is required to provide all the information specified in Section 25.114 of the Commission's rules, 47 C.F.R. § 25.114.

Appendix D
Proposed Revisions to Form 312

FCC Form 312EZ Qualification Questions

For purposes of this form, "you" are an applicant for an earth station license. You must be able to answer YES to all of the following questions in order to use this form 312EZ to file an earth station application. If you cannot answer "YES" to any of the following questions cannot be answered "YES", then you must use FCC Form 312.

01. Application, Frequency Bands, Satellites, and Service: Are you applying for a NEW earth station license (*i.e.*, one that has not been previously licensed)? Will you operate your proposed earth station ONLY within the C-band (3700-4200 MHz and 5925-6425 MHz) or Ku-band (11.7-12.2 GHz and 14.0-14.5 GHz)? Will you operate your proposed earth station operate ONLY with U.S.-licensed or Permitted List geostationary satellites? Will your proposed earth station be a fixed earth station or temporary-fixed earth station that will operate only in the Fixed Satellite Service on a non-Common Carrier basis?

YES _____ NO _____

02. Rules and Waivers: Does your proposed earth station and its operation conform to all technical, procedural, and operational requirements of the FCC Rules and Regulations (47 CFR) and therefore requires NO waivers or exemptions from any of the Commission's Rules?

YES _____ NO _____

03. Antenna Standard: Do(es) your proposed antenna(s) comply with the antenna gain standard specified in Section 25.209(a) and (b) as demonstrated by the manufacturer's qualification measurements?

YES _____ NO _____

04. Power Levels: Does your proposed earth station operation conform with all routine power and power density rules contained in Sections 25.211 and 25.212?

YES _____ NO _____

05. Frequency Coordination: If you will operate your proposed earth station in the C-band (3700-4200 MHz and 5925-6425 MHz), have you completed frequency coordination and attached Frequency Coordination Report to this application?

YES _____ NO _____

28. Environmental Policy: Do you certify that Commission grant of any proposal in this application will NOT have a significant environmental impact as defined by 47 CFR Section 1.1307?

YES _____ NO _____

06. Radiation Hazard: If you are asking for a transmit/receive or transmit-only earth station license, has a Radiation Hazard Study (refer to OET Bulletin 65) been completed and will this Radiation Hazard Study be attached as an exhibit to this application?

YES _____ NO _____

07. FAA Notification: Can you answer "yes" to one or more of the following questions?

- a. Have you completed FCC Form 854?
- b. Have you attached an FAA study regarding the potential hazard of the structure to aviation as an exhibit to this application?
- c. Can you certify that FAA notification is not required under 47 CFR Part 17 and 47 CFR Section 25.113(c)?

YES _____ NO _____

29. **Alien Ownership:** Can you answer "yes" to all of the following questions?

- a. Do you certify that you are not a foreign government or a representative of a foreign government?
 - b. Do you certify that you are not an alien, or the representative of an alien?
 - c. Do you certify that you are not a corporation organized under the laws of any foreign government?
 - d. Do you certify that you are not a corporation of which more than one-fifth of the capital stock is owned of record or voted by aliens or their representatives or by a foreign government or representative thereof or by any corporation organized under the laws of a foreign country?
 - e. Do you certify that you are not a corporation directly or indirectly controlled by any other corporation of which more than one-fourth of the capital stock is owned of record or voted by aliens, their representatives, or by a foreign government or representative thereof or by any corporation organized under the laws of a foreign country?
- YES _____ NO _____

36. **Revoked or Denied Authorization:** Do you certify that the applicant or any party to this application has NOT had any FCC station authorization or license revoked or had any application for an initial, modification or renewal of FCC station authorization, license or construction permit denied by the Commission?

YES _____ NO _____

37. **Felony Conviction:** Do you certify that neither nor any party to this application, nor any party directly or indirectly controlling your company, has EVER been convicted of a felony by any state or federal court?

YES _____ NO _____

38. **Monopolizing Radio Communication:** Do you certify that NO court has finally adjudged the applicant, or any person directly or indirectly controlling the applicant, guilty of unlawfully monopolizing or attempting unlawfully to monopolize radio communication, directly or indirectly, through control of manufacture or sale of radio apparatus, exclusive traffic arrangement or any other means or unfair methods of competition?

YES _____ NO _____

39. **Pending Matters:** Do you certify that neither you nor any person directly or indirectly controlling the applicant, is not currently a party in any pending matter referred to in the preceding two items?

YES _____ NO _____

41. **Denial of Federal Benefits:** Does the undersigned certify that neither the applicant nor any other party to the application is subject to a denial of Federal benefits that includes FCC benefits pursuant to Section 5301 of the Anti-Drug Act of 1988, 21 U.S.C. Section 862, because of a conviction for possession or distribution of a controlled substance? See 47 CFR Section 1.2002(b) for the meaning of "party to the application" for these purposes.

YES _____ NO _____

[Note: Questions 28, 29, 36, 37, 38, 39, and 40 are related to questions with the same numbers on the Main Form of FCC Form 312.]

FCC 312-EZ

APPLICANT INFORMATION

1. Legal Name of Applicant		2. Voice Telephone Number		FCC Use Only File Number:	
3. Other Name Used for Doing Business (if any)		4. Fax Telephone Number		Call Sign:	
5. Mailing Street Address or P.O. Box		6. City		E-mail Address:	
ATTENTION:		7. State / Country (if not U.S.A.)		8. Zip Code	
9. Name of Contact Representative (if other than applicant)		10. Voice Telephone Number		11. Firm or Company Name	
11. Firm or Company Name		12. Fax Telephone Number		E-mail Address:	
13. Mailing Street Address or P.O. Box		14. City		15. State / Country (if not U.S.A.)	
ATTENTION:		16. Zip Code		Fee Number:	

TYPE OF APPLICATION, SERVICE, AND STATION

17. Classification of Earth Station filing. Mark only one. <input type="checkbox"/> b1. Application for License of New Station <input type="checkbox"/> b2. Application for Registration of New Domestic Receive-Only Station	20. NATURE OF SERVICE: <input type="checkbox"/> a. Fixed Satellite	21. STATUS: <input type="checkbox"/> b. Non-Common Carrier	22. Satellites to be accessed <input type="checkbox"/> a. Using Only GSO satellites on the Permitted List
24. FREQUENCY BAND(S): Mark all applicable frequency band(s). <input type="checkbox"/> a. C-Band (4/6 GHz) <input type="checkbox"/> b. Ku-Band (12/14 GHz)	25. CLASS OF STATION: Mark only one class. <input type="checkbox"/> a. Fixed Earth Station <input type="checkbox"/> b. Temporary-Fixed Earth Station	26. TYPE OF EARTH STATION FACILITY: Mark only one. <input type="checkbox"/> a. Transmit/Receive <input type="checkbox"/> b. Transmit-Only <input type="checkbox"/> c. Receive-Only	

43. Description. (Summarize the nature of the application and the services to be provided).

Exhibit No.	Identify all exhibits that are attached to this application.

CERTIFICATION

The Applicant waives any claim to the use of any particular frequency or of the electromagnetic spectrum as against the regulatory power of the United States because of the previous use of the same, whether by license or otherwise, and requests an authorization in accordance with this application. The applicant certifies that grant of this application would not cause the applicant to be in violation of the spectrum aggregation limit in 47 CFR Part 20. All statements made in exhibits are a material part hereof and are incorporated herein as if set out in full in this application. The undersigned, individually and for the applicant, hereby certifies that all statements made in this application and in all attached exhibits are true, complete and correct to the best of his or her knowledge and belief, and are made in good faith.

44. Applicant is a (an): (Place an "X" in the box next to applicable response.)
 a. Individual
 b. Unincorporated Association
 c. Partnership
 d. Corporation
 e. Governmental Entity
 f. Other (Please specify) _____

45. Typed Name of Person Signing _____
 46. Title of Person Signing _____

47. Signature _____
 48. Date _____

WILLFUL FALSE STATEMENTS MADE ON THIS FORM ARE PUNISHABLE BY FINE AND/OR IMPRISONMENT (U.S. Code, Title 18, Section 1001), AND/OR REVOCATION OF ANY STATION AUTHORIZATION (U.S. Code, Title 47, Section 312(a)(1)), AND/OR FORFEITURE (U.S. Code, Title 47, Section 503).

FCC 312-EZ

B1. Location of Earth Station Site. If temporary-fixed specify area of operation and point of contact.

B1a. Station Call Sign	B1b. Site Identifier*	B1c. Telephone Number	N/S Geographic Coordinates C-eg. - Min. - Sec. - E/W
B1d. Street Address of Station or Area of Operation	B1e. Name of Contact Person	B1f. Zip Code	Lat. _____ Lon. _____
B1f. City	B1g. County	B1h. State	B1i. Site Elevation (AMSL) meters

Coordinates are:
 NAD-27
 NAD-83

B2. Points of Communications: ALSAT B3. Destination points for communications using non-U.S. licensed satellites. N/A

B4. Earth Station Antenna Facilities:

(a) Site ID*	(b) Antenna ID**	(c) Quantity	(d) Manufacturer	(e) Model	(f) Antenna Size (meters)	(g) Antenna Gain Transmit and/or Receive (____ dBi at ____ GHz)

B5. Antenna Heights and Maximum Power Limits: (The corresponding Antenna ID in tables B4 and B5 applies to the same antenna)

(a) Antenna ID**	(b) Antenna Structure Registration No.	(c) Maximum Antenna Height		(e) Building Height Above Ground Level (meters)***	(f) Maximum Antenna Height Above Rooftop (meters)***	(g) Total Input Power at antenna flange (Watts)	(h) Total EIRP for all carriers (dBW)
		(d) Above Ground Level (meters)	(d) Above Mean Sea Level (meters)				

Notes: * Identify the site (Item B1b) where each antenna is located.
 ** Identify each antenna in multi-antenna station with a unique identifier, such as A1, A2, 10M, 12M, 7M, etc. Use this same antenna ID throughout tables B4, B5, B6, and B7 when referring to the same antenna.
 *** Attach sketch of site or exemption. See 47 CFR Part 17.

B6. Frequency Coordination Limits:

(a) Antenna ID*	(b) Frequency Limits (MHz)	(c) Range of Satellite Arc Eastern Limit**	(c) Range of Satellite Arc Western Limit**	(d) Range of Satellite Arc	(e) Antenna Elevation Angle Eastern Limit	(e) Antenna Elevation Angle Western Limit	(f) Earth Station Azimuth Angle Eastern Limit	(f) Earth Station Azimuth Angle Western Limit	(g) Maximum EIRP Density toward the Horizon (dBW/4kHz)

Notes: * Provide the ANTENNA-ID from table B4 to identify the antenna to which each frequency band and orbital arc range is associated.
 ** For with geostationary satellites, give the orbital arc limits and the associated elevation and azimuth angles.

B7. Particulars of Operation (Full particulars are required for each r.f. carrier):

(a) Antenna ID*	(b) Frequency Bands (MHz)	(c) T/R Mode **	(d) Antenna Polarization (H,V,L,R)	(e) Emission Designator	(f) Maximum Power per Carrier (dBW)	(g) Maximum Power Density per Carrier (dBW/4kHz)	(h) Description of Modulation and Services

Notes: * Provide the ANTENNA-ID from table B4 to identify the antenna to which each frequency band and emission is associated.
 ** Indicate whether the earth station transmits or receives in each frequency band.

APPENDIX E

Technical Analysis for Proposed VSAT Multiple Access Rules

I. Introduction

In this Appendix, we explain how we derived the formula in our proposed Section 25.134(a)(1). First, we address the Poisson distribution issue raised in response to Spacenet's petition for declaratory ruling, and then explain how we derived the formula from the Poisson distribution. Subsequently, we explain how we derived the values for N specified in Sections 25.134(a)(1)(i) through (iv).

II. The Formula

A. Poisson Distribution

In response to Spacenet's petition for declaratory ruling, ALOHA Networks, Inc. claimed that Spacenet erred by basing its calculations on a "Poisson" probability distribution rather than a binomial probability distribution. The Bureau did not reach this issue in its Order, but deferred to this proceeding.¹ Strictly speaking, ALOHA is not a Poisson process. However, because of low numbers, the large number of anticipated VSAT remote stations (e.g. 5000 terminals), and the probability $P\{k\}$ of occurrence that five or more of those terminals will be simultaneously transmitting is sufficiently small, the characteristics of ALOHA approach the Poisson probability distribution. Furthermore, the academic community has studied the Aloha access technique, and it generally agrees that the Poisson probability distribution is best suited to the Aloha access technique.²

B. Derivation of Formula

Proposed Section 25.134(a)(1) is as follows:

The maximum transmitter power spectral density of a digital modulated carrier into any GSO FSS earth station antenna shall not exceed $-14.0 - 10 \cdot \log(N)$ dB(W/4 kHz).

Below, we first discuss our derivation of the "-14" term. We then discuss our derivation of the $10 \cdot \log(N)$ term.

The -14 term is based on the Commission's routine licensing rules. In the 1983 *Two Degree Spacing Order*, the Commission determined the maximum power spectral density and minimum earth station antenna size that would allow earth stations to communicate in the Ku-band with a space station located as close as two degrees away from adjacent satellite systems without causing unacceptable interference to those adjacent satellite systems. Later, in the *1987 VSAT Order*, the Commission's staff supplemented the conclusions of the *Two Degree Spacing Order*, and found that the maximum power spectral density for VSAT remote earth stations in the Ku-band consistent with a two-degree-spacing environment is -14 dBW/4kHz. See 47 C.F.R. § 25.134(a); *1987 VSAT Order*, 2 FCC Rcd at 2150 (para. 9).

¹ *Spacenet Order* at paras. 13-14.

² See W. Stallings, *Data and Computer Communications* at 298-99 (2nd ed., 1988); M. Richharia, *Satellite Communications Systems: Design Principles* at 249 (1995).

The $10 \cdot \log(N)$ term is derived from our conclusion that, when a number of N earth stations are transmitting to the same space station, in the same frequency band, at the same time, at the maximum power level specified in our two-degree-spacing rules, the combined power radiated to space would be N-fold of that by a single earth station transmitting continuously by the Rule. As a result, in order to prevent these simultaneous transmissions from causing unacceptable interference to adjacent satellite systems in a two-degree-spacing environment, each earth stations involved would have to reduce power spectral densities in a equal share total to the same amount exceeds the rule limit. The $10 \cdot \log(N)$ term effectively divides the required total power density reduction equally among the N earth stations emitting colliding transmissions, so that when the transmissions collide, the total power emission to space cannot exceed -14 dBW/4 kHz, our rule limit.

III. The N Values

A. Summary of Multiple Access Techniques

In summary, there are two types of multiple access techniques that have been developed for VSAT networks. The first type is a "reservation" technique, in which each transmitting earth station operates in a preassigned or predetermined fashion. One example is TDMA, in which each earth station operates only during predetermined times. The second type is a "contention" technique, in which earth stations are allowed to transmit randomly, and there is a possibility that transmissions will collide. We discuss below all the current multiple access techniques and the "N" value we plan to employ in our proposed formula for each technique.

B. Reservation TDMA

Time division multiple access (TDMA) is the allocation or the use of the full available bandwidth to every user in the network in sequence of a limited amount of non-over lapping time, called a time slot, in a specific time interval, called TDMA frame period. The summation of the time slots is equal to the time frame period. This time-slotted transmission provides interference isolation between the users within the network. In other words, if we compare a VSAT network to several people in a room, TDMA would assign a particular time for each person to talk.

Proposed Section 25.134(a)(1)(i) sets N equal to 1 for TDMA networks. Because TDMA guarantees that no more than one remote earth station will transmit at any one time, there is no likelihood of simultaneous transmissions. Therefore, there is no need to require remote earth stations in a VSAT network using TDMA to reduce their power spectral density. In other words, under conventional access techniques such as TDMA (or FDMA), channels are pre-assigned or demand-assigned. This scheme guarantees only one station can transmitting at a time. Thus, we can define $N=1$, the maximum power spectral density for each earth station to operate on is

$$\begin{aligned}
 -14 - 10 \cdot \log(N) &= -14 - 10 \cdot \log(1) \\
 &= -14 - 0 \\
 &= -14 \quad [\text{dBW/4 kHz}]
 \end{aligned}$$

C. Reservation FDMA

Frequency division multiple access (FDMA) is the allocation of a subband of an available bandwidth to every user in the network. The summation of all subbands is equal to the total available bandwidth. This band segmentation provides the interference isolation between the users in the network.

If we compare a VSAT network to several people in a room, FDMA would assign a particular part of the room to each person. Several conversations could go on simultaneously because each conversation would be limited to a particular part of the room.

Proposed Section 25.134(a)(1)(i) sets N equal to 1 for FDMA networks. Because TDMA guarantees that no more than one remote earth station will transmit at a given frequency band, there is no likelihood of simultaneous transmissions. Thus, similar to TDMA, there is no need to require remote earth stations in a VSAT network using TDMA to reduce their power spectral density. In other words, under conventional access techniques such as TDMA (or FDMA), channels are pre-assigned or demand-assigned. This scheme guarantees only one station can transmitting at a time. Thus, we can define N=1, the maximum power spectral density for each earth station to operate on is

$$\begin{aligned}
 -14 - 10 \cdot \log(N) &= -14 - 10 \cdot \log(1) \\
 &= -14 - 0 \\
 &= -14 \quad [\text{dBW/4 kHz}]
 \end{aligned}$$

D. Reservation CDMA

In the code division multiple access (CDMA), the entire available bandwidth is allocated to every user for all time. The interference isolation among the users in a network is derived from the modulating digital codes. The number of available distinct digital codes determines the number of simultaneous users in a network. In the room analogy, everyone is allowed to speak at any time, and anywhere in the room, but everyone must use a different language. A listener can focus on one speaker and hear that speaker clearly because other speakers using other languages seem to be background noise.

In a VSAT network using CDMA, several remote earth stations transmit simultaneously. Each transmission is spread over a wider bandwidth, and is transmitted at reduced power. Using wider bandwidth allows each transmission to carry more information. Using lower power levels allows the VSAT network to transmit several messages at the same time without causing interference into other satellite systems.

For VSAT networks using CDMA, proposed Section 25.134(a)(1)(ii) sets N equal to the likely maximum number of earth stations transmitting simultaneously in the same frequency band in the same satellite receiving beam. Because CDMA allows N users to transmit signals simultaneously on the same channel, we must ensure that the combining total transmission power will not exceed the max power allowed by the Rule. To prevent from excessive power being transmitted to the channel, we require that total transmission power permitted be equally divided by number of users (*e.g.*, N users). As a result, the max power spectral density for each transmitting station is

$$-14 - 10 \cdot \log(N) \quad [\text{dBW/4 kHz}]$$

This ensures that the VSAT network as a whole reduces its power spectral density by 3 dB regardless of the number of remote earth stations transmitting simultaneously.

E. TDMA/Aloha

Aloha is a random TDMA system. The avoidance of transmission collision (*i.e.*, avoiding mutual interference) depends on the short duration of the transmission and the infrequent activation of transmission. In the room analogy, the people are allowed speak whenever they want, wherever they want, and they all speak the same language. There will be occasions when two people speak at the same time,

but based on statistical probability studies, it can be assumed that it will not happen very often if the number of people allowed to speak at the same time is kept within a certain limit.

In other words, this is a variation of the TDMA multiple access technique, with a contention protocol (ALOHA), which implies that the channel, or the time slot, is not reserved. First, because this is a variation of TDMA, we know that during its time slot, the user acquires the full band and does not share the bandwidth with anyone else. Therefore, $N = 1$, and the reduction of the first part is

$$-10 \cdot \log(N) = -10 \cdot \log(1) = 0 \quad [\text{dB}]$$

Second, under the conditions proposed by the Spacenet (Poisson distribution with 38% channel load), we determine that a smaller than 1% probability of carrier collision would be acceptable as a good tradeoff. Based on this condition, we found that likelihood of two-station ($N=2$) colliding is greater than 1% and therefore, a power spectral density adjustment is required. Thus,

$$-10 \cdot \log(N) = -10 \cdot \log(2) = -3 \quad [\text{dB}]$$

Combining the two parts, we obtain max power spectral density for each station in TDMA/ALOHA scheme is

$$-14 + 0 + (-3) = -17 \quad [\text{dBW}/4 \text{ kHz}]$$

To summarize, proposed Section 25.134(a)(1)(iii) sets N equal to 2 for VSAT networks using the Aloha multiple access technique. There is a statistically significant probability of two remote earth stations transmitting simultaneously, but the probability of three or more earth stations transmitting simultaneously is not statistically significant. Setting N equal to two ensures that the power spectral density of two remote earth stations is reduced by 3 dB when those two earth stations are transmitting simultaneously.

F. CDMA/Aloha

A VSAT network could also use a combination of the CDMA and Aloha multiple access techniques. In other words, transmissions could be given codes to distinguish them from most other transmissions, and the VSAT network could rely on Aloha-type statistical calculations to keep simultaneous transmissions of signals with the same code within acceptable limits.

We start here as we started in Section III.E. of this Appendix. All users, N , can transmit simultaneously, so the adjustment for CDMA is

$$-10 \cdot \log(N) \quad [\text{dB}]$$

For the second part, again as it is a contention scheme and we found under the Spacenet's proposed condition, the likelihood of two-station ($N=2$) collision is greater than 1% margin. Therefore, the adjustment for this is

$$-10 \cdot \log(N) = -10 \cdot \log(2) \quad [\text{dB}]$$

Combining the two parts, we have

$$\begin{aligned} -14 - 10 \log(N) - 10 \log(2) &= -14 - (10 \log(N) + 10 \log(2)) \\ &= -14 - 10 \log(2N) \end{aligned}$$

where N is the intended number of simultaneous transmission.

Based on these calculations, our proposed Section 25.134(a)(1)(iv) sets N equal to two times the likely maximum number of co-frequency simultaneously transmitting earth stations in the same satellite-receiving beam without contention. In other words, this is two for the simple Aloha technique times the N for the CDMA technique in proposed Section 25.134(a)(1)(ii). This ensures that the VSAT network as a whole reduces its power spectral density by 3 dB, regardless of the number of remote earth stations transmitting simultaneously.

APPENDIX F

Adoption of Current Power Limits

In 1986, the Commission adopted a routine licensing procedure and technical standards for VSAT networks in our *VSAT Order*.¹ The diameter the of hub station antenna employed at the time the *1986 VSAT Order* was 5 meters or larger. The identical remote antennas were 1.2 meters or larger.² We established a maximum outbound downlink EIRP spectral density of +6.0 dBW/4 kHz, a maximum input power spectral density into the VSAT antenna of -14 dBW/4 kHz and a maximum hub EIRP of 78.3 dBW for operation in a digital VSAT network.³

A routine licensing procedure and technical standards were adopted for small earth stations providing full transponder service and analog narrowband single channel per carrier (SCPC) services in the *1987 VSAT Order*.⁴ The *1987 VSAT Order* established a maximum downlink EIRP power spectral density of +13.0 dBW/4 kHz and a maximum input power spectral density limit of -8.0 dBW/4 kHz with a bandwidth of 200 kHz into a 1.2-meter Ku-band antenna.⁵

In the *1996 Streamlining Order*, the Commission extended the maximum input power limits of Section 25.212 to all other FSS earth stations, regardless of antenna size and signal bandwidth.⁶ Under the present rules for Ku-band satellite communications, we authorize earth station antennas 1.2 meters or larger for SCPC services if the maximum power spectral density into the antenna does not exceed +8 dBW/4 kHz in a narrowband analog SCPC carrier, and -14 dBW/4 kHz in a narrowband or wideband digital carrier.⁷ Also, under the present rules for C-band communications, we authorize earth station antennas 4.5 meters or larger for SCPC services if the maximum power spectral density into the antenna does not exceed +0.5 dBW/4 kHz in a narrowband analog SCPC carrier, and -2.7 dBW/4 kHz in a narrowband or wideband digital SCPC carrier.⁸ The power limits for full transponder service are contained in Section 25.211(d).

¹ Routine Licensing of Large Networks of Small Antenna Earth Stations Operating in the 12/14 GHz Frequency Bands, 51 Fed. Reg. 15067 (Apr. 22, 1986) (*1986 VSAT Order*). See also 47 C.F.R. §25.134(a).

² *1986 VSAT Order*, 51 Fed. Reg. at 15068.

³ *1986 VSAT Order*, 51 Fed. Reg. at 15068.

⁴ Routine Licensing of Earth Stations in the 6 GHz and 14 GHz Bands Using Antennas Less than 9 Meters and 5 Meters in Diameter, Respectively, for Both Full Transponder and Narrowband Transmissions, Declaratory Order, 2 FCC Rcd 2149 (Com. Car. Bur. 1987) (*1987 VSAT Order*). See also 47 C.F.R. §§25.211, 25.212.

⁵ *1987 VSAT Order*, 2 FCC Rcd at 2150 (para. 6).

⁶ *1996 Streamlining Order*, 11 FCC Rcd at 21596-97 (paras. 38-39).

⁷ 47 C.F.R. § 25.212(c).

⁸ 47 C.F.R. § 25.212(d).

APPENDIX G

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 of Proposed Rulemaking. 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 of Proposed Rulemaking provided above in Section IX. The Commission will send a copy of the Notice of Proposed Rulemaking, including this IRFA, to the Chief Counsel for Advocacy of the Small Business Administration. *See* 5 U.S.C. § 603(a). In addition, the Notice of Proposed Rulemaking and IRFA (or summaries thereof) will be published in the Federal Register.

A. Need for, and Objectives of, the Proposed Rules

The Telecommunications Act of 1996 requires the Commission in every even-numbered year beginning in 1998 to review all regulations that apply to the operations or activities of any provider of telecommunications service and to determine whether any such regulation is no longer necessary in the public interest due to meaningful economic competition.

Our objective is to repeal or modify any rules in Part 61 that are no longer necessary in the public interest, as required by Section 11 of the Communications Act of 1934, as amended.

B. Legal Basis

The proposed action is supported by Section 11 of the Communications Act of 1934, as amended, 47 U.S.C. § 161.

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 proposed rules, if adopted.² The RFA generally defines the term "small entity" as having the same meaning as the terms "small business," "small organization," and "small governmental jurisdiction."³ In addition, the term "small business" has the same meaning as the term "small business concern" under the Small Business Act.⁴ A small business concern is one which: (1) is independently owned and operated; (2) is not dominant in its field of operation; and (3)

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, 110 Stat. 847 (1996) (CWAAA). Title II of the CWAAA is the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA).

² 5 U.S.C. § 603(b)(3).

³ *Id.* § 601(6).

⁴ 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).

satisfies any additional criteria established by the Small Business Administration (SBA).⁵ A small organization is generally "any not-for-profit enterprise which is independently owned and operated and is not dominant in its field."⁶ Nationwide, as of 1992, there were approximately 275,801 small organizations.⁷ "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."⁸ As of 1992, there were approximately 85,006 such jurisdictions in the United States.⁹ This number includes 38,978 counties, cities, and towns; of these, 37,566, or 96 percent, have populations of fewer than 50,000.¹⁰ The Census Bureau estimates that this ratio is approximately accurate for all governmental entities. Thus, of the 85,006 governmental entities, we estimate that 81,600 (91 percent) are small entities. Below, we further describe and estimate the number of small entity licensees that may be affected by the proposed rules, if adopted.

1. Cable Services. The SBA has developed a definition of small entities for cable and other pay television services, which includes all such companies generating \$11 million or less in revenue annually. This definition includes cable systems operators, closed circuit television services, direct broadcast-satellite services, multipoint distribution systems, satellite master antenna systems and subscription television services. According to the Census Bureau data from 1992, there were 1,788 total cable and other pay television services and 1,423 had less than \$11 million in revenue. The Commission has developed its own definition of a small cable system operator for the purposes of rate regulation. Under the Commission's rules, a "small cable company," is one serving fewer than 400,000 subscribers nationwide¹¹. Based on our most recent information, we estimate that there were 1,439 cable operators that qualified as small cable system operators at the end of 1995¹². Since then, some of those companies may have grown to serve over 400,000 subscribers, and others may have been involved in transactions that caused them to be combined with other cable operators. Consequently, we estimate that there are fewer than 1,439 small entity cable system operators.

The Communications Act also contains a definition of a small cable system operator, which is "a cable operator that, directly or through an affiliate, serves in the aggregate fewer than 1 percent of all subscribers in the United States and is not affiliated with any entity or entities whose gross annual revenues in the aggregate exceed \$250,000,000."¹³ The Commission has determined that there are 66,690,000 subscribers in the United States. Therefore, we found that an operator serving fewer than 666,900 subscribers shall be deemed a small operator, if its annual revenues, when combined with the total annual revenues of all of its affiliates, do not exceed \$250 million in the aggregate.¹⁴ Based on available data, we find that the number of cable operators serving 666,900 subscribers or less totals 1,450.¹⁵ We do not request nor do we collect information concerning whether cable system operators are affiliated with entities whose gross annual revenues exceed \$250,000,000, and thus are unable at this time to estimate

⁵ Small Business Act, 15 U.S.C. § 632 (1996).

⁶ 5 U.S.C. § 601(4).

⁷ 1992 Economic Census, U.S. Bureau of the Census, Table 6 (special tabulation of data under contract to Office of Advocacy of the U.S. Small Business Administration).

⁸ 5 U.S.C. § 601(5).

⁹ U.S. Dept. of Commerce, Bureau of the Census, "1992 Census of Governments."

¹⁰ *Id.*

¹¹ 47 C.F.R. § 76.901(e). The Commission developed this definition based on its determination that a small cable system operator is one with annual revenues of \$100 million or less. Implementation of Sections of the 1992 Cable Act: Rate Regulation, Sixth Report and Order and Eleventh Order on Reconsideration. 10 FCC Rcd 7393 (1995), 60 FR 10534 (Feb. 27, 1995).

¹² Paul Kagan Associates, Inc., Cable TV Investor, Feb. 29, 1996 (based on figures for Dec. 30, 1995).

¹³ 47 U.S.C. § 543(m)(2).

¹⁴ 47 C.F.R. § 76.1403(b).

¹⁵ Paul Kagan Associates, Inc., Cable TV Investor, Feb. 29, 1996 (based on figures for Dec. 30, 1995).

with greater precision the number of cable system operators that would qualify as small cable operators under the definition in the Communications Act.

2. International Services. The Commission has not developed a definition of small entities applicable to licensees in the international services. Therefore, the applicable definition of small entity is generally the definition under the SBA rules applicable to Communications Services, Not Elsewhere Classified (NEC).¹⁶ This definition provides that a small entity is expressed as one with \$11.0 million or less in annual receipts.¹⁷ According to the Census Bureau, there were a total of 848 communications services providers, NEC, in operation in 1992, and a total of 775 had annual receipts of less than \$9.999 million.¹⁸ The Census report does not provide more precise data.

a. Fixed Satellite Transmit/Receive Earth Stations. Currently there are over 7500 authorized fixed satellite transmit/receive earth stations authorized for use in bands shared with the terrestrial fixed service. We do not request or collect annual revenue information, and thus are unable to estimate the number of the earth stations that would constitute a small business under the SBA definition.

b. Mobile Satellite Earth Station Feeder Links. There are two licensees operating in spectrum shared with terrestrial fixed services. We do not request or collect annual revenue information, and thus are unable to estimate of the number of mobile satellite earth stations that would constitute a small business under the SBA definition.

c. Space Stations (Geostationary). Commission records reveal that there are six space station licensees licensed in spectrum shared on a co-primary basis with the terrestrial fixed service in the C- and Ku-bands. We do not request or collect annual revenue information, and thus are unable to estimate of the number of geostationary space stations that would constitute a small business under the SBA definition.

d. Space Stations (Non-Geostationary). There are four Non-Geostationary Space Station licensees licensed in spectrum shared on a co-primary basis with the terrestrial fixed service in the C- and Ku-bands. We do not request or collect annual revenue information, and thus are unable to estimate of the number of non-geostationary space stations that would constitute a small business under the SBA definition.

3. Auxiliary, Special Broadcast and other program distribution services. This service involves a variety of transmitters, generally used to relay broadcast programming to the public (through translator and booster stations) or within the program distribution chain (from a remote news gathering unit back to the station). The Commission has not developed a definition of small entities applicable to broadcast auxiliary licensees. Therefore, the applicable definition of small entity is the definition under the Small Business Administration (SBA) rules applicable to radio broadcasting stations (SIC 4832) and television broadcasting stations (SIC 4833). These definitions provide that a small entity is one with either \$5.0 million or less in annual receipts for a radio broadcasting station or \$10.5 million in annual receipts for a TV station. 13 C.F.R. § 121.201, SIC CODES 4832 and 4833. There are currently 3,237 FM translators and boosters, 4913 TV translators.¹⁹ The FCC does not collect financial information on any broadcast facility and the Department of Commerce does not collect financial information on these auxiliary

¹⁶ An exception is the Direct Broadcast Satellite (DBS) Service, *infra*.

¹⁷ 13 C.F.R. § 120.121, SIC code 4899.

¹⁸ 1992 *Economic Census Industry and Enterprise Receipts Size Report*, Table 2D, SIC code 4899 (U.S. Bureau of the Census data under contract to the Office of Advocacy of the U.S. Small Business Administration).

¹⁹ FCC News Release, Broadcast Station Totals as of September 30, 1999, No. 71831 (Jan. 21, 1999).

broadcast facilities. We believe, however, that most, if not all, of these auxiliary facilities could be classified as small businesses by themselves. We also recognize that most translators and boosters are owned by a parent station which, in some cases, would be covered by the revenue definition of small business entity discussed above. These stations would likely have annual revenues that exceed the SBA maximum to be designated as a small business (as noted, either \$5 million for a radio station or \$10.5 million for a TV station). Furthermore, they do not meet the Small Business Act's definition of a "small business concern" because they are not independently owned and operated.

4. Microwave Services. Microwave services include common carrier, private operational fixed, and broadcast auxiliary radio services. At present, there are over 13,500 common carrier stations, and approximately 18,000 private operational fixed stations and broadcast auxiliary radio stations in the microwave services in spectrum that is potentially affected by this rulemaking. Additionally, these stations represent the following distinct licensees among the various radio services: LMDS (121), DEMS (2), Common Carrier Fixed (PTP and LTTS) (1028), Private Operational Fixed PTP (1511), and Fixed Broadcast Auxiliary (806).²⁰ Inasmuch as the Commission has not yet defined a small business with respect to microwave services, we will utilize the SBA's definition applicable to radiotelephone companies -- *i.e.*, an entity with no more than 1,500 persons. 13 C.F.R. § 121.201, SIC CODE 4812. We estimate, for this purpose, that all of the Fixed Microwave licensees (excluding broadcast auxiliary licensees) would qualify as small entities under the SBA definition for radiotelephone companies.

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

None of the proposed rules in this notice are expected to increase the reporting, record keeping and other compliance requirements of any telecommunications carrier.

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

The RFA requires an agency to describe any significant alternatives that it has considered in reaching its proposed approach, which may include the following four alternatives: (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 or reporting requirements under the rule for small entities; (3) the use of performance, rather than design, standards; and (4) an exemption from coverage of the rule, or any part thereof, for small entities.

This Notice solicits comment on alternatives for more efficient processing of non-routine earth station applications and simplifying earth station application forms.

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

None.

²⁰ Results of analysis by FCC ULS contractor in July 2000.