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

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In the Matter of )  
)  
The Establishment of Policies and Service Rules for the )  
Broadcasting Satellite Service at the 17.3-17.7 GHz )  
Frequency Band and at the 17.7-17.8 GHz Frequency )  
Band Internationally, and at the 24.75-25.25 GHz ) IB Docket No. 06-123  
Frequency Band for Fixed Satellite Services Providing )  
Feeder Links to the Broadcasting-Satellite Service and )  
for the Broadcasting Satellite Service Operating Bi- )  
directionally in the 17.3-17.7 GHz Frequency Band )

NOTICE OF PROPOSED RULEMAKING

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## I. INTRODUCTION

1. With this Notice of Proposed Rulemaking (*NPRM*), we propose processing and service rules for the 17/24 GHz Broadcasting Satellite Service (BSS).<sup>1</sup> Under the Commission's rules and the International Telecommunication Union (ITU) Region 2 allocation, the allocation for BSS at 17/24 GHz will become effective on April 1, 2007. Our goal in this proceeding is to promote prompt commencement of services in this newly allocated band. The 17/24 GHz BSS will introduce a new generation of broadband services to the public, providing a mix of local and domestic video, audio, data, video-on-demand and multimedia services to residential and business subscribers in the United States. The services will potentially include standard-definition and high-definition formats and, in certain cases, may complement existing direct broadcast satellite (DBS)<sup>2</sup> services. This should provide U.S. consumers with access to a wider variety of services and suppliers. Increased competition may also lead to reduced prices for those services and further technological innovation.

2. In this *NPRM*, we provide a brief background on the development of the 17/24 GHz BSS band allocation by the ITU and Commission. We also provide a short description of the 17/24 GHz BSS applications that have been filed with the Commission. Next, the *NPRM* proposes service rules for

<sup>1</sup> BSS is the international term used for a radiocommunication service in which signals transmitted or retransmitted by space stations are intended for direct reception by the general public. See, e.g., 47 C.F.R. § 2.1. In this item, the term "17/24 GHz BSS band" generally refers to the space-to-Earth (downlink) frequencies at 17.3-17.7 GHz and the corresponding Earth-to-space (uplink) frequencies at 24.75-25.25 GHz.

<sup>2</sup> DBS is the term used in the United States to describe the domestic implementation of BSS in the 12.2-12.7 GHz frequency bands. See 47 C.F.R. §§ 25.201, 25.202(a)(7).

operations in the 17/24 GHz BSS bands, including requirements for licensing, service obligations, orbital spacing, adjacent band operations, reverse band operations, and shared band operations. Potential interference from primary adjacent-band radiolocation systems and in-band secondary radiolocation systems is also addressed. In addition, the *NPRM* also considers proposals for use of the 17.7-17.8 GHz BSS spectrum for provision of international services outside the United States.

## II. BACKGROUND

### A. ALLOCATION

3. Satellite operators have been offering direct-to-home (DTH) video service to U.S. customers since the 1980's. These services were first provided in the C- and Ku-bands allocated to the Fixed-Satellite Service.<sup>3</sup> Later, operators implemented new systems that could use smaller receiving dishes in another portion of the Ku-band. This newer service is commonly referred to as the Direct Broadcast Satellite (DBS) service in the United States.<sup>4</sup> The Commission recently recognized that DTH video service was growing rapidly and that additional spectrum for these types of systems would likely be required within the next decade.<sup>5</sup>

4. In 1992, the World Administrative Radio Conference (WARC-92) of the ITU<sup>6</sup> adopted an additional frequency allocation for BSS in Region 2.<sup>7</sup> Specifically, WARC-92 allocated the 17.3-17.8 GHz band to the BSS on a primary basis in Region 2, effective April 1, 2007.<sup>8</sup> Until this time, the 17.3-17.7 GHz band may be used in Region 2 by the FSS (Earth-to-space) on a primary basis and by the radiolocation service on a secondary basis.<sup>9</sup> The 17.7-17.8 GHz band may be used on a co-primary basis by the FSS (space-to-Earth), the Fixed Service, and the Mobile Service. Pursuant to actions taken at WARC-92, the Mobile Service allocation in this band will revert to a secondary allocation on April 1, 2007.<sup>10</sup> Further, after April 1, 2007, FSS downlink services may not claim protection from and may not

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<sup>3</sup> These frequency bands are the C-band at 3700-4200/5925-6425 MHz and the Ku-band at 11.7-12.2/14.0-14.5 GHz.

<sup>4</sup> See fn. 2, *supra*.

<sup>5</sup> 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, *Notice of Proposed Rulemaking*, 13 FCC Rcd 19923,19958, para. 79 (1998) ("*18 GHz NPRM*").

<sup>6</sup> The ITU, based in Geneva, Switzerland, is a United Nations specialized organization that deals with international communications issues.

<sup>7</sup> International Telecommunication Union, Final Acts of the World Administrative Radio Conference (Malaga-Torremolinos, 1992). The ITU Radio Regulations divide the world into three regions. Generally, Region 1 includes Africa, Europe, and northern and western portions of Asia; Region 2 includes the Americas and Greenland; Region 3 includes southern portions of Asia, Australia, and the South Pacific. See ITU Radio Regulations, Article 5, Section 1.

<sup>8</sup> See also 47 C.F.R. § 2.106, footnote 5.517.

<sup>9</sup> The 17.3-17.7 GHz band is also allocated to the fixed and mobile services on a secondary basis in the countries listed in footnote 5.514 of the ITU Radio Regulations. See also 47 C.F.R. § 2.106, footnote 5.514.

<sup>10</sup> Specifically, footnote 5.518 of the ITU Radio Regulations reads as follows: "*Different category of service: in Region 2, the allocation of the band 17.7-17.8 GHz to the mobile service is on a primary basis until 31 March 2007.*" See also 47 C.F.R. § 2.106, footnote 5.518.

cause harmful interference to BSS operations.<sup>11</sup>

5. In the *18 GHz Report and Order*,<sup>12</sup> the Commission implemented, in large part, the ITU Region 2 allocation for BSS domestically.<sup>13</sup> The Commission recognized that although the allocation would not become effective for several years, its action would provide interested parties with sufficient notice and time to design their systems to use this spectrum in the most efficient manner.<sup>14</sup> Specifically, the Commission adopted the following allocation and designation decisions, to take effect on April 1, 2007: (1) The Commission allocated the 17.3-17.7 GHz band, on a primary basis, to the BSS for downlink transmissions.<sup>15</sup> Although the ITU Region 2 allocation apportioned the 17.3-17.8 GHz band for BSS use, the Commission limited the allocation to 17.3-17.7 GHz to retain spectrum for the relocation of fixed service (FS) facilities which were being displaced as a result of the new BSS allocation.<sup>16</sup> (2) The Commission allocated 300 megahertz of spectrum at 24.75-25.05 GHz on a primary basis for the FSS (uplink) and limited FSS use to BSS feeder links.<sup>17</sup> It also allocated 200 megahertz of spectrum at 25.05-25.25 GHz for co-primary use between the 24 GHz Fixed Service, formerly known as Digital Electronic Messaging Service (DEMS), and BSS feeder links.<sup>18</sup> The Commission's objective was to accommodate

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<sup>11</sup> See footnote 5.517 of the ITU Radio Regulations and 47 C.F.R. § 2.106, footnote 5.517. Two other international footnotes impact the sharing or use of the 17.3-17.8 GHz band. In Region 2, footnote 5.515 of the ITU Radio Regulations provides that “[i]n the band 17.3-17.8 GHz, sharing between the fixed-satellite service (Earth-to-space) and the broadcasting-satellite service shall also be in accordance with the provisions of § 1 of Annex 4 of Appendix 30A.” See also 47 C.F.R. § 2.106, footnote 5.515. Further, footnote 5.516 of the ITU Radio Regulations provides that in Region 2, “[t]he use of the band 17.3-18.1 GHz by geostationary-satellite systems in the fixed-satellite service (Earth-to-space) is limited to feeder links for the broadcasting-satellite service. The use of the band 17.3-17.8 GHz in Region 2 by systems in the fixed-satellite service (Earth-to-space) is limited to geostationary satellites. For the use of the band 17.3-17.8 GHz in Region 2 by feeder links for the broadcasting-satellite service in the band 12.2-12.7 GHz, see Article 11. The use of the bands 17.3-18.1 GHz (Earth-to-space) in Regions 1 and 3 and 17.8-18.1 GHz (Earth-to-space) in Region 2 by non-geostationary-satellite systems in the fixed-satellite service is subject to application of the provisions of No. 9.12 for coordination with other non-geostationary-satellite systems in the fixed-satellite service. Non-geostationary-satellite systems in the fixed-satellite service shall not claim protection from geostationary-satellite networks in the fixed-satellite service operating in accordance with the Radio Regulations, irrespective of the dates of receipt by the Bureau of the complete coordination or notification information, as appropriate, for the non-geostationary-satellite systems in the fixed-satellite service and of the complete coordination or notification information, as appropriate, for the geostationary-satellite networks, and No. 5.43A does not apply. Non-geostationary-satellite systems in the fixed-satellite service in the above bands shall be operated in such a way that any unacceptable interference that may occur during their operation shall be rapidly eliminated.” See also 47 C.F.R. § 2.106, footnote 5.516.

<sup>12</sup> 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*, 15 FCC Rcd 13430 (2000).

<sup>13</sup> *Id.* at 13482.

<sup>14</sup> *Id.* at 13478.

<sup>15</sup> *Id.* at 13476, 13478.

<sup>16</sup> *Id.* at 13477-78.

<sup>17</sup> *18 GHz Report & Order*, 15 FCC Rcd at 13476, 13479.

<sup>18</sup> *Id.* at 13476, 13479-80.

new satellite services while providing adequate spectrum for existing FS operations.<sup>19</sup>

## B. APPLICATIONS TO OPERATE IN THE 17/24 GHz BSS BAND

6. Four entities have filed applications to provide broadcast satellite service in the 17/24 GHz BSS bands. The applications were filed by DIRECTV Enterprises, Inc. (DIRECTV),<sup>20</sup> Pegasus Development DBS Corporation (Pegasus),<sup>21</sup> EchoStar Satellite LLC (EchoStar),<sup>22</sup> and Intelsat North America, LLC (Intelsat).<sup>23</sup> Because these applications represent a wide range of system designs and

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<sup>19</sup> *Id.*

<sup>20</sup> In June 1997, DIRECTV filed three applications for authority to construct, launch, and operate a 17/24 GHz BSS system at the 96.5° W.L., 101° W.L., and 105.5° W.L. orbital locations. See File Nos. SAT-LOA-19970605-00049 (S2242), SAT-LOA-19970605-00050 (S2243) and SAT-LOA-19970605-00051 (S2244), as amended by SAT-AMD-20051118-00224, SAT-AMD-20051118-00225, SAT-AMD-20051118-00226. (collectively, "*DIRECTV Application*"). DIRECTV proposes to use these satellites to provide direct-to-home and direct-to-business delivery of video, audio, data, and multimedia services. DIRECTV also filed a Petition for Rulemaking concurrently with its application, requesting that the Commission allocate spectrum in the 17.3-17.8 GHz band for BSS downlinks, and in the 24.75-25.25 GHz band for FSS for use as BSS feeder links. DIRECTV's Petition for Rulemaking was partially granted by the *18 GHz Report & Order*, 15 FCC Rcd. at 13477-78, para. 99.

<sup>21</sup> In March 2002, Pegasus filed applications for authority to construct, launch, and operate a BSS system that will operate at the 91° W.L., 101° W.L., and 110° W.L. orbital locations. See File Nos. SAT-LOA-20020322-00032, SAT-LOA-20020322-00033, SAT-LOA-20020322-00034. These applications were dismissed in December 2005 for failure to submit the required orbital debris showings. See Policy Branch Information, Actions Taken, *Public Notice*, Report No. SAT-00332, DA 05-3152 (rel. Dec. 7, 2005). Pegasus filed a Petition for Reconsideration, which was denied by the Bureau in an Order dated June 6, 2006 (DA 06-1220). In April 2006, Pegasus re-filed its applications seeking authority to construct, launch, and operate a BSS system at the 91° W.L., 101° W.L., and 110° W.L. orbital locations. See File Nos. SAT-LOA-20060412-00042, SAT-LOA-20060412-00043, and SAT-LOA-20060412-00044 (collectively, "*Pegasus Application*"). In addition, Pegasus' parent company, Pegasus Development Corporation, filed modification applications to add similar satellite payloads to two of its licensed Ka-band satellites at the 107° W.L. and 117° W.L. orbital locations (SAT-MOD-20020322-00035 (117° W.L.) and SAT-MOD-20020322-00036 (107° W.L.)) (*Pegasus Ka-band Mod. Applications*). These applications were dismissed as moot in November 2004 because Pegasus chose not to develop a Ka-band BSS system. See Letter from Fern J. Jarmulnek, Deputy Chief, Satellite Division, Int'l. Bur., FCC to Bruce D. Jacobs, Esq., Shaw Pittman LLP (November 17, 2004).

<sup>22</sup> EchoStar filed an application in March 2002 for authority to construct, launch, and operate three BSS satellites at the 110° W.L., 114.5° W.L., and 119° W.L. orbital locations. EchoStar proposes to use these satellites to supplement its multichannel video program distribution offerings to residential subscribers in the United States, and to offer additional services to business users and international consumers as regulatory approvals are obtained in other countries. See File Nos. SAT-LOA-20020328-00050 (S2440), SAT-LOA-20020328-00051 (S2441), and SAT-LOA-20020328-00052 (S2442), as amended by SAT-AMD-20051118-00245, SAT-AMD-20051118-00246, SAT-AMD-20051118-00247 (collectively, "*EchoStar Application*").

<sup>23</sup> In February 2005, Intelsat filed an application for authority to construct, launch, and operate four BSS satellites at the 67.5° W.L., 89.0° W.L., 97.0° W.L., and 121.0° W.L. orbital locations. Intelsat proposes to use these satellites to provide video, audio, data, and multimedia services to residential subscribers in the United States, as well as Canada, Central America, and South America, subject to obtaining the requisite non-U.S. regulatory approvals to do so. See Intelsat North America LLC, Application for Authority to Construct, Launch and Operate a Direct Broadcast Satellite System Comprised of Four Satellites in the 17 GHz and 25 GHz Bands, File Nos. SAT-LOA-20050210-00028 (S2659), SAT-LOA-20050210-00029 (S2660), SAT-LOA-20050210-00030 (S2661) and SAT-LOA-20050210-00031 (S2662) SAT-AMD-20051118-00238, SAT-AMD-20051118-00239, SAT-AMD-20051118-00240, and SAT-AMD-20051118-00241 (collectively, "*Intelsat Application*").

business plans, we will use them as a basis for developing service rules for BSS systems in these bands.

### III. DISCUSSION

#### A. LICENSING AND PROCESSING PROCEDURES

##### 1. LICENSING FRAMEWORK

7. In the *First Space Station Licensing Reform Order*, the Commission adopted various procedural reforms to expedite the licensing process for most satellite services, with an exception for DBS and the Digital Audio Radio Satellite (DARS).<sup>24</sup> The *Reform Order* did not specifically mention how the Commission would treat 17/24 GHz BSS. We could, therefore, conclude that 17/24 GHz BSS is analogous to the direct-to-home fixed-satellite service (DTH FSS), which is included in the *Reform Order's* purview. This is because the proposed 17/24 GHz BSS systems would provide services similar those provided by DTH FSS systems and the 17/24 GHz BSS band, like FSS bands, is not planned.<sup>25</sup> Further, the Commission's rules specify that DBS is a service provided in the 12.2-12.7 GHz band.<sup>26</sup> These considerations could lead us to conclude that we should consider 17/24 GHz BSS under the *Space Station Reform* licensing framework. Alternatively, because it is anticipated that 17/24 GHz BSS systems will provide services similar to DBS, we could characterize 17/24 GHz BSS as DBS and include this new service in the limited exception to the *Space Station Reform* licensing rules for DBS. We request comment on the appropriate characterization for 17/24 BSS systems. We discuss below the licensing issues that arise under each of the alternatives.

8. If we ultimately decide that it is more appropriate to treat 17/24 GHz BSS systems under the scope of the *Space Station Reform* proceeding, we propose to treat applications for such systems under the "first-come, first-served" licensing approach for geostationary-satellite orbit (GSO)-like applications. As part of the reforms, the Commission adopted two separate licensing frameworks for satellite systems – a first-come, first-served approach for "GSO-like" applications and a modified processing round approach for "non-geostationary satellite orbit (NGSO)-like" applications. Under the first-come, first-served approach, the Commission will grant an application provided the applicant is qualified and the proposed system is not technically incompatible with a previously licensed satellite or with a satellite proposed in a previously-filed application.<sup>27</sup> All the proposed 17/24 GHz BSS satellites will operate in GSO-orbits and all DTH video services, to date, are provided via GSO satellites.<sup>28</sup> Thus, if we decide to treat 17/24 GHz BSS systems under the scope of the *Space Station Reform* proceeding, we propose to consider 17/24 GHz BSS as "GSO-like" under the first-come, first-served licensing queue. In

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<sup>24</sup> Amendment of the Commission's Space Station Licensing Rules and Policies, *First Report and Order and Further Notice of Proposed Rulemaking*, 18 FCC Rcd 10760, 10764, n. 4 (2003) ("*First Space Station Licensing Reform Order*"). These rules became effective on August 27, 2003.

<sup>25</sup> 17/24 GHz BSS is an unplanned band, as opposed to a planned band, which is a band for which the ITU has assigned frequencies at certain orbital locations to each country.

<sup>26</sup> Definition of DBS, *see* fn 2, *supra*. 47 C.F.R. § 25.202 and 25.202(a)(7). *Cf.* definition of BSS, *see* fn. 1, *supra*.

<sup>27</sup> *See* 47 C.F.R. § 25.158. In contrast, under the modified processing round approach for NGSO-like satellite systems, the Commission announces a cut-off date for filing applications and then divides the available spectrum equally among the qualified applicants. *See First Space Station Licensing Reform Order*, 18 FCC Rcd 10760, 10792-10822, paras. 71-159 (2003). *See also* 47 C.F.R. § 25.158.

<sup>28</sup> The Commission determined that in cases where there are no service rules establishing criteria for sharing between GSO and NGSO satellite systems in a particular frequency band, we will consider only applications of the kind that is filed first. In this case, all the 17/24 GHz BSS band applications propose GSO satellites.

addition, we propose that applicants for 17/24 GHz BSS satellites should pay fees associated with the "Space Stations (Geostationary)" service in Section 1.1107 of the Commission's rules.<sup>29</sup> For applications seeking authority to operate earth stations in the 17/24 GHz BSS band, we propose to apply the fees associated with the "Fixed Satellite Transmit/Receive Earth Stations" in Section 1.1107.<sup>30</sup> We seek comment on these proposals.

9. If we decide that it is more appropriate to treat 17/24 GHz BSS outside the scope of the *Space Station Reform Order*, we seek comment on what processing framework we should use for licensing these satellites. We specifically seek comment on whether pursuant to Section 309(j) of the Communications Act<sup>31</sup> a competitive bidding system, or auction, could be designed to assign mutually exclusive license applications for use of the 17/24 GHz service in the United States. In this regard, we note that a U.S. Court of Appeals decision in the *Northpoint* case<sup>32</sup> found the Commission's July 2004 auction of DBS licenses were unauthorized in light of Section 647 of the ORBIT Act,<sup>33</sup> which prohibits the Commission from using competitive bidding to assign orbital locations or spectrum used "for the provision of international or global satellite communications services."<sup>34</sup> We seek comment on whether the Commission could conduct an auction for 17/24 GHz BSS licenses consistent with the *Northpoint* ruling and, if so, how such an auction would be implemented. We also seek comment on what, if any, limitations, the ITU procedures<sup>35</sup> may place on a Commission auction. Further, if future legislative action authorizes the Commission to award 17/24 GHz BSS licenses via competitive bidding, we request comment on how we could structure an auction in this case. Commenters should specify whether, and the extent to which, such an auction would be different from one conducted without such legislation.

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<sup>29</sup> 47 C.F.R. § 1.1107, 9.

<sup>30</sup> 47 C.F.R. § 1.1107, 3.

<sup>31</sup> 47 U.S.C. § 309(j).

<sup>32</sup> See *Northpoint Technology, Ltd. and Compass Systems, Inc. v. Federal Communications Commission*, 412 F.3d 145 (D.C. Cir. 2005) (*Northpoint v. FCC*).

<sup>33</sup> Open-Market Reorganization for the Betterment of International Telecommunications Act, Pub. L. No. 106-180, 114 Stat. 48 (2000), as amended, Pub. L. No. 107-233, 116 Stat. 1480 (2002), as amended Pub. L. No. 108-228, 118 Stat. 644 (2004), as amended, Pub. L. No. 108-371, 118 Stat. 1752 (2004). The ORBIT Act amended the Satellite Communications Act of 1962, 47 U.S.C. § 701 *et seq.* (Satellite Act) and is codified at 47 U.S.C. § 761 *et seq.* Section 647 of the ORBIT Act states that "[n]otwithstanding any other provision of law, the Commission shall not have the authority to assign by competitive bidding orbital locations or spectrum used for the provision of international or global satellite communications services. The President shall oppose in the International Telecommunication Union and in other bilateral and multilateral fora any assignment by competitive bidding of orbital locations or spectrum used for the provision of such services." See 47 U.S.C. § 765f.

<sup>34</sup> *Id.*

<sup>35</sup> For example, the ITU first in time filing policy applies to the 17/24 GHz service. Thus, a country filing first at the ITU obtains superior international coordination rights at that orbital location. See ITU Radio Regulations, Articles 7, 8, 9, and 11.

## 2. SAFEGUARDS AGAINST SPECULATION

10. Our first-come, first-served approach for processing space station applications contains a package of safeguards to ensure that licensees remain committed and able to proceed with system implementation in a timely manner. Our rules require all GSO-like applicants awarded a license under this procedure to post a \$3 million performance bond with the Commission within 30 days of license grant. They also require licensees to construct and launch the satellite consistent with a specified milestone schedule.<sup>39</sup> If the licensee fails to meet an implementation milestone, the license becomes null and void and the bond is executed.<sup>40</sup> The rules also limit applicants to a total of five pending applications and licenses for unbuilt satellites in a specific frequency band at any one time.<sup>41</sup> If we decide to include 17/24 GHz BSS in the processing rules and requirements of the *Space Station Licensing Reform Orders*, we propose to apply these accompanying safeguards, including applying the standard milestone schedule in Section 25.164 of the Commission's rules to 17/24 GHz BSS systems. We request comment on these proposals. Additionally, we seek comment on whether there are any public interest rationales for imposing a higher performance bond and/or whether we should impose tighter limits on the number of pending applications and licenses that applicants for 17/24 GHz systems may have for unbuilt satellites at any one time.

## 3. ANNUAL REPORTING REQUIREMENT

11. Most space station operators are subject to annual reporting requirements on June 30 of each year. These reports must include, among other things, the status of space station construction and anticipated launch dates.<sup>42</sup> We believe that these reports help to keep us apprised of whether operators are taking all necessary action to meet their milestones. We seek comment on whether 17/24 GHz BSS U.S.-licensees and 17/24 GHz BSS non-U.S. operators that are authorized to access the United States should be required to submit similar annual reports, regardless of the licensing mechanism we ultimately adopt in this proceeding.

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<sup>39</sup> 47 C.F.R. § 25.164. Under this milestone schedule, the licensee must enter into a binding, non-contingent construction contract within one year of grant; complete critical design review within two years; begin construction within three years; and launch and operate the satellite within five years of grant.

<sup>40</sup> 47 C.F.R. § 25.165.

<sup>41</sup> 47 C.F.R. § 25.159.

<sup>42</sup> See, e.g., 47 C.F.R. §§ 25.143(e) (reporting requirements for 1.6/2.4 GHz mobile-satellite service (MSS) and 2 GHz MSS); 25.144(c) (reporting requirements for satellite digital audio radio service (SDARS)); 25.145(f) (reporting requirements for fixed-satellite service in the 20/30 GHz bands); 25.10(l) (reporting requirements for FSS in the 4/6 GHz band). Other elements of the annual reports include a listing of non-scheduled transponder outages that last more than 30 minutes and identification of transponders not available for service or not performing to specifications. See *id.*

#### 4. LICENSE TERMS

12. Section 25.121 of the Commission's rules currently provides that licenses for space stations will be issued for a period of 15 years, except licenses for DBS space stations.<sup>43</sup> DBS space stations licensed as broadcast facilities are issued licenses for eight year terms, and those DBS space stations not licensed as broadcast facilities have 10 year terms.<sup>44</sup> These rules are governed by the Communications Act, which provides for a maximum licensing term of 8 years for broadcasting facilities and allows the Commission to determine license terms for particular classes of stations, including satellite space and earth stations.<sup>45</sup>

13. We propose to adopt a ten-year license term for all non-broadcast 17/24 GHz BSS licenses. For 17/24 GHz BSS satellites that will operate as broadcast facilities, we propose an eight-year license term, as provided under Section 307(c)(1) of the Communications Act. We seek comment on these proposals.

#### 5. REPLACEMENT SATELLITES

14. The Commission has previously stated that, given the huge costs of building and operating GSO space stations, operators should have some assurance that they will be able to continue to serve their customers.<sup>46</sup> Therefore, the Commission has stated that, when an orbit location remains available for a U.S. satellite with the technical characteristics of the proposed replacement satellite, it will generally authorize the replacement satellite at the same location.<sup>47</sup> In 2003, the Commission adopted a streamlined procedure for processing replacement satellite applications. Unopposed replacement satellite applications with technical characteristics consistent with those of the satellite to be retired are processed under a grant-stamp procedure.<sup>48</sup> Upon Commission review and finding that the technical characteristics

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<sup>43</sup> 47 C.F.R. § 25.121(a).

<sup>44</sup> *Id.* Changes in the license terms for DBS space stations were initially addressed in the *DBS Auction Order*, which adopted a ten-year license term for non-broadcast DBS space stations. See *DBS Auction Order*, 11 FCC Rcd at 9762, para. 130.

<sup>45</sup> The Telecommunications Act of 1996 granted the Commission authority to "prescribe the period or periods for which licenses shall be granted and renewed . . ." 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)).

<sup>46</sup> Amendment of the Commission's Space Station Licensing Rules and Policies, *First Order on Reconsideration and Fifth Report and Order*, 19 FCC Rcd 12673, 12657, at para. 54 (2004) ("*Fifth Space Station Reform Order*"), citing Amendment of the Commission's Space Station Licensing Rules and Policies, *Notice of Proposed Rulemaking*, 17 FCC Rcd 3847, 3887, at para. 119 (2002) ("*Space Station Reform NPRM*"); citing Assignment of Orbital Locations to Space Stations in the Domestic Fixed-Satellite Service, *Memorandum Opinion and Order*, 3 FCC Rcd 6972, 6976 n. 31 (1988); Hughes Communications Galaxy, Inc., *Order and Authorization*, 6 FCC Rcd 72, 74 n. 7 (1991); GE American Communications, Inc., *Order and Authorization*, 10 FCC Rcd 13775, 13775-76, at para. 6 (1995). The Commission's rules define a "replacement" satellite as one that is authorized to operate at the same orbit location, in the same frequency bands, and with the same coverage area as one of the licensees existing satellites and will be brought to use at "approximately the same time as . . . the existing satellite is retired." See, e.g., 47 C.F.R. § 25.143(c).

<sup>47</sup> *Fifth Space Station Reform Order*, 19 FCC Rcd at 12657, para. 54, citing *Space Station Reform NPRM*, 17 FCC Rcd at 3887, para. 119, citing *1988 Orbit Assignment Order*, 3 FCC Rcd at 6976 n. 31; *GE Americom Replacement Order*, 10 FCC Rcd at 13775-76, para. 6.

<sup>48</sup> *Fifth Space Station Reform Order*, 19 FCC Rcd at 12657, para. 54, citing *First Space Station Reform Order*, 18 FCC Rcd at 10856, paras. 253-54.

of the replacement satellite are consistent with the satellite to be retired, the Commission stamps the application as "granted" and returns a copy to the applicant. In order to keep track of these actions, the Commission issues a public notice announcing such action.<sup>49</sup> We believe that the grant-stamp procedure has proven to be an efficient method of processing replacement satellite applications, and therefore we propose to employ this procedure to process unopposed replacement BSS applications in the 17.3-17.7 GHz band. We seek comment on this proposal.

## 6. NON-U.S.-LICENSED SATELLITE OPERATORS

15. In the 1997 *DISCO II Order*,<sup>50</sup> the Commission established a framework under which it would consider requests to serve the U.S. market from non-U.S.-licensed satellites. In establishing this framework, the Commission implemented market-opening commitments that the United States made in the 1997 World Trade Organization (WTO) Agreement on Basic Telecommunications Services (WTO Basic Telecomm Agreement).<sup>51</sup> The United States made its market access commitments for satellite services in this Agreement on a service-by-service basis. The commitments include FSS and mobile-satellite service (MSS), but specifically exclude DTH service, DBS service, and digital audio radio service (DARS). The U.S. commitments do not reference 17/24 GHz BSS. We propose to consider requests for U.S. access by foreign-licensed 17/24 GHz BSS systems on a service-specific basis consistent with the framework established in *DISCO II* and the United States' WTO commitments.<sup>52</sup>

16. Thus, under the *DISCO II* framework, we will evaluate the legal and technical qualifications of the non-U.S.-licensed 17/24 GHz BSS satellite operator in each request to serve the U.S.-market. Further, we will assess the competitive effects of this entry. In cases where systems licensed by WTO-member countries seek to provide non-DTH FSS to U.S. customers from their 17/24 GHz BSS systems, we will presume that entry will further competition. In cases where non-WTO-member countries seek to use these systems to serve the United States or where WTO-member countries seek to provide services such as DTH over 17/24 GHz BSS systems, we will apply the effective competitive opportunities test (ECO-SAT) to ensure that entry will not distort competition in the U.S. market. Under this test, the Commission examines whether there are effective competitive opportunities for U.S.-licensed satellites to serve the home market of the satellite seeking U.S. access. In particular, the Commission examines whether there are any *de jure* or *de facto* barriers to entry in the foreign country for the provision of analogous services and whether any such barriers cause competitive distortions in the U.S. market.

17. As in all cases where an operator seeks authority to serve the U.S.-market from a non-U.S. satellite, the foreign operator must provide the same information concerning the 17/24 GHz BSS

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<sup>49</sup> *First Space Station Reform Order*, 18 FCC Rcd at 10856, para. 253.

<sup>50</sup> See Amendment of the Commission's Regulatory Policies to Allow Non-U.S. Licensed Satellites to Provide Domestic and International Service in the United States, *Report and Order*, IB Docket No. 96-111, 12 FCC Rcd 24094 (1997) ("*DISCO II*" or "*DISCO II Order*").

<sup>51</sup> *DISCO II*, 12 FCC Rcd at 24112, para. 39. The WTO came into being on January 1, 1995, pursuant to the Marrakesh Agreement Establishing the World Trade Organization (the Marrakesh Agreement). 33 I.L.M. 1125 (1994). The Marrakesh Agreement includes multilateral agreements on trade in goods, services, intellectual property, and dispute settlement. The General Agreement on Trade in Services (GATS) is Annex 1B of the Marrakesh Agreement. 33 I.L.M. 1167 (1994). The WTO Basic Telecom Agreement was incorporated into the GATS by the Fourth Protocol to the GATS (April 11, 1997), 36 I.L.M. 354 (1997) (Fourth Protocol to the GATS). The WTO Basic Telecom Agreement also contains specific commitments with respect to market access and national treatment commitments made by WTO members.

<sup>52</sup> *DISCO II*, 12 FCC Rcd at 24134, para. 92.

satellite as U.S. applicants must provide when applying for a space station license.<sup>53</sup> In addition, foreign entities must include an ECO-SAT analysis where applicable.

18. Once authorized to serve the United States, we propose to impose the same technical and regulatory requirements as contained in our existing rules and rules established as a result of this proceeding (e.g., bond requirement, geographic service requirements, spacecraft end-of-life disposal requirements). We seek comment on any reason we should deviate from this approach.

## B. PUBLIC INTEREST AND OTHER STATUTORY OBLIGATIONS

### 1. PUBLIC INTEREST OBLIGATIONS

19. In 1992, Congress directed the Commission to initiate a rulemaking and impose public interest obligations on providers of direct broadcast satellite service.<sup>54</sup> Section 335 of the Communications Act defines DBS providers as either licensees for a Ku-band satellite system under Part 100 of the Commission's rules or as distributors who control a minimum number of channels using a Ku-band fixed-satellite service satellite for the provision of video programming directly to the home and are licensed under Part 25 of the Commission's rules.<sup>55</sup> In 1998, the Commission adopted rules<sup>56</sup> to implement Section 335. The Commission's rules apply to entities licensed to operate satellites in the 12.2 to 12.7 GHz DBS frequency bands;<sup>57</sup> entities licensed pursuant to Part 25 of the Commission's rules to provide FSS, via the Ku-band,<sup>58</sup> that sell or lease transponder capacity to a video program distributor who offers the specified number of direct-to-home video channels to consumers; and non-U.S. licensed satellites providing DBS or DTH-FSS services in the United States.<sup>59</sup> Section 25.701 of our rules requires these providers to meet certain political broadcast requirements, compliance with children's television advertising limits, and to set aside four percent of channel capacity for noncommercial, educational or informational programming.

20. Section 335 was enacted in 1992 and does not expressly identify satellite licensees in the

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<sup>53</sup> *First Space Station Reform Order*, 18 FCC Rcd at 10776, para. 30. See 47 C.F.R. § 25.137. Thus, foreign entities must file a Schedule S, providing all the information required in Section 25.114 (c) of the Commission's rules. 47 C.F.R. § 25.114(c).

<sup>54</sup> Section 25 of the 1992 Cable Act is codified at Section 335 of the Communications Act of 1934, 47 U.S.C. § 335.

<sup>55</sup> 47 U.S.C. § 335(b)(5). Definitions set by other statutes or rules may apply in different settings. See, e.g., Section 1012 of the Local TV Act (Prevention of Interference to Direct Broadcast Satellite Services), which defines "Direct Broadcast Satellite Service" as "any direct broadcast satellite system operating in the direct broadcast satellite frequency band," which this statute defines as "the band of frequencies at 12.2 to 12.7 gigahertz." 47 U.S.C. § 1110(c).

<sup>56</sup> Implementation of Section 25 of the Cable Television Consumer Protection and Competition Act of 1992, Direct Broadcast Satellite Public Interest Obligations, *Report and Order*, 13 FCC Rcd 23254 (1998) ("*First Report and Order*").

<sup>57</sup> In 2002, the Commission released a *Report and Order* eliminating Part 100 of the Commission's Rules. The Commission moved Section 100.5 to Section 25.701 and eliminated the reference to entities licensed pursuant to Part 100. Instead, the new rule in section 25.701 (a)(1) defines DBS Providers as entities licensed to operate satellites in the 12.2-12.7 GHz frequency bands. See *Policies and Rules for the Direct Broadcast Satellite Service, Report and Order*, 17 FCC Rcd 11331 at paras. 22-24 (2002) ("*Part 100 Report & Order*"). For purposes of this section of the *NPRM*, any reference to Part 100 licensees means entities defined in Section 25.701(a)(1).

<sup>58</sup> The Ku-band frequencies referenced in the statute are 11.7 GHz-12.2 GHz and 14.0 GHz-14.5 GHz.

<sup>59</sup> 47 C.F.R. § 25.701(a).

17/24 GHz band because this band was not then allocated domestically for BSS.<sup>60</sup> To the extent that 17/24 GHz band licensees provide DBS-like services, we propose that they should be subject to the public interest obligations contained in Section 25.701 of our rules. We seek comment on this proposal.

21. In addition, we request comment on whether licensees in the 17/24 GHz BSS band qualify to use the compulsory copyright licenses granted under Sections 119 and 122 of the Copyright Act.<sup>61</sup> These licenses permit satellite carriers, as defined in the Copyright Act, to provide broadcast television service to subscribers. Section 119 defines the term "satellite carrier" as an entity that uses a satellite operating in the FSS or in the DBS service for point-to-multipoint distribution of television signals.<sup>62</sup> This section allows satellite carriers to offer distant broadcast signals under certain circumstances. Section 122 defines the term "satellite carrier" by reference to the definition in Section 119 and provides a copyright license for local-into-local broadcast television service.<sup>63</sup> We ask commenters to address whether 17/24 GHz licensees should be considered "satellite carriers" within the meaning of these statutory provisions. If so, do broadcast carriage requirements apply to these licensees?<sup>64</sup> Should the Commission apply these requirements to the extent that the licensees using this new allocation provide services similar to other satellite carriers? Or, if these licensees are not within the Copyright Act definition, how would they obtain permission to retransmit material subject to copyright?

## 2. EQUAL EMPLOYMENT OPPORTUNITIES

22. Section 25.601 of the Commission's rules require an entity that uses an owned or leased FSS or DBS service facility for video programming directly to the public on a subscription basis to comply with the equal employment opportunity (EEO) requirements set forth in Part 76 of the Commission's rules if such entity exercises control over the video programming it distributes.<sup>65</sup> Notwithstanding other EEO provisions within these rules, a licensee or permittee of a DBS station operating as a broadcaster must comply with the equal employment opportunity requirements set forth in Part 73.<sup>66</sup> Consequently, to the extent that 17/24 GHz BSS band licensees provide DBS-like services, we propose to apply Section 25.601 to those licensees. In addition, we propose to require 17/24 GHz BSS licensees to comply with any other EEO requirements that may be subsequently adopted or enforced by the Commission for broadcasters and multichannel video service providers (MVPDs). We seek comment on these proposals.

## 3. GEOGRAPHIC SERVICE RULES

23. The Commission is committed to establishing policies and rules that will promote service to all regions in the United States, particularly to traditionally underserved areas, such as Alaska and Hawaii, and other remote and underserved areas in the United States. In order to achieve these goals, we propose to apply geographic service rules for the states of Alaska and Hawaii in the 17/24 GHz BSS band. Specifically, to the extent that 17/24 GHz BSS band licensees provide DBS-like services, we propose to adopt rules analogous to those in effect for DBS satellites in Section 25.148(c) of the

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<sup>60</sup> See *18 GHz Report & Order*, 15 FCC Rcd at 13475, paras. 96-99.

<sup>61</sup> 17 U.S.C. §§ 119 & 122.

<sup>62</sup> 17 U.S.C. § 119 (d)(6).

<sup>63</sup> 17 U.S.C. § 122. See also 47 U.S.C. § 338.

<sup>64</sup> See 47 U.S.C. § 338.

<sup>65</sup> See 47 C.F.R. § 25.601.

<sup>66</sup> 47 C.F.R. Part 73.

Commission's rules.<sup>67</sup> These rules require licensees to provide service to Alaska and Hawaii where such service is technically feasible from the authorized orbit location. Applicants who do not propose to provide service to Alaska and Hawaii must provide technical analyses to the Commission demonstrating that such service is not feasible as a technical matter or that, while technically feasible, such service would require so many compromises in satellite design and operation as to make it economically unreasonable. We seek comment on this proposal.

24. We anticipate that many of the satellite operators in the 17/24 GHz BSS bands will operate multiple satellites in their system or fleet. If a 17/24 GHz BSS licensee has multiple satellites, should the Commission consider applying geographic service rules at each orbit location or should we apply rules on a per licensee basis?<sup>68</sup> We also anticipate that many 17/24 GHz BSS satellites will be used to provide local-into-local broadcast television stations via small-footprint spot beams. As discussed previously, we are seeking comment on whether 17/24 GHz licensees are "satellite carriers" for Copyright Act purposes.<sup>69</sup> If so, those licensees that provide any local broadcast stations to subscribers residing in a particular market pursuant to the compulsory copyright license must also provide all otherwise qualified local stations to subscribers in that market.<sup>70</sup> We seek comment on any special considerations we should take into account because of the different business models and system designs that are envisioned for 17/24 GHz BSS bands if licensees are subject to carry-one, carry-all copyright requirements. We also note that Section 210 of the Satellite Home Viewer Extension and Reauthorization Act<sup>71</sup> amends Section 338(a) of the Communications Act of 1934, as amended,<sup>72</sup> and requires satellite carriers with more than five million subscribers to carry both the analog and digital signals of television broadcast stations in local markets in noncontiguous states. This legislation further requires that satellite carriers provide these signals to substantially all of their subscribers in each station's local market. We seek comment on whether satellite operators in the 17/24 GHz BSS bands are "satellite carriers" within the meaning of Section 338 and if they are thus subject to this requirement.<sup>73</sup>

25. Commenters should also address issues concerning international coordination with neighboring satellites. 17/24 GHz BSS satellites are subject to the ITU's first-in-time filing policy to

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<sup>67</sup> 47 C.F.R. § 25.148(c).

<sup>68</sup> See *In the Matter of EchoStar Satellite LLC, Memorandum Opinion and Order*, 19 FCC Rcd 6075 (2004) (In this Order, the International Bureau granted EchoStar's request for a waiver of the geographic service rule for its EchoStar 4 satellite at the 157° W.L. orbital location because service to Alaska and Hawaii was not technically feasible from that satellite at that particular orbital location, and EchoStar was providing service to Alaska and Hawaii from its satellites at the 119° orbital location.); *In re EchoStar Satellite Corporation, DIRECTSAT Corporation, EchoStar DBS Corporation, Memorandum Opinion and Order*, 13 FCC Rcd 8595 (1998) (In this Order, the International Bureau granted EchoStar's request for a waiver of the geographic service rule for its EchoStar 1 satellite at the 148° W.L. orbital location because service to Hawaii was not technically feasible from that satellite at that particular orbital location, and EchoStar pledged to provide service to Hawaii from its satellite at the 119.2° W.L. orbital location.).

<sup>69</sup> 17 U.S.C. §§ 119, 122. See para. 21 *supra*.

<sup>70</sup> 47 U.S.C. § 338.

<sup>71</sup> The Satellite Home Viewer Extension and Reauthorization Act of 2004 ("SHVERA"), Pub. L. No. 108-447, §210, 118 Stat 2809 (2004).

<sup>72</sup> 47 U.S.C. § 338.

<sup>73</sup> See *In the Matter of Implementation of Section 210 of the Satellite Home Viewer Extension and Reauthorization Act of 2004 to Amend Section 338 of the Communications Act*, Notice of Proposed Rulemaking, MB Docket No.181, FCC 05-92 (released May 2, 2005).

satellite coordination and notification outlined in Articles 9 and 11 of the International Radio Regulations.<sup>74</sup> The final operating parameters of the satellite, including its coverage area, power levels, and even perhaps, orbital location, are subject to the completion of these coordination requirements which may conclude many years after the Commission has licensed the satellite to operate. We seek comment on how the Commission should take into account the uncertainty imposed by this international regulatory system when considering various approaches to ensure service to traditionally underserved areas in the United States.

#### 4. EMERGENCY ALERT SYSTEM

26. In the Commission's August, 2004 Emergency Alert System (EAS) Notice of Proposed rulemaking,<sup>75</sup> the Commission sought comment on whether the Commission should require digital providers, including DBS providers, to comply with the Commission's EAS Rules.<sup>76</sup> In November, 2005, the Commission released the *EAS First Report and Order and Further Notice*,<sup>77</sup> in which it noted that consumers are adopting digital technologies as replacements to analog broadcast and cable systems that are currently required to implement EAS, and as such, an increasingly large percentage of television viewers and radio listeners receive their programming from systems that may have no independent duty to provide EAS.<sup>78</sup> Consequently, the Commission amended Part 11 of its rules to require participation in the EAS by digital broadcast stations, digital cable systems, wireless cable systems, DBS services, and DARS. In the Further Notice of Proposed Rulemaking that accompanied the *EAS First Report and Order and Further Notice*, the Commission sought comment on how DBS providers might deliver regionally targeted alerts in a next generation alert and warning system.<sup>79</sup>

27. In the *EAS First Report and Order and Further Notice*, the Commission defined DBS broadly to include the "vast majority of DTH services, particularly those which viewers may have expectations as to available warnings based on experience with broadcast television services."<sup>80</sup> We believe the same concerns the Commission addressed in the *EAS First Report and Order and Further Notice* are presented with the introduction of services by 17/24 GHz providers. The customers of the new 17/24 GHz services would likely have similar expectations regarding these services as they would

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<sup>74</sup> See ITU Radio Regulations, Article 9 and Article 11.

<sup>75</sup> See Review of the Emergency Alert System, *Notice of Proposed Rulemaking*, EB Docket No. 04-296, 19 FCC Rcd 15775 (2004) (*EAS NPRM*).

<sup>76</sup> *Id.*, at 15786, para 29.

<sup>77</sup> See Review of the Emergency Alert System, *First Report and Order and Further Notice of Proposed Rulemaking*, EB Docket No. 04-296, FCC 05-191 (rel. Nov. 10, 2005) (*EAS First Report and Order and Further Notice*).

<sup>78</sup> *Id.* at para. 2.

<sup>79</sup> *Id.* at para 68.

<sup>80</sup> *Id.* at para 49. In the *EAS First Report and Order and Further Notice*, the Commission defined DBS providers for EAS purposes to include: (1) entities licensed to operate satellites in the 12.2 to 12.7 GHz DBS frequency bands; (2) entities licensed to operate satellites in the Ku band fixed satellite service (FSS) and that sell or lease capacity to a video programming distributor that offers service directly to consumers providing a sufficient number of channels so that four percent of the total applicable programming channels yields a set aside of at least one channel of non commercial programming pursuant to section 25.701(e) of the Commission's rules, or (3) non U.S. licensed satellite operators in the Ku band that offer video programming directly to consumers in the United States pursuant to an earth station license issued under part 25 of this title and that offer a sufficient number of channels to consumers so that four percent of the total applicable programming channels yields a set aside of one channel of non commercial programming pursuant to section 25.701(e) of the Commission's rules. *Id.*

towards those in the 12.2 to 12.7 GHz and Ku bands, if for no other reason than the particular band in which DTH services are offered has no relevance to customers' expectations regarding their ability to receive warnings. Accordingly, to the extent that 17/24 GHz BSS band licensees provide DBS-like services, we propose to apply the EAS requirements to providers of those services. We seek comment on this proposal. Finally, we propose to incorporate herein by reference all comments regarding the application of EAS requirements to DBS providers in the EAS Notice and Further Notice of Proposed Rulemaking. We seek further comment on this issue in this docket.

### C. USE OF BSS SPECTRUM AT 17.7-17.8 GHz

28. In the *18 GHz Report and Order*, the Commission stopped the domestic allocation to the BSS at 17.7 GHz.<sup>81</sup> Although the international allocation for Region 2 BSS in the space-to-Earth direction extends from 17.3-17.8 GHz, the Commission believed that it was important to keep as much spectrum available to the terrestrial fixed services as possible, for as long as possible, in order to assist in relocating displaced facilities. In making this decision, the Commission took into account the ubiquitous nature of BSS services which we believed would preclude successful coordination with a terrestrial service that was similarly widely deployed, and the amount of terrestrial fixed spectrum being lost as a result of that proceeding.<sup>82</sup>

29. The Commission now has received several applications seeking authority to launch and operate satellites in the 17.3-17.8 GHz band. DIRECTV, Pegasus, EchoStar and Intelsat all propose to operate their satellites in the full 500 MHz of spectrum from 17.3-17.8 GHz.<sup>83</sup> In their applications, EchoStar and Intelsat request that the Commission re-examine the availability of the 17.7-17.8 GHz band in the future.<sup>84</sup> EchoStar states that if the Commission extends the BSS allocation to cover the full 500 MHz of spectrum allocated in the ITU Radio Regulations, it intends to use the 17.7-17.8 GHz band to provide U.S. service; but at a minimum it plans to use the band for international BSS service to other portions of North America, including Canada, Mexico and the Caribbean.<sup>85</sup> Similarly, Pegasus is hopeful that the Commission will re-examine the availability of spectrum in the 17.3-17.8 GHz band and includes the 17.7-17.8 GHz band in its application. However Pegasus states that it will modify its technical design should only 400 MHz of spectrum be available.<sup>86</sup> Intelsat states that its proposed satellites have the capability to provide both U.S. and foreign service in the 17.7-17.8 GHz band should the spectrum become available, and seeks authority to operate in the band.<sup>87</sup>

30. The intent of this proceeding is to establish service rules for use of the 17/24 GHz BSS allocation that becomes effective on April 1, 2007, so that applicants may have sufficient time to design

<sup>81</sup> See *18 GHz Report & Order*, 15 FCC Rcd at 13475, paras. 95-99.

<sup>82</sup> *Id.* See also *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, First Order on Reconsideration*, 16 FCC Rcd 19808, 19822-23, paras. 30-31 (2001).

<sup>83</sup> See *DIRECTV Application* at 7; *EchoStar Application* at 4 and 23; *Pegasus Application* at 3; and *Intelsat Application* at 3.

<sup>84</sup> See *EchoStar Application* at 4 and 23; and *Intelsat Application* at 3. The application of DIRECTV was filed in 1997 prior to the Commission's decision to stop the BSS allocation at 17.7 GHz.

<sup>85</sup> See *EchoStar Application* at 4 and 23.

<sup>86</sup> See *Pegasus Application* at 3.

<sup>87</sup> See *Intelsat Application* at 3.

their systems in a manner that will conform to our rules. Recognizing the significant technical challenges posed by the question of BSS/FS band-sharing at 17.7-17.8 GHz, we believe that this goal would be disserved by engaging in the protracted rulemaking process that would inevitably result. Moreover, although 17/24 GHz BSS applicants seek to use the 17.7-17.8 GHz band, none has provided evidence that terrestrial fixed service spectrum relocation requirements are less demanding than predicted. Nor has any applicant provided a convincing argument that coordination of widely deployed terrestrial services with ubiquitously located 17/24 GHz BSS receivers would be readily feasible. For these reasons, we do not find compelling motivation to reexamine the Commission's earlier decision with regard to BSS use of the 17.7-17.8 GHz band in the United States. Therefore, we do not propose to authorize or to protect the reception of BSS (space-to-Earth) transmissions into the United States and its possessions in the 17.7-17.8 GHz band.<sup>88</sup>

31. We recognize however, that U.S. satellite operators may wish to use the 17.7-17.8 GHz band to provide service to receiving earth stations located within Region 2, but outside of the United States. The operation of 17/24 GHz BSS receiving earth stations outside of the United States and its possessions does not present the same coordination difficulties with regard to U.S.-licensed terrestrial fixed service stations, nor would it hinder the re-location of these services in the 18 GHz band.<sup>89</sup> We propose to permit U.S. operators to use the international allocation to the BSS in the 17.7-17.8 GHz band,<sup>90</sup> but to limit use of that allocation to international service only, *i.e.*, to receiving earth stations located outside of the U.S. and its possessions.<sup>91</sup> We seek comment on this proposal.

32. We seek comment on other changes to our rules which might be necessary should we allow use of the 17.7-17.8 GHz band to provide non-U.S. BSS service. We are proposing to permit transmissions in the 17.7-17.8 GHz band only to receiving earth stations located outside of the United States and its possessions. However, we recognize that the footprint of satellite beams serving near-by Region 2 countries could illuminate portions of the United States and that U.S. terrestrial service stations may be subject to interference from such space-to-Earth satellite transmissions, particularly at low elevation angles. Historically, the Commission has adopted power flux density (pfd) limits to protect terrestrial service antennas from interference from co-frequency space station transmissions.<sup>92</sup> At present, neither the Commission's rules nor the ITU define any pfd limits for BSS systems operating in the 17.7-17.8 GHz band. Prior to adoption of the *18 GHz Report and Order* in 2002,<sup>93</sup> Section 25.208(c) of the Commission's rules imposed pfd limits for the FSS in the entire 17.7-19.7 GHz band<sup>94</sup> and Article 21 of

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<sup>88</sup> In the United States and its possessions, reception of BSS (space-to-Earth) transmissions in the 17.7-17.8 GHz band from foreign-licensed satellites would similarly not be authorized or protected.

<sup>89</sup> The relocation of FS in the 18 GHz band in Docket 04-143 is currently under review by the Commission. See *Rechannelization of the 17.7-19.7 GHz Frequency Band for Fixed Microwave Services* under Part 101 of the Commission's Rules, WT Docket No. 04-143, *Notice of Proposed Rulemaking*, FCC 04-77 (rel. April 19, 2004).

<sup>90</sup> See Article 5 of the ITU Radio Regulations and footnote 5.517, which reads as follows: In Region 2, the allocation to the broadcasting-satellite service in the band 17.3-17.8 GHz shall come into effect on 1 April 2007. See also 47 C.F.R. § 2.106, footnote 5.517.

<sup>91</sup> We note that licensing of earth stations in a foreign country does not fall within the purview of the Commission. Authorization for any such earth stations would be granted by the relevant foreign administration.

<sup>92</sup> See, *e.g.*, 47 C.F.R. § 25.208.

<sup>93</sup> See note 12 *supra*.

<sup>94</sup> In the 17.7-19.7 GHz band these pfd limits were as follows: (1) -115 dB (W/m<sup>2</sup>) in any 1 MHz band for angles of arrival between 0 and 5 degrees above the horizontal plane; (2) -115+0.5 (δ-5) dB (W/m<sup>2</sup>) in any 1 MHz band

(continued....)

the ITU Radio Regulations imposes the same pfd limits on the FSS operating in the 17.7-19.7 GHz band in order to protect terrestrial stations.<sup>95</sup> We propose to extend these same pfd limits to the BSS service (space-to-Earth) in the 17.7-17.8 GHz band. We seek comment on this proposal, and ask whether these pfd limits are sufficient to protect U.S. terrestrial operations in the band, or whether some other limits should be adopted. We note that these pfd limits were adopted to facilitate sharing between co-primary FS and FSS services. Recognizing that we do not intend to authorize receipt of (space-to-Earth) BSS transmissions in the United States and its possessions in the 17.7-17.8 GHz band, we ask whether more stringent pfd limits might be appropriate, particularly in areas of the U.S. located farther from the borders.

33. We also seek comment on tracking, telemetry and command (TT&C) operations in the 17.7-17.8 GHz band. Section 25.202(g) of our rules requires that TT&C functions for all U.S. domestic satellites be conducted at either or both edges of the allocated band(s).<sup>96</sup> The Commission has previously recognized that TT&C functions for U.S.-licensed satellites are best performed at facilities located within the United States, and that locating such facilities in a foreign country could adversely affect an operator's ability to maintain control of its spacecraft.<sup>97</sup> Accordingly, we ask how best to accommodate TT&C functions for 17/24 GHz BSS satellites seeking to use the 17.7-17.8 GHz band to provide international service. We ask whether there is sufficient spectrum available at the lower edge of the band (*i.e.*, above 17.3 GHz) for TT&C transmissions, particularly recognizing that this same portion of the band will be used for reverse-band telecommand transmissions from DBS satellites. We seek comment on whether TT&C transmissions can be carried out at the band edge just below 17.7 GHz.

#### D. ORBITAL SPACING AND MINIMUM ANTENNA DIAMETER AND PERFORMANCE STANDARDS

##### 1. ORBITAL SPACING

34. In this proceeding, we seek to establish service rules for use of the 17/24 GHz BSS allocation that become effective on April 1, 2007. To date we have received only applications to operate GSO satellites in the 17/24 GHz band.<sup>98</sup> Because we envision the service as a GSO service, we are not considering rules for NGSO satellite systems in this proceeding. However, we seek comment on the

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for angles of arrival  $\delta$  (in degrees) between 5 and 25 degrees above the horizontal plane; (3) -105 dB (W/m<sup>2</sup>) in any 1 MHz band for angles of arrival between 25 and 90 degrees above the horizontal plane.

<sup>95</sup> See Table 21-4 of the ITU Radio Regulations. These limits are:

-115 dBW/m <sup>2</sup> /MHz	for $0^\circ \leq \delta \leq 5^\circ$
-115 + 0.5( $\delta$ -5) dBW/m <sup>2</sup> /MHz	for $5^\circ \leq \delta \leq 25^\circ$
-105 dBW/m <sup>2</sup> /MHz	for $25^\circ \leq \delta \leq 90^\circ$

where  $\delta$  is the angle of arrival above the horizontal plane.

<sup>96</sup> See 47 C.F.R. § 25.202(g).

<sup>97</sup> See In the Matter of EchoStar Satellite LLC Application for Authority to Construct, Launch and Operate a Geostationary Satellite Using the Extended Ku-band Frequencies in the Fixed-Satellite Service at the 109° W.L. Orbital Location, *Order and Authorization*, 20 FCC Rcd 930 at para. 17 (2004).

<sup>98</sup> See *DIRECTV Application, EchoStar Application, Pegasus Application and Intelsat Application*.

<sup>100</sup> See 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. 2d577 (rel. Aug. 16, 1983); summary printed in Licensing Space Stations in the Domestic Fixed-Satellite Service, 48 F.R. 40233 (Sept. 6, 1983) (*Two-Degree Spacing Order*). See also *18 GHz Report & Order*, 15 FCC Rcd. at 13479.

appropriateness of this approach and ask whether we should allow for the possibility of both GSO and NGSO 17/24 GHz BSS systems. If so, we ask commenters to elaborate on how such GSO/NGSO sharing might be effected, and what additional or different rules might be necessary to accommodate both types of systems in the band.

35. In developing operating rules for the 17/24 GHz BSS allocation, the Commission must consider whether a GSO orbital spacing policy is needed, and if so, what separation is appropriate. Historically, the Commission has adopted orbital spacing policies in other frequency bands as a means of accommodating the largest number of spacecraft in an environment that minimizes harmful interference between adjacent satellite operators. For example, the Commission's licensing policy for C-, Ku- and Ka-band GSO FSS networks is predicated upon two-degree orbital spacing.<sup>100</sup> In contrast, in the 12 GHz BSS (DBS) band, U.S.-licensed satellites now operate from allotted orbital positions that are spaced at least nine degrees apart.<sup>101</sup> This nine-degree spacing environment was established by the ITU Region 2 Plan outlined in Appendices 30 and 30A of the Radio Regulations.<sup>102</sup> DBS operators have taken advantage of this orbital separation to deploy small-diameter subscriber receiving antennas<sup>103</sup> and to operate with the relatively high-transmit powers associated with modern multi spot-beam DBS space station antennas.

36. Many of the economic and technical concerns associated with 17/24 GHz BSS operations may be either exacerbated or mitigated by the degree of orbital spacing. These can include the size, cost and design of receiving antennas, the degree of interference from and into adjacent satellites, which in turn affects quality and availability of service, the equipment cost required to mitigate adjacent-satellite interference, the total orbital capacity available for use by operators, the degree of design and operational flexibility afforded to satellite operators and the ability to adapt to future advances in technology. Carefully conceived GSO orbital spacing policies can permit satellite operators to design their systems in a manner that best balances these technical and economic concerns, and affords some assurance that subscriber receiving antennas will be protected from interference from other U.S.-licensed transmissions. In the FSS bands, our ability to license GSO satellites in an efficient and equitable manner has been facilitated by our two-degree orbital spacing policy. We believe that the establishment of a well-considered orbital spacing policy in the 17/24 GHz band will be equally valuable in achieving these goals.

37. In addition, we acknowledge the unique opportunity and advantages available in adopting an orbital spacing policy before the frequency band becomes populated with operating satellites. However, we also recognize that administrations other than the United States now have 17.3-17.8 GHz (space-to-Earth) BSS filings at the ITU<sup>104</sup> and it is reasonable to anticipate that others will file in the

<sup>101</sup> Under the terms of the Region 2 BSS and Feeder-Link Plans, the United States is assigned eight orbit locations for providing broadcasting-satellite service to the United States. The eight U.S. orbital positions, proceeding from east to west (all West Longitude), are 61.5°, 101°, 110°, 119°, 148°, 157°, 166°, and 175°. Requests to serve the United States from DBS orbital locations not in the ITU Region 2 Plan are now under consideration in separate proceedings. *See, e.g.,* para. 43 *infra*.

<sup>102</sup> The International Telecommunication Union's (ITU) Regional Administration Radio Conference for the Planning in Region 2 of the Broadcasting-Satellite Service (BSS) in the Frequency Bands 12.2-12.7 GHz and Associated Feeder links in the Frequency Band 17.3-17.8 GHz (Geneva) (1983) ("RARC Sat-R2"), adopted the plan for the broadcasting-satellite service in the frequency band 12.2-12.7 GHz in Region 2 (the "Region 2 Plan").

<sup>103</sup> In ITU Regions 1 and 3 (Europe/Africa and Asia/Oceania) a separate allotment plan exists with orbital separations for Ku-band BSS satellites of six degrees in order to protect receiving antennas as small as 60 cm in diameter.

<sup>104</sup> At this time, advance publication information and/or coordination information has been submitted by the Administrations of Canada, Luxembourg, Malaysia, and United Kingdom.

future. Any orbital spacing policy that the Commission might adopt would be applicable only to U.S.-licensed satellites and to foreign satellites seeking authority to serve the U.S. Because coordination between U.S. and foreign-licensed satellites is governed by procedures set forth in the ITU Radio Regulations, there is no assurance that a particular orbital spacing designed for service to the United States could be achieved and maintained across significant portions of the Western Hemisphere. Moreover, there may be a loss of operating flexibility associated with any orbital spacing policy, as well as certain economic and technical costs. Accordingly, we seek comment on whether an orbital spacing policy should be adopted for the 17/24 GHz BSS service. We ask commenters to consider and comment on whether some other approach might be preferred in order to maximize orbital capacity and minimize interference to operators of small-diameter antenna receivers. We also seek comment on how any such policy should take into account co-existence and coordination with foreign satellites that are not subject to U.S. rules, or foreign satellites seeking to provide service to the U.S.

38. Two 17/24 GHz BSS applicants, DIRECTV and EchoStar, propose satellite fleets that are located at orbital separations of 4.5 degrees.<sup>105</sup> Moreover, in its comments in response to the *18 GHz NPRM*, DIRECTV specifically proposed that the Commission adopt a separation of 4.5 degrees instead of the nine-degree spacing characteristic of the 12 GHz DBS band.<sup>106</sup> DIRECTV asserts that this value would at least double the spectrum resources available in this band relative to the 12 GHz DBS band, and permit operators to locate BSS satellites not only at current U.S. DBS locations, but also at many additional locations.<sup>107</sup> DIRECTV also argues that due to the characteristics of the higher frequency band, customers will be able to receive a quality of service to 45-cm (18-inch) receive antennas comparable to that now available in the 12 GHz DBS band. Finally, DIRECTV maintains that any orbital spacing policy we adopt should, when possible, be consistent with the U.S. assignments in the ITU Region 2 BSS Plan.<sup>108</sup> A third applicant, Intelsat, asserts that from the point of view of mutual interference, an orbital spacing of four-degrees is the minimum separation required for adequate provision of service to receiving earth stations larger than 18 inches (45 cm) at these frequencies.<sup>109</sup> In its application, Pegasus proposes to operate its fleet at orbital separations of nine or ten degrees, although the interference analysis submitted with its application is based on a 4.5-degree orbital separation.<sup>110</sup> Finally we note that Pegasus also filed an application proposing to add 17/24 GHz BSS service to its Ka-band FSS DTH satellites that would operate at an orbital separation of ten degrees.<sup>111</sup>

39. The Commission recognizes that there is merit in considering an orbital spacing policy for the 17/24 GHz BSS band that is different from either two or nine degrees. The current two-degree FSS spacing requirement, if applied to 17/24 GHz BSS systems, would necessitate deployment of subscriber antennas with diameters that may be unacceptably large for the direct-to-home market.

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<sup>105</sup> See *DIRECTV Application* and *EchoStar Application*.

<sup>106</sup> See *18 GHz Report & Order*, 15 FCC Rcd at 13475-76, para. 96, citing *DIRECTV Comments* at 6, n.12.

<sup>107</sup> See *In the Matter of Petition of DIRECTV Enterprises, Inc. to Amend Parts 2, 25 and 100 of the Commission's Rules to Allocate Spectrum for the Fixed-Satellite Service and the Broadcasting-Satellite Service*, Petition for Rulemaking, RM No. 9118 (filed June 5, 1997). This Petition for Rulemaking was filed in response to the *18 GHz NPRM*.

<sup>108</sup> *Id.*

<sup>109</sup> See *Intelsat Application* at 7.

<sup>110</sup> See *Pegasus Application* at 1 and 27.

<sup>111</sup> See *Pegasus Ka-band Mod. Applications* (File Nos. SAT-MOD-20020322-00035, SAT-MOD-20020322-00036). See also note 21 *supra*.

Moreover, two-degree spacing would increase relative to that now afforded to operations subject to nine-degree spacing, without sacrificing quality of service to consumers. The question we must consider is what orbital spacing best advances the competing goals of permitting small-diameter receiving antennas and relatively high-power transmissions, while simultaneously allowing for the greatest occupancy of the geostationary satellite orbit.

40. Both DIRECTV and EchoStar propose to operate their satellites at 4.5-degrees of orbital separation.<sup>112</sup> We recognize that such a spacing scheme offers the advantages of accommodating relatively small-diameter subscriber antennas, while simultaneously permitting operators to co-locate with 12 GHz DBS satellites at up to three existing U.S. GSO locations from which service is possible to all 50 states.<sup>113</sup> We note, however, that other orbital separations (e.g., three-degrees) could similarly facilitate co-location with 12 GHz DBS satellites. There are other advantages and associated trade-offs with other spacing schemes that we might consider. For example a two-degree or three-degree separation scheme would afford increased orbital capacity, albeit at the expense of smaller antenna diameters. Separation values such as six-degrees, eight-degrees, or even nine-degrees would permit even smaller subscriber antennas to be deployed, however, the choice and flexibility of sites available to operators would decrease accordingly. The primary differences in these spacing schemes would be the resulting minimum receiving antenna diameter possible, and the total number of orbital positions made available to operators. Accordingly, we seek comment on whether there is a spacing scheme different from the current FSS two-degrees or DBS nine-degrees (i.e., 3°, 4°, 4.5°, etc.), that would better maximize orbital capacity, accommodate small-diameter antennas, be compatible with the ITU Appendices 30 and 30A Plans, and optimize operator flexibility.

41. In addition, we note that U.S. licensed 12 GHz DBS satellites now operate at only those GSO locations allotted to the U.S. in the Region 2 Plan. While a few 17/24 GHz BSS applicants may be able to take initial advantage of co-location with these 12 GHz DBS satellites at select positions, subsequent applicants, or those seeking to offer service from other portions of the GSO arc, may not have this co-location option available. Moreover, there are numerous unresolved technical and operational difficulties associated with co-locating 17/24 GHz BSS and DBS satellites, particularly problems associated with space-path interference, which may make this arrangement less attractive than originally envisioned by certain applicants. For these reasons, we consider it likely that many operators may choose to co-locate 17/24 GHz BSS satellites with Ku-band or Ka-band FSS satellites<sup>114</sup> that are also authorized to provide DTH services, in particular to capitalize on the possibility of marketing a single antenna with dual-band receivers. In such instances, an orbital separation that is compatible with current FSS satellite spacing regimen might be preferable. Accordingly, adoption of a 17/24 GHz BSS orbital separation that is some multiple of two degrees might best facilitate our goals of maximizing orbital capacity and operator flexibility while providing sufficient protection for small-diameter subscriber antennas. It is also possible that different spacing schemes could be adopted in different portions of the GSO arc. For example, recognizing the stated desire of many applicants to co-locate or interleave with DBS satellites

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<sup>112</sup> See *DIRECTV Application* at 3 and *EchoStar Application* at 3.

<sup>113</sup> These locations are 101° W.L., 110° W.L., and 119° W.L.

<sup>114</sup> See *Intelsat Application* at 7. Intelsat proposes to locate two of its 17/24 GHz BSS satellites at locations where it is already authorized to provide C/Ku-band services, i.e., 89° W.L. and 97° W.L. See also *Pegasus Ka-band Mod. Applications* (File Nos. SAT-MOD-20020322-00035, SAT-MOD-20020322-00036). Pegasus proposed to modify two of its Ka-band authorizations at the orbital locations, 107° W.L. and 117° W.L. to include 17/24 GHz BSS payloads. However, these applications were dismissed in November 2004. See note 21 *supra*.

operating between 101° W.L. and 119° W.L.,<sup>115</sup> we could adopt a 3-degree or 4.5-degree spacing policy in this segment of the GSO arc, and a different spacing scheme (e.g., 4 degrees) in other portions of the arc.

42. We seek comment on what minimum orbital separation should be effected in the 17/24 GHz BSS band. Specifically, we ask how to best balance the goals of providing maximum GSO orbital capacity while simultaneously minimizing interference into small receiving antennas. We seek comment on what parameters we should give priority to when formulating such a policy, including what minimum-diameter antenna we should seek to accommodate, what service availability<sup>116</sup> we should seek to protect, and what degree of orbital capacity and flexibility in system design we should seek to make available. We ask whether any orbital spacing scheme must include the ability to co-locate with U.S. Region 2 BSS Plan assignments, as DIRECTV suggests. In addition, we ask whether there are other factors that we should consider, such as the ability to co-exist with foreign BSS networks, the technical difficulties associated with reverse-band operation in the 17 GHz band, geographic service requirements, and frequency sharing with other services. We seek comment on whether a single orbital separation for 17/24 GHz BSS satellites will best accomplish the objectives we seek to promote, or whether a hybrid orbital spacing scheme might better achieve these objectives. We also seek comment on whether an orbital spacing scheme should be applied to only certain portions of the GSO arc, or whether it should apply uniformly across the entire hemisphere. We ask for comments on what orbital spacing regime, if any, might be best adopted in the eastern or far-western regions of the arc, i.e., 61.5° W.L., 148° W.L., 157° W.L., 166° W.L., and 175° W.L., where DBS channels are allotted to the United States in the ITU Region 2 BSS and Feeder Link Plans.

43. Finally, we recognize that several petitions are now before the Commission asking us to consider various proposals to permit operation of 12 GHz DBS satellites at orbital separations less than nine degrees.<sup>117</sup> The Commission has reached no conclusions with regard to these petitions, nor has it limited the proceeding to consideration of a single possible spacing scheme (e.g., 4.5 degrees). Although it is not the purpose of this document to influence that proceeding, we recognize that any decision the Commission ultimately reaches with regard to less than nine-degree spacing for 12 GHz DBS satellites may have bearing upon the preferred orbital spacing for the 17 GHz BSS band. Accordingly, parties should consider all possible outcomes when formulating their comments in this proceeding. In addition, we invite comment on how the possibility of reduced orbital spacing in the 12 GHz DBS band might influence the choice of orbital spacing in the 17/24 GHz BSS band. We also invite commenters to

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<sup>115</sup> We note that at least two DBS locations, 110° W.L. and 119° W.L., lie in a region of the GSO arc where the U.S. is precluded from operating 12/14 GHz Ku-band satellites by virtue of the Trilateral Agreement between the U.S., Canada and Mexico. See Trilateral Arrangement Regarding Use of the Geostationary Orbit Reached by Canada, Mexico, and the United States, *Public Notice* (September 2, 1988) (“*Trilateral Agreement*”).

<sup>116</sup> “Service availability” is defined as the amount of time that the quality of a telecommunication service or communications link equals or exceeds a specified minimum value. For satellite communication links, the availability is usually expressed as a percentage of the average year.

<sup>117</sup> See, e.g., In the matter of SES Americom, Inc., Petition for Declaratory Ruling to Serve the U.S. Market Using BSS Spectrum from the 105.5° W.L. Orbital Location, FCC File No. SAT-PDR-200220425-00071; Petition of DIRECTV Enterprises LLC for a Rulemaking on the Feasibility of Reduced Orbital Spacing in the U.S. Direct Broadcast Satellite Service, filed December 5, 2003; Application of EchoStar Satellite Corporation for Authority to Construct, Launch and Operate a Direct Broadcast Satellite in the 12.2-12.7 GHz and 17.3-17.8 GHz Frequency Bands at the 86.5° W.L. Orbit Location, File No. SAT-LOA-20030606-00113; and In the Matter of Spectrum Five LLC, Petition for Declaratory Ruling to Serve the U.S. Market Using BSS Spectrum from the 114.5° W.L. Orbital Location, File Nos. SAT-LOI-20050312-00062 and SAT-LOI-20050312-00063. See also submissions made in response to *International Bureau Seeks Comment on Proposals to Permit Reduced Orbital Spacing Between U.S. Direct Broadcast Satellites*, Public Notice, Report No. SPB-196, DA 03-3903 (rel. Dec. 16, 2003).

address what measures the Commission should consider when formulating its decision on 17/24 GHz BSS spacing in the broader context of accommodating the current FSS and DBS orbital spacing schemes, as well as the possibility of reduced orbital spacing in the 12 GHz DBS band.

## 2. MINIMUM ANTENNA DIAMETER AND PERFORMANCE STANDARDS

44. Because of the inverse relationship between antenna diameter and antenna off-axis discrimination performance, the orbital separation scheme will largely determine the minimum antenna diameter that can be accommodated in the 17/24 GHz BSS band. As the receiving antenna diameter decreases, greater orbital separation is required to compensate for the increase in off-axis interference received from neighboring satellites. However, because antenna off-axis discrimination performance for a given size antenna improves at shorter received-signal wavelengths, comparably-sized 17/24 GHz BSS-band receive-antennas may be able to deliver a quality of service comparable to 12 GHz DBS-band systems, while operating with satellites at smaller orbital separations.

45. Figure 1 shows the antenna off-axis discrimination as a function of off-axis angle for three different diameters of antenna.<sup>118</sup> The antenna patterns are based on ITU-R Recommendation BO.1213-1.<sup>119</sup> Assuming that orbital separation must be large enough to place adjacent satellites outside the receiving antenna's main beam, and that minimum off-axis rejection values on the order of 20 dB<sup>120</sup> are desired, some observations can be made regarding the relationship between antenna diameter and orbital spacing. For example, based upon this figure, antenna diameters of 0.45 m may be accommodated with orbital spacing of about four degrees. A spacing of three degrees or less would demand antennas of 0.6 meters in diameter or greater, and two-degree spacing would require receiving antennas on the order of 1 meter – a size that is likely to be unacceptable to a large percentage of U.S. consumers.

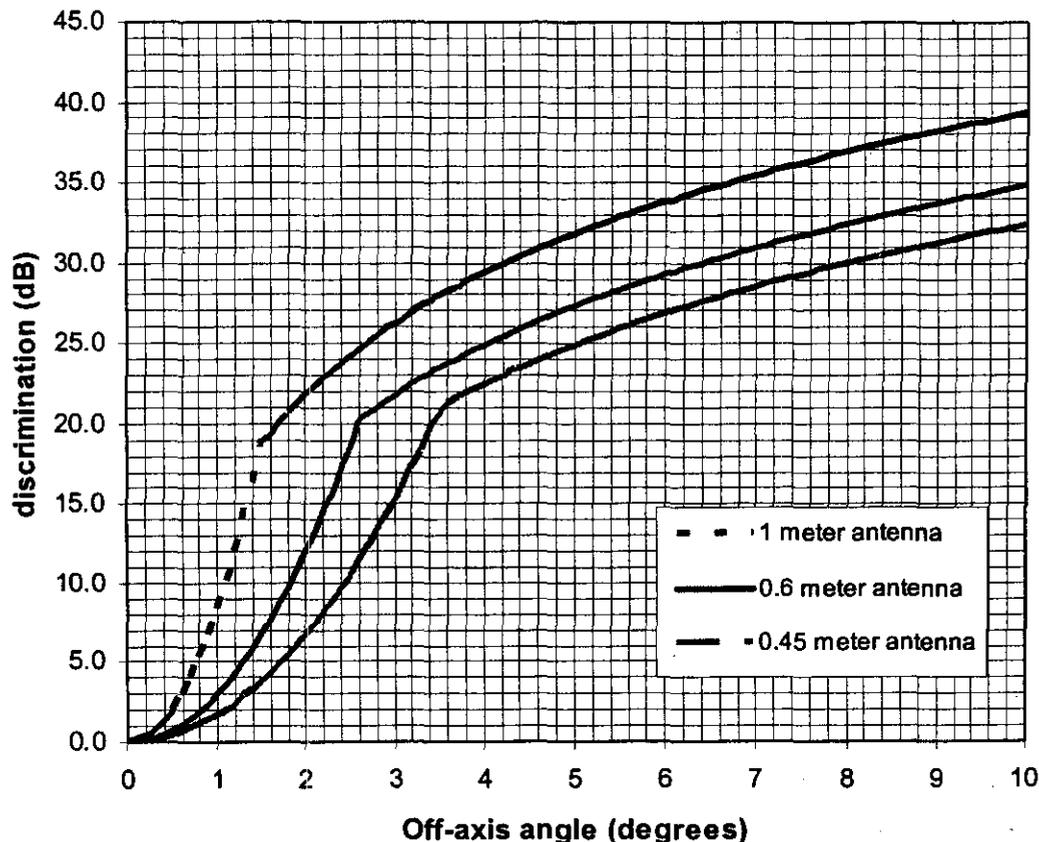
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<sup>118</sup> This graph does not take into account topocentric off-set or antenna pointing error.

<sup>119</sup> See Recommendation ITR-R BO.1213-1. We note that that ITU-R BO.1213 was recently updated at the November 2005 meeting of ITU-R Study Group 6. This most recent version (ITU-R BO.1213-1) includes new language recommending that the co-polar and cross-polar antenna patterns given by the formulae therein should be recognized as reference earth station antenna patterns for the BSS in the 11.7-12.75 GHz band. This change does not preclude use of these formulae in other frequency bands (*e.g.*, 17 GHz) and we believe that for the purposes of this NPRM these formulae may be reasonably applied to the 17 GHz band.

<sup>120</sup> The Commission's rules provide for routine licensing of Ku-band earth stations with antenna diameters of greater than 1.2 meters in a two-degree spacing environment. At the 14 GHz uplink and 11.7 GHz downlink frequencies, this translates to off-axis discrimination values of 22 dB and 20.5 dB respectively.

**BO.1213 off-axis antenna discrimination  
at 17.3 GHz for three antenna diameters**



**Figure 1.**

46. At present, four parties have filed applications with the Commission to operate BSS satellites in the 17/24 GHz bands.<sup>121</sup> All of these applicants propose to operate direct-to-home (DTH) satellite services with receiving antennas as small as 45 cm in diameter. In the DBS band, consumers commonly purchase receive antennas on the order of 45 cm in diameter, and we recognize the desire to continue marketing this size dish to U.S. customers. However, we ask whether 45 cm is an appropriate minimum size antenna to accommodate when considering a GSO orbital spacing policy. Many customers have shown a willingness to purchase larger dishes, particularly those receiving enhanced programming packages requiring multi-feed antennas.<sup>122</sup> In other regions of the world, the 60-cm antenna is the

<sup>121</sup> See *DIRECTV Application, Pegasus Application, EchoStar Application, and Intelsat Application.*

<sup>122</sup> In recent years, triple-feed 18" x 20" elliptical-dish antennas capable of receiving signals from satellites at 101° W.L., 110° W.L., and 119° W.L. have been deployed by DIRECTV. DIRECTV also markets an 18"-diameter dual-feed circular antenna designed to receive signals from the 101° W.L. orbital location, and dual-feed 20"-diameter round antennas capable of receiving signals from the satellites at both 110° W.L. and 119° W.L. orbital locations. DISH Network has also deployed two versions of a 26" x 18" "SuperDish" elliptical antenna which is capable of receiving signals from DBS satellites at both 110° W.L. and 119° W.L. orbital locations, as well as signals from FSS  
(continued....)

accepted standard, and in some portions of the U.S. where 45-cm antennas are infeasible, consumers have become accustomed to larger diameter dishes.<sup>123</sup> In addition, we note that the increased gain achieved at larger diameters is helpful in mitigating certain technical difficulties, such as those due to rain-fade effects. We ask what minimum earth station size the Commission should seek to accommodate when formulating its rules. Is 45 cm reasonable, or should some other size be considered, especially in light of the increased orbital capacity that could be afforded with closer satellite spacing?

47. Historically, the Commission has opted not to regulate explicitly the diameter or other technical characteristics of receive-only antennas.<sup>124</sup> Rather, the Commission has typically chosen to establish limits on other system characteristics such as power flux density (pfd) levels or orbital spacing and has left the choice of receive-antenna characteristics to the operator with the understanding that receiver size has a bearing on availability, quality of service and the ability to market the service to consumers; however, the operator must then accept any resulting interference from other systems that are operating within the permitted levels. We believe that this approach has afforded operators maximum technical flexibility, especially considering that earth station receive antenna size is a very important factor to potential consumers of DTH service. However, the Commission also seeks to ensure that U.S.-licensed BSS systems receive sufficient interference protection and that subscribers' receive antennas will work effectively in current and future radio frequency interference environments. In particular, the receive earth station antenna off-axis discrimination performance will affect the amount of interference into BSS receivers from other systems. We note that, in implementing its two-degree spacing policy with respect to the FSS, the Commission has adopted certain earth station antenna performance requirements.<sup>125</sup> Accordingly, we request comment on whether the Commission should afford interference protection to 17/24 GHz BSS systems only to the extent that they meet certain receive antenna performance standards. Specifically, we request comment on what type of regulation might be appropriate, such as adopting side-lobe suppression or minimum gain requirements, or some other parameter.

## **E. TECHNICAL REQUIREMENTS FOR INTRA-SERVICE OPERATIONS**

### **1. UPLINK POWER LEVELS**

48. In order to implement the two-degree spacing policy for C- and Ku-band FSS satellites, the Commission established rules that define uplink power density limits and antenna performance standards.<sup>126</sup> In combination, these power density limits and antenna performance standards ensure that conforming FSS satellite systems will not emit power at off-axis angles at levels high enough to cause unacceptable interference to adjacent co-frequency satellites spaced at two-degree intervals. Similarly, in the Ka-band the Commission adopted a two-degree blanket licensing requirement that included uplink off-axis equivalent isotropically radiated power (e.i.r.p.) density limits and a single-entry power flux density (pfd) limit in the downlink.<sup>127</sup> Successful implementation of any orbital spacing regime for the

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satellites at either the 105° W.L. or 121° W.L. orbital locations that transmit DTH signals with DISH Network programming.

<sup>123</sup> Larger antennas, up to 2.4 meters in diameter, are required to receive DBS signals in Alaska and Hawaii.

<sup>124</sup> See, e.g., *Part 100 Report & Order*, 17 FCC Rcd 11331 (2002).

<sup>125</sup> See, e.g., 47 C.F.R. § 25.209.

<sup>126</sup> See 47 C.F.R. §§ 25.134, 25.208, 25.209.

<sup>127</sup> See 47 C.F.R. § 25.138.

17/24 GHz BSS service will likely require that the Commission develop analogous criteria. However, we recognize that in the 17/24 GHz BSS band the choice of orbital spacing will be determined in large measure by the operator's desire to serve its customers with a certain size of receiving antenna, and that 17/24 GHz BSS satellites may operate in an orbital spacing environment with greater than two-degrees of separation. Moreover, we recognize that feeder link earth stations typically operate with large diameter antennas that exhibit good off-axis rejection properties. For these reasons, the problem of off-axis interference into adjacent satellites may not be as significant in the 17/24 GHz band as it is in the FSS bands. Accordingly, we seek comment on our assumption regarding the need to establish off-axis uplink power limits for this service. In addition, the Commission's rules provide for routine licensing of FSS earth stations in situations where (in combination with the antenna performance standards of § 25.209) specific minimum equivalent antenna diameters and maximum uplink power limits are met.<sup>128</sup> We seek comment on whether analogous criteria might be developed for expedited licensing of feeder link earth stations in the 24 GHz band, and if so, what equivalent antenna diameters and power limits, or other technical characteristics might be appropriate.

49. The antenna performance standards of Section 25.209 apply to any antenna transmitting from an earth station operating with a geostationary satellite in the FSS.<sup>129</sup> Because by definition BSS feeder-links operate in the FSS, these antenna standards are applicable to the 17/24 GHz BSS feeder-link earth stations. At present there are no uplink power or power-density requirements established for Earth-to-space transmissions in the 24 GHz FSS band. A review of the current 17/24 GHz BSS applications reveals that applicants propose to operate with clear-sky<sup>130</sup> uplink e.i.r.p levels that range between 76.1 dBW and 79.4 dBW<sup>131</sup>; associated e.i.r.p. density levels ranging between 2.3 dBW/Hz and 5.6 dBW/Hz.<sup>132</sup> We propose to accommodate the highest clear-sky power density levels planned thus far, *i.e.*, 5.6 dBW/Hz. Applying the current GSO FSS antenna performance standard of Section 25.209, the resulting e.i.r.p density values at various off-axis angles are shown in Table 1 below.<sup>133</sup>

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<sup>128</sup> See 47 C.F.R. § 25.211(d), and § 25.212(c)-(d).

<sup>129</sup> Section 25.209 establishes an envelope, below which the antenna gain, as a function of off-axis angle, must lie. Separate envelopes are established for the plane of the GSO arc and for all other directions. This rule also protects receiving antennas from harmful interference on the basis of conformance to these same standards. Separate requirements for NGSO antennas are also defined. See 47 C.F.R. § 25.209.

<sup>130</sup> The clear-sky value is taken to be the condition when the intrinsic atmospheric attenuation due to gasses and water vapor are applicable, without additional attenuation due to tropospheric precipitation, such as rain or snow. See Recommendation ITU-R PN.676-1.

<sup>131</sup> One recent application included spot beam peak e.i.r.p. levels as high as 103.2 dBW, however it was not clear from the application that these were clear sky values. See *Pegasus Application* at 20.

<sup>132</sup> See *DIRECTV Application* at 42, *Intelsat Application* at 22.

<sup>133</sup> These values are the product of the off-axis the earth station antenna gain values given in §25.209 and an antenna input e.i.r.p. density of 79.4 dBW/24MHz, with a peak gain of 65.1 dBi. They do not take into account topocentric gain.

**E.I.R.P. Density as Function of Off-Axis Angle**

Off-axis angle (degrees)	e.i.r.p density (dBW/Hz)
2	-38.0
3	-42.4
4	-45.5
4.5	-46.8
6	-50.0
8	-51.5
9	-51.5

**Table 1**

50. We recognize that absent a clearly defined orbital separation, the interference contribution resulting from uplink transmissions to adjacent satellites cannot be fully determined. However, we seek comment on whether the proposed clear-sky earth station antenna off-axis e.i.r.p. density values might be appropriate down to some minimum orbital separation value, and whether they would provide sufficient protection to adjacent GSO BSS satellites. We have chosen to propose accommodating the highest power level proposed by an applicant, but we seek comment on whether some mid-range or other value might be preferable, or whether a higher level might be better to allow for future higher-power systems. We seek further comment on whether there are other factors that should be considered when determining an off-axis e.i.r.p. density value, such as the potential for interference to/from other services sharing the band, including 24 GHz FS systems, or the radiolocation service. We also ask what form an uplink power density rule should take, whether it is most appropriate to specify some input power or power density level in combination with the antenna performance requirements of Section 25.209, or to specify a composite curve of off-axis e.i.r.p. density levels as is done for blanket licensing of Ka-band GSO FSS earth stations.<sup>134</sup>

51. We anticipate that some future systems may wish to operate at higher e.i.r.p. density values than those proposed at this time. Our current FSS service rules provide a mechanism for licensing such non-conforming systems.<sup>135</sup> These rules place the burden on the applicant to provide a technical showing to the Commission, and to coordinate its non-conforming operations with adjacent operators. We propose to adopt a similar approach to accommodate satellite systems in the 17/24 GHz BSS band wishing to uplink with higher power levels. We seek comment on this issue and ask whether this approach is appropriate or whether different rules should be adopted. Non-conforming FSS operators are required to coordinate with adjacent satellites at 2°, 4° and 6° away.<sup>136</sup> Recognizing that 17/24 GHz BSS satellites may not be operating in a two-degree spacing environment, we seek comment on the angular distance over which coordination should be required.

52. The uplink off-axis e.i.r.p. density limits discussed above are for clear-sky operations only. GSO satellites operating in the 24 GHz band can suffer significant signal attenuation in the presence of precipitation and may likely need to transmit at higher powers during such weather conditions in order to overcome the effects of rain fade. Applicants have indicated a need to employ uplink adaptive power control to provide transmit power levels sufficient to meet the desired link performance during unfavorable weather events, while simultaneously ensuring that threshold power levels are not excessive

<sup>134</sup> See 47 C.F.R. § 25.138(a).

<sup>135</sup> See 47 C.F.R. §§ 25.220, 25.138(b),(c).

<sup>136</sup> See 47 C.F.R. §§ 25.220, 25.138(c).