

adopted rules for the operation of Earth Stations on Vessels (ESVs) that include a number of instances where cessation of transmissions may be required to prevent unwanted interference into either co-frequency terrestrial or FSS systems.¹⁶³ Where the Commission has adopted specific rules requiring licensees to terminate transmissions, specific events trigger the requirement to terminate transmissions. While DIRECTV and EchoStar proposed that 17/24 GHz BSS space stations be required to cease operations when they cause harmful interference to a DBS space station, no commenter has submitted proposals regarding what level of reduced availability or degradation in the Carrier-to-Interference ratio (C/I) might constitute sufficiently harmful interference to require a 17/24 GHz BSS operator to cease transmissions from its space station in order to protect the feeder links of a nearby DBS space station.¹⁶⁴ Moreover, any such condition is likely to be highly variable, depending upon a combination of circumstances unique to each location, each operator's business model, and the particular operating parameters for each pair of systems. Thus, without specific technical criteria to determine when cessation of transmissions might be necessary, we do not believe it is appropriate to adopt such a rule as proposed by DIRECTV and EchoStar. Nor do we wish to create a situation whereby one service might unduly constrain development of the other.

58. As DIRECTV correctly notes, our experience with reverse band operations – and particularly with reverse-band operations involving close-proximity space stations – is extremely limited.¹⁶⁵ Further, as commenters have indicated, the off-axis receiving antenna performance characteristics of currently operating DBS satellites may not be documented.¹⁶⁶ As both EchoStar and DIRECTV remind the Commission, there are millions of American consumers who depend upon DBS

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the interference event. The Commission's overall approach to Ku- and Ka-band NGSO FSS sharing encourages the exchange of data by system operators, so that they may predict and avoid such events by any preferred mitigation means. The default sharing mechanism, which includes equal splitting of the available spectrum for the duration of the event, is required only when the system operators have not agreed on a preferred avoidance method. Choice of the preferred, equal portion of spectrum to which it will resort during the event, is accorded to the first-launched NGSO-FSS system. The Establishment of Policies and Service Rules for the Non-Geostationary Satellite Orbit, Fixed Satellite Service in the Ku-Band, *Report and Order*, IB Docket No. 01-96, 17 FCC Rcd 7841 (2002) and The Establishment of Policies and Service Rules for the Non-Geostationary Satellite Orbit, Fixed Satellite Service in the Ka-Band, *Report and Order*, IB Docket No. 02-19, 18 FCC Rcd 14708 (2003).

¹⁶³ ESVs may be required to cease operations if they operate outside the terms of their coordination agreement or coordinated area, exceed the required e.i.r.p or e.i.r.p. spectral density toward the horizon, or if the antenna mispointing exceeds a specified angular amount. Procedures to Govern the Use of Satellite Earth Stations on Board Vessels in the 5925-6425 MHz/3700-4200 MHz Bands and 14.0-14.5 GHz/11.7-12.2 GHz Bands, *Report and Order*, IB Docket No. 02-10, 20 FCC Rcd 674, 694, 696, 699 and 718, ¶¶ 46, 58 and 104 (2005) (“*ESV Order*”); 47 C.F.R. §§ 25.221, 25.222. The Commission also requires that ESV operators maintain a point of contact in the United States, available at all times, and with authority and ability to cease all emissions from the ESVs. This may be accomplished either directly or through the facilities of a U.S. hub or a hub located in another country with which the U.S. has a bilateral agreement that enables such cessation of emissions. *Id.* at 695-96 and 721, ¶¶ 47-50 and 112-113; and 47 C.F.R. §§ 25.221(a)(3), 25.222(a)(8). In addition, the Commission requires that although C-band ESVs must coordinate their near-shoreline operations prior to commencing operations, in the event objections to the coordination arrangements are received prior to the end of the 30-day Public Notice comment period, the operator must cease transmitting from the ESV until the coordination dispute is resolved. *ESV Order* at, 20 FCC Rcd at 690, ¶ 33; 47 C.F.R. § 25.221(e).

¹⁶⁴ Carrier-to-Interference ratio (C/I) is the ratio of power in an RF carrier to the interference power in the channel.

¹⁶⁵ DIRECTV Comments at 4; DIRECTV Ex Parte Report on 17/24 GHz BSS Operations at 101° W.L. of July 29, 2008 at 4.

¹⁶⁶ *Order and FNPRM*, 22 FCC Rcd at 8916, ¶ 184; EchoStar Comments at 4.

transmissions.¹⁶⁷ Thus, while we do not adopt a service-specific rule regarding cessation of emissions, we remind operators that our existing rules apply to 17/24 GHz BSS.

59. Further, while we do not adopt service-specific rules regarding the cessation of emissions, our licensing process provides an opportunity to address this issue. While it is our intention that bounding the antenna off-axis pfd levels will ultimately provide the best mechanism for mitigating space path interference, its efficacy depends upon sufficient knowledge of the coordination situation between both space stations. Until such information can be better established for DBS receiving antennas, we believe that affording DBS operators the opportunity to raise concerns during the licensing process provides the best temporary remedy. Specifically, we believe that DBS operators are uniquely positioned to provide useful data regarding what level of interference would be sufficiently detrimental to their operations taking into account the distinct circumstances present at the orbital location and to provide this information to the Commission. Thus, we remain open to the possibility of placing additional operating constraints on a 17/24 GHz BSS space station seeking to operate in close proximity (*i.e.*, within 0.4°) to a U.S.-authorized DBS space station that was placed into service at its current location prior to the release date of this Order. The 0.4° distance is a useful threshold within which we would remain open to additional licensing conditions and is based upon the comments and analysis in the ITU document provided by DIRECTV who, in discussing an orbital separation approach to space path interference mitigation, encourages the Commission to adopt a conservative orbital separation of 0.4°.¹⁶⁸ Any such additional licensing conditions would be determined on a case-by-case basis, and would address the conditions under which the 17/24 GHz BSS operator would be required to modify or terminate its transmissions. DBS operators bear the burden of timely requesting and fully justifying any such additional conditions or requirements through the public notice and comment process.

60. Where the Bureau has determined that a DBS operator has timely requested and fully justified inclusion of additional conditions on the grant of a 17/24 GHz BSS application, the Bureau should narrowly tailor the relief granted. Specifically, the conditions placed on the 17/24 GHz BSS operations should be limited to protecting U.S.-authorized DBS space stations (or non-U.S. authorized DBS space station granted market access to the United States) that were placed into service at their assigned location prior to the release date of this Order,¹⁶⁹ and that are separated by 0.4° or less from the 17/24 GHz BSS space station. In these cases, the condition placed on the 17/24 GHz BSS operator would terminate if the DBS space station is relocated to a new orbital location regardless of whether that new location is within 0.4° of a current or planned 17/24 GHz BSS space station. The condition would also terminate at the end of the license term for the DBS space station at issue. We believe that in the short-term, when used as a temporary measure in combination with our other rules, this approach will provide the most effective means of balancing the competing needs of both services.

61. At present, U.S.-licensed DBS space stations and non-U.S. licensed DBS space stations granted market access to the United States are operating at only a small number of orbital locations.¹⁷⁰

¹⁶⁷ DIRECTV Comments at 4; EchoStar Comments at 4.

¹⁶⁸ Recommendation ITU-R BO.1835; DIRECTV Comments at 4-6; DIRECTV Reply Comments at 2-3.

¹⁶⁹ The co-primary allocation for this service was adopted by the Commission in 2000 and became effective in 2007. As the comments in this proceeding have shown, DBS operators have been analyzing space path interference issues since 2006. Thus, DBS operators have had an extended time to prepare for the commencement of service by 17/24 GHz BSS operators. As a result, DBS space station operators would reasonably be expected to have designed new satellites in the last few years with these issues in mind. Thus, limiting this particular condition to existing in-orbit DBS space stations is reasonable.

¹⁷⁰ Examples of operational DBS space stations include: EchoStar 12 (S2653) at 61.35° W.L.; EchoStar 3 (S2741) at 61.45° W.L.; EchoStar 15 (S2811) at 61.55° W.L.; DIRECTV 1R (S2369) at 72.5° W.L.; and Nimiq 5 (*See* File No. (continued...))

We have authorized 17/24 GHz BSS space stations to operate within 0.4° of a DBS space station at only one of these locations (*i.e.*, 110° W.L.),¹⁷¹ and one pending application seeks authority to operate within 0.4° of a DBS space station.¹⁷² For this reason, we believe that instances of unforeseen harmful interference will be exceedingly rare. Moreover, complete cessation of emissions is an extreme remedy. For the rare interference event, it will likely be sufficient for the 17/24 GHz BSS operator to correct the problem with more moderate measures such as reducing its transmitted power levels or redistributing its transponder loading. As required by our existing rules, 17/24 GHz BSS operators are required to coordinate their operations carefully with adjacent DBS systems prior to launch. Further, we strongly encourage, but do not mandate, 17/24 GHz BSS operators to undertake cooperative on-station testing prior to commencing full operations, so that any potential interference problems between the 17/24 GHz BSS and DBS systems can be identified and mitigated at an early stage.

H. Procedures for Pending Applications and Current Authorizations

62. In this Second Report and Order, we amend our rules to require that all 17/24 GHz BSS applicants submit with their applications predicted transmitting off-axis antenna gain information over the angular range described above.¹⁷³ In this section, we address how existing licensees and applicants can file new data to conform their licenses and pending applications to these new rules. To implement our decision here, we direct the Bureau to release a Public Notice after publication of the rules in the Federal Register, inviting applicants to amend their pending applications consistent with the rules we adopt today. Any application that is not amended by the date specified by the Bureau will be dismissed as defective.¹⁷⁴ The Bureau will review the amended applications to determine whether they are substantially complete and acceptable for filing. The Bureau will return to the applicant as defective any amended applications that are not substantially complete.¹⁷⁵

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SES-MFS-20090306-00253) at 72.7° W.L.; EchoStar 6 (S2232) at 76.95° W.L.; EchoStar 4 (S2621) at 77° W.L.; EchoStar 8 (S2439) at 77° W.L.; EchoStar 1 (S2739) at 77.15° W.L.; DIRECTV 8 DBS (S2430) at 100.85° W.L.; DIRECTV 9S DBS (S2669) at 101.1° W.L.; DIRECTV 4S (S2430) at 101.2° W.L.; EchoStar 11 (S2738) at 110° W.L.; DIRECTV 5 (S2673) at 110.1° W.L.; EchoStar 10 (S2694) at 110.2° W.L.; EchoStar 7 (S2740) at 118.8° W.L.; EchoStar 14 (S2790) at 118.9° W.L.; DIRECTV 7S (S2455) at 119.05° W.L.; and Ciel-2 (*See* File No. SES-MFS-20080926-01242) at 128.85° W.L. For complete information, *see* IBFS.

¹⁷¹ EchoStar EX-1 (S2441) was licensed to operate at 110.4° W.L. *See supra* n. 23 explaining that EchoStar submitted a letter on May 24, 2011 surrendering its 17/24 GHz BSS authorizations.

¹⁷² Spectrum Five has filed an application to operate at 118.8° W.L. Application of Spectrum Five LLC, IBFS File No. SAT-LOI-20081113-00216; SAT-AMD-20091026-00113 (Call Sign S2777). This is in very close proximity to in-orbit DBS space stations located at the 119° W.L. DBS cluster. *e.g.*, EchoStar 14 (S2790) which is operating at 118.9° W.L. EchoStar 7 (S2740) is currently operating at 118.8° W.L. under a 180-day STA, SAT-STA-20110204-00024, commencing March 10, 2011. *See also* EchoStar 7's pending modification, IBFS File No. SAT-MOD-20100329-00058.

¹⁷³ *See supra* ¶¶ 20-31.

¹⁷⁴ 47 C.F.R. § 25.112(a)(2).

¹⁷⁵ *See* Amendment of the Commission's Space Station Licensing Rules and Policies and Mitigation of Orbital Debris, *First Report and Order and Further Notice of Proposed Rulemaking in IB Docket No. 02-34, and First Report and Order in IB Docket No. 02-54, IB Docket Nos. 02-34 and 02-54*, 18 FCC Rcd 10760, 10852, ¶ 244 (2003) ("*First Space Station Licensing Reform Order*"). Applications of PanAmSat Licensee Corp. for Authority to Construct, Launch, and Operate a Hybrid Satellite System in its Separate International Communications Satellite System, *Order on Reconsideration*, 18 FCC Rcd 23916 (2003). We note that the Commission reserves the right to return an application which has been placed on Public Notice as acceptable for filing if, upon further examination, it is (continued...)

63. We recognize that the authorizations issued under these technical rules may not be exactly what the applicants expected. This, by itself, is not a barrier to the adoption of these rules or the requirement that applicants amend their applications to come into compliance with the new rules. The Commission has the authority to apply new procedures to pending applications if doing so does not impair the rights an applicant possessed when it filed its application, increase an applicant's liability for past conduct, or impose new duties on applicants with respect to "transactions already completed."¹⁷⁶ Applicants do not gain any vested right merely by filing an application.¹⁷⁷ Filing an application cannot be considered a "transaction already completed" for purposes of this analysis.

64. Similarly, the Public Notice will also require current authorization holders to file a modification application that demonstrates compliance with the rules we adopt here today, and to supplement the file with all required information. The Bureau will review the modification applications to determine whether they are substantially complete and acceptable for filing. The Bureau will return to the applicant as defective any modification applications that are not substantially complete.

65. The Commission may adopt rules that modify any station license of general applicability that affect a class of licensees,¹⁷⁸ "if in its judgment such action will promote the public interest, convenience and necessity" and the modification may be accomplished through notice and comment rulemaking.¹⁷⁹ The purpose of the Commission's actions here is to establish revised technical rules that will foster the provision of new services without causing harmful interference to a co-primary service – DBS. Neither DBS nor 17/24 GHz BSS operators possess the right to interfere with co-primary operations. We are not altering the past legal consequences of past actions of 17/24 GHz BSS

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determined that the application is not in conformance with the Commission's rules. See, e.g., Policy Branch Information, Satellite Space Applications Accepted for Filing, *Public Notice*, Report No. SAT-00418 (Feb. 2, 2007).

¹⁷⁶ *Order and FNPRM*, 22 FCC Rcd at 8901, ¶ 144. See also *First Space Station Licensing Reform Order*, 18 FCC Rcd at 10865, ¶ 278 and n.673 (citing *Landgraf v. USI Film Products*, 511 U.S. 244, 269-70 ("Landgraf"); *DIRECTV v. FCC*, 110 F.3d 816, 825-2626 (citing *Bell Atlantic Telephone Cos. v. FCC*, 79 F.3d 1195, 1207 (D.C. Cir., 1996)); *Black Citizens for a Fair Media v. FCC*, 719 F.2d 407, 411 (D.C. Cir., 1983); *Celotronic Telemetry, Inc. v. FCC*, 272 F.3d 585, 588 (D.C. Cir. 2001) ("Celotronic") (citing *Landgraf*, 511 U.S. at 280).

¹⁷⁷ *Order and FNPRM*, 22 FCC Rcd at 8901, ¶ 144; *Chadmoore Communications, Inc. v. FCC*, 113 F.3d 235, 240-41 (D.C. Cir. 1997) ("Chadmoore") ("In this case the Commission's action did not increase [the applicant's] liability for past conduct or impose new duties with respect to completed transactions. Nor could it have impaired a right possessed by [the applicant] because none vested on the filing of its application."); *Hispanic Info. & Telecomms. Network v. FCC*, 865 F.2d 1289, 1294-95 (D.C. Cir. 1989) ("The filing of an application creates no vested right to a hearing; if the substantive standards change so that the applicant is no longer qualified, the application may be dismissed."); *Schraier v. Hickel*, 419 F.2d 663, 667 (D.C. Cir. 1969) (filing of application that has not been accepted does not create a legal interest that restricts discretion vested in agency). See also *United States v. Storer Broadcasting Co.*, 351 U.S. 192 (1952) (pending application for new station dismissed due to rule change limiting the number of licenses that could be held by one owner); *Bachow Communications, Inc. v. FCC*, 237 F.3d 683, 686-88 (D.C. Cir. 2001) (upholding freeze on new applications and dismissal of pending applications in light of adoption of new licensing scheme); *PLMRS Narrowband Corp. v. FCC*, 182 F.3d 995, 1000-01 (D.C. Cir. 1999) (applicant did not, by virtue of filing application, obtain the right to have it considered under the rules then applicable).

¹⁷⁸ 47 U.S.C. § 316. See Amendment of Part 27 of the Commission's Rules to Govern the Operation of Wireless Communication Services in the 2.3 GHz Band, *Report and Order and Second Report and Order*, 25 FCC Rcd 11710, 11774-75, at ¶ 157 (rel. May 20, 2010) ("2.3 GHz Order").

¹⁷⁹ *Id.* at 11774-75, ¶ 157 (rel. May 20, 2010); *Committee for Effective Cellular Rules v. FCC*, 53 F.3d 1309 (D.C. Cir. 1995); *WBEN, Inc. v. FCC*, 396 F.2d 601, 618 (2nd Cir. 1968), cert. denied, 393 U.S. 914 (1968).

authorization holders.¹⁸⁰ Rather, the scheme we are adopting in this order is a means of bringing current authorization holders and pending applicants into compliance with general operational requirements.¹⁸¹ Moreover, the 17/24 GHz BSS authorization holders could not have had any reasonable expectation that the Commission would refrain from exercising its regulatory power to change the operational requirements of a service in cases where the public interest is best served by such change. Commission action that upsets expectations held by current authorization holders based on existing rules is not impermissibly retroactive.¹⁸² This is particularly true given the fact that all 17/24 GHz BSS licensees were aware at the time of grant that they would be subject to any additional requirements adopted as a result of this proceeding.¹⁸³ In fact, all such licenses were granted with a condition on the face of the license stating that “[t]his authorization and all conditions contained herein are subject to the outcome of the Commission’s rulemaking in IB Docket No. 06-123 and any requirements subsequently adopted therein.”

66. We invite both 17/24 GHz BSS applicants and authorization holders to file their predicted transmitting antenna off-axis gain data at any time prior to the date that the rules adopted today become effective.¹⁸⁴ We acknowledge that some parties may be close to possessing actual measured data, particularly those who actively participated and commented in this proceeding. If any of these entities have measured data, they are permitted to immediately file a modification (or amendment as appropriate) containing measured data rather than filing predicted data. No fee will be required for amendments or modifications filed for the sole purpose of amending a pending application or modifying a current authorization to comply with the rules adopted here today. Amendments that include changes in requested frequencies, orbital locations, or any other change not required by the rules adopted today, must include the appropriate fee.¹⁸⁵

¹⁸⁰ Mitigation of Orbital Debris, *Second Report and Order*, IB Docket No. 02-54, 19 FCC Rcd 11567, 11598, ¶ 78 (2004) (“*Second Orbital Debris Order*”) (applying a rule to satellites that are currently on-orbit or under physical construction is impermissibly retroactive only when an agency “alter[s] the past legal consequences of past actions.”) *Celotronic*, 272 F.3d at 588 (citing *Bowen v. Georgetown University Hospital*, 488 U.S. 204, 219 (1988)).

¹⁸¹ *Second Orbital Debris Order*, 19 FCC Rcd at 11598, ¶ 78 (stating that the application of rules adopted in the order to existing spacecraft would not be impermissible under the Administrative Procedure Act or Commission precedent).

¹⁸² 47 U.S.C. § 304. See *2.3 GHz Order*, 25 FCC Rcd at 11774-75, ¶ 157.

¹⁸³ See *National Cable & Telecommunications Assn. v. FCC*, 567 F.3d 659, 670 (D.C. Cir. 2009) (citing *Mobile Relay Assocs. v. FCC*, 457 F.3d 1, 11 (D.C. Cir. 2006)); *Chemical Manufacturers Ass’n v. EPA*, 869 F.2d 1526, 1536 (D.C. Cir. 1989) (stating that “[i]t is often the case that a business will undertake a certain course of conduct based on the current law, and will then find its expectations frustrated when the law changes. This has never been thought to constitute retroactive lawmaking, and indeed most economic regulation would be unworkable if all laws disrupting prior expectations were deemed suspect”).

¹⁸⁴ We recognize that some parties may seek to file conforming off-axis antenna gain data and associated information prior to the effective date of these rules. We will not prohibit them from doing so. If off-axis antenna gain data and associated information is filed prior to the effective date of these rules, defects in the off-axis antenna gain data will not be grounds for dismissal. After the effective date of the rules, if the off-axis antenna gain data and associated information does not meet our substantially complete standard it will be grounds for dismissal. At all times, modifications for other purposes where the rules are in effect will continue to be reviewed pursuant to the substantially complete standard.

¹⁸⁵ 47 C.F.R. § 1.1111(a).

IV. PROCEDURAL MATTERS

A. Final Regulatory Flexibility Analysis

67. Pursuant to the Regulatory Flexibility Act ("RFA"),¹⁸⁶ the *FNPRM* incorporated an Initial Regulatory Flexibility Analysis ("IRFA"). The Commission sought written public comments on the possible significant economic impact of the proposed policies and rules on small entities in the *FNPRM*, including comments on the IRFA. No one commented specifically on the IRFA. Pursuant to the RFA, Appendix C provides a Final Regulatory Flexibility Analysis. It assesses the effects of adopting space path interference rules on small business concerns.

B. Final Paperwork Reduction Act of 1995 Analysis

68. In the *FNPRM*, the Commission analyzed the actions we now adopt in this Report and Order with respect to the Paperwork Reduction Act of 1995. The Report and Order modifies the data collection by requiring 17/24 GHz BSS applicants to provide pfd calculations at the time of application and 9 months prior to launch of the space station that either: (1) demonstrate that the pfd level at the location of any prior-filed DBS network does not exceed the coordination trigger of -117 dBW/m²/100 kHz; or (2) demonstrate to what extent the coordination trigger is exceeded at the receiver input of any prior-filed DBS network. If the coordination trigger is exceeded, the 17/24 GHz BSS applicant must also provide certification that all affected DBS operators acknowledge and do not object to the applicant's higher off-axis pfd levels. 17/24 GHz BSS applicants are also required to submit transmitting antenna off-axis gain measurements made over a range of $\pm 30^\circ$ from the X axis in the X-Z plane and over a range of $\pm 60^\circ$ in planes rotated about the Z axis that should permit accurate off-axis pfd information to be calculated for DBS and 17/24 GHz BSS space stations separated in longitude by as little as 0.2°. 17/24 GHz BSS and DBS Applicants seeking to bias their space station orientation are required to file additional information with the Commission in which they provide an explanation of the planned orientation bias and the necessary increased range of antenna off-axis gain measurements. Both 17/24 GHz BSS and DBS applicants are required to file the predicted maximum orbital eccentricity with their application. This document contains new information collection requirements subject to the Paperwork Reduction Act of 1995 (PRA), Public Law 104-13. It will be submitted to the Office of Management and Budget (OMB) for review under section 3507(d) of the PRA. OMB, the general public, and other Federal agencies are invited to comment on the new information collection requirements contained in this proceeding. In addition, the Commission notes that pursuant to the Small Business Paperwork Relief Act of 2002, Public Law 107-198, *see* 44 U.S.C. 3506(c)(4), we previously sought specific comment on how the Commission might further reduce the information collection burden for small business concerns with fewer than 25 employees.

V. ORDERING CLAUSES

69. Accordingly, IT IS ORDERED that, pursuant to the authority contained in Sections 4(i), 4(j), 7(a), 302(a), 303(c), 303(e), 303(f), 303(g), 303(j), 303(r), and 303(y) of the Communications Act of 1934, as amended, 47 U.S.C. §§ 154(i), 154(j), 157(a), 302(a), 303(c), 303(e), 303(f), 303(g), 303(j), 303(r), 303(y), this Report and Order in IB Docket No. 06-123 IS ADOPTED.

70. IT IS FURTHER ORDERED that Part 25 of the Commission's rules IS AMENDED as set forth in Appendix B, and such rule amendments SHALL BE EFFECTIVE 30 days after the date of publication in the Federal Register, except for Sections 25.114(d)(15)(iv), 25.114(d)(18), 25.264(a),

¹⁸⁶ *See* 5 U.S.C. § 603. The RFA has been amended by the Contract with America Advancement Act of 1996, Pub. L. No. 104-121, 110 Stat. 847 (1996) ("CWAAA"). Title II of the CWAAA is the Small Business Regulatory Enforcement Fairness Act of 1996.

25.264(b), 25.264(c), 25.264(d), 25.264(f), which contain new information collection requirements that require approval by the Office of Management and Budget (OMB) under the PRA. The Federal Communications Commission will publish a document in the Federal Register announcing such approval and the relevant effective date.

71. IT IS FURTHER ORDERED that the International Bureau is delegated authority to issue Public Notices consistent with this Report and Order.

72. IT IS FURTHER ORDERED that the final regulatory flexibility analysis, as required by section 604 of the Regulatory Flexibility Act, IS ADOPTED.

73. IT IS FURTHER ORDERED that the Commission's Consumer and Governmental Affairs Bureau, Reference Information Center SHALL SEND a copy of this Report and Order, including the final regulatory flexibility analysis, to the Chief Counsel for Advocacy of the Small Business Administration, in accordance with section 603(a) of the Regulatory Flexibility Act, 5 U.S.C. § 601, *et seq.*

74. IT IS FURTHER ORDERED that the Commission SHALL SEND a copy of this Report and Order in a report to be sent to Congress and the General Accountability Office pursuant to the Congressional Review Act, 5 U.S.C. § 801(a)(1)(A).

FEDERAL COMMUNICATIONS COMMISSION



Marlene H. Dortch
Secretary

APPENDIX A**List of Comments and Reply Comments**Comments

EchoStar Satellite LLC (11/5/2007)
DIRECTV (11/5/2007)
SES Americom (11/5/2007)

Reply Comments

EchoStar Satellite LLC (12/5/2007)
DIRECTV (12/5/2007)
Telesat Canada (12/5/2007)
SES Americom (12/5/2007)

Ex Parte Filings

DIRECTV, Inc. (6/2/2011)
DIRECTV, Inc. (6/1/2011)
DIRECTV, Inc. (5/27/2011)
SES Americom, Inc. (5/26/2011)
DIRECTV, Inc. (5/24/2011)
DIRECTV, Inc. (5/16/2011)
DIRECTV, Inc. (5/5/2011)
DIRECTV, Inc. (4/29/2011)
DIRECTV, Inc. (4/29/2011)
DIRECTV, Inc. (4/28/2011)
DIRECTV, Inc. (4/28/2011)
SES Americom (2/9/2011)
EchoStar Corporation (2/7/2011)
EchoStar Corporation (10/8/2008)
EchoStar Corporation (8/8/2008)
DIRECTV, Inc. (7/30/2008)
DIRECTV, Inc. (7/14/2008)
DIRECTV, Inc. (6/17/2008)
DIRECTV, Inc. (5/1/2008)
DIRECTV, Inc. (4/21/2008)

APPENDIX B**Final Rules**

For the reasons discussed above in the preamble, the Federal Communications Commission amends 47 CFR Part 25 as follows:

PART 25 – SATELLITE COMMUNICATIONS

1. Section 25.114 by adding paragraphs (d)(15)(iv) and (d)(18) to read as follows:

§ 25.114 Applications for space station authorizations.

(d) ***

(15) ***

(iv) The information required in Section 25.264(a)-(b).

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

2. Create new Section 25.264 to read as follows:

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

(a) Each applicant for a space station license in the 17/24 GHz broadcasting-satellite service (BSS) must provide a series of tables or graphs with its application, that contain the predicted transmitting antenna off-axis gain information for each transmitting antenna in the 17.3-17.8 GHz frequency band. Using a Cartesian coordinate system wherein the X axis is tangent to the geostationary orbital arc with the positive direction pointing east, *i.e.*, in the direction of travel of the satellite; the Y axis is parallel to a line passing through the geographic north and south poles of the Earth, with the positive direction pointing south; and the Z axis passes through the satellite and the center of the Earth, with the positive direction pointing toward the Earth, the applicant must provide the predicted transmitting antenna off-axis antenna gain information:

(1) in the X-Z plane, *i.e.*, the plane of the geostationary orbit, over a range of ± 30 degrees from the positive and negative X axes in increments of 5 degrees or less.

(2) in planes rotated from the X-Z plane about the Z axis, over a range of ± 60 degrees relative to the equatorial plane, in increments of 10 degrees or less.

(3) in both polarizations.

(4) at a minimum of three measurement frequencies determined with respect to the entire portion of the 17.3-17.8 GHz frequency band over which the space station is designed to transmit: 5 MHz above the lower edge of the band; at the band center frequency; and 5 MHz below the upper edge of the band.

(5) over a greater angular measurement range, if necessary, to account for any planned spacecraft orientation bias or change in operating orientation relative to the reference coordinate system. The applicant must also explain its reasons for doing so.

(b) Each applicant for a space station license in the 17/24 GHz BSS must provide power flux density (pfd) calculations with its application that are based upon the predicted off-axis transmitting antenna gain information submitted in accordance with paragraph (a) of this section, as follows:

(1) the pfd calculations must be provided at the location of all prior-filed U.S. DBS space stations where the applicant's pfd level exceeds the coordination trigger of $-117 \text{ dBW/m}^2/100 \text{ kHz}$ in the 17.3-17.8 GHz band. In this rule, the term prior-filed U.S. DBS space station refers to any Direct Broadcast Satellite service space station application that was filed with the Commission (or authorization granted by the Commission) prior to the filing of the 17/24 GHz BSS application containing the predicted off-axis transmitting antenna gain information. The term prior-filed U.S. DBS space station does not include any applications (or authorizations) that have been denied, dismissed, or are otherwise no longer valid. Prior-filed U.S. DBS space stations may include foreign-licensed DBS space stations seeking authority to serve the United States market, but do not include foreign-licensed DBS space stations that have not filed applications with the Commission for market access in the United States.

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

(i) identify each prior-filed U.S. DBS space station at whose location the coordination threshold pfd level of $-117 \text{ dBW/m}^2/100 \text{ kHz}$ is exceeded; and

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

(3) if the calculated pfd level is in excess of the threshold level of $-117 \text{ dBW/m}^2/100 \text{ kHz}$ at the location of any prior-filed U.S. DBS space station, the applicant must also provide with its application certification that all affected DBS operators acknowledge and do not object to the applicants higher off-axis pfd levels. No such certification is required in cases where the DBS and 17/24 GHz BSS assigned operating frequencies do not overlap.

(c) No later than 9 months prior to launch, each 17/24 GHz BSS space station applicant or authorization holder must confirm the predicted transmitting antenna off-axis gain information provided in accordance with §25.114(d)(15)(iv) by submitting measured transmitting antenna off-axis gain information over the angular ranges, measurement frequencies and polarizations described in paragraphs (a)(1)-(5) of this section. The transmitting antenna off-axis gain information should be measured under conditions as close to flight configuration as possible.

(d) No later than 9 months prior to launch, each 17/24 GHz BSS space station applicant or authorization holder must provide pfd calculations based upon the measured transmitting antenna off-axis gain information that is submitted in accordance with paragraph (c) of this section as follows:

(1) the pfd calculations must be provided:

(i) at the location of all prior-filed U.S. DBS space stations as defined in paragraph (b)(1) of this section, where the applicant's pfd level in the 17.3-17.8 GHz band exceeds the coordination trigger of -117 dBW/m²/100 kHz; and

(ii) at the location of any subsequently-filed U.S. DBS space station where the applicant's pfd level in the 17.3-17.8 GHz band exceeds the coordination trigger of -117 dBW/m²/100 kHz. In this rule, the term subsequently-filed U.S. DBS space station refers to any Direct Broadcast Satellite service space station application that was filed with the Commission (or authorization granted by the Commission) after the 17/24 GHz BSS operator submitted the predicted data required by paragraphs (a)-(b) of this section, but prior to the time the 17/24 GHz BSS operator submitted the measured data required in this paragraph. Subsequently-filed U.S. DBS space stations may include foreign-licensed DBS space stations seeking authority to serve the United States market. The term does not include any applications (or authorizations) that have been denied, dismissed, or are otherwise no longer valid, nor does it include foreign-licensed DBS space stations that have not filed applications with the Commission for market access in the United States.

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

(i) identify each prior-filed U.S. DBS space station at whose location the coordination threshold pfd level of -117 dBW/m²/100 kHz is exceeded; and

(ii) demonstrate the extent to which the applicant's or licensee's transmissions in the 17.3-17.8 GHz band exceed the threshold pfd level of -117 dBW/m²/100 kHz at those prior-filed U.S. DBS space station locations.

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

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

(i) coordinate its operations that are in excess of the threshold pfd level of -117 dBW/m²/100 kHz with the affected prior-filed U.S. DBS space station operator, or

(ii) adjust its operating parameters so that at the location of the prior-filed U.S. DBS space station, the pfd level of -117 dBW/m²/100 kHz is not exceeded.

(2) at the location of any subsequently-filed U.S. DBS space station as defined in paragraph (d)(1) of this section, where the pfd level submitted in accordance with paragraph (d) of this section, is also in excess of the pfd level calculated on the basis of the predicted data submitted in accordance with paragraph (a) of

this section that were on file with the Commission at the time the DBS space station application was filed, then the 17/24 GHz broadcasting-satellite operator must either:

- (i) coordinate with the affected subsequently-filed U.S. DBS space station operator all of its operations that are either in excess of the pfd level calculated on the basis of the predicted antenna off-axis gain data, or are in excess of the threshold pfd level of $-117 \text{ dBW/m}^2/100 \text{ kHz}$, whichever is greater, or
 - (ii) adjust its operating parameters so that at the location of the subsequently-filed U.S. DBS space station, either the pfd level calculated on the basis of the predicted off-axis transmitting antenna gain data, or the threshold pfd level of $-117 \text{ dBW/m}^2/100 \text{ kHz}$, whichever is greater, is not exceeded.
- (3) no coordination or adjustment of operating parameters is required in cases where the DBS and 17/24 GHz BSS operating frequencies do not overlap.
- (f) The 17/24 GHz BSS applicant or licensee must modify its license, or amend its application, as appropriate, based upon new information:
- (1) if the pfd levels submitted in accordance with paragraph (d) of this section, are in excess of those submitted in accordance with paragraph (b) of this section at the location of any prior-filed or subsequently-filed U.S. DBS space station as defined in paragraphs (b)(1) and (d)(1) of this section, or
 - (2) if the 17/24 GHz BSS operator adjusts its operating parameters in accordance with paragraphs (e)(1)(ii) or (e)(2)(ii) or this section.
- (g) Absent an explicit agreement between operators to permit more closely spaced operations, U.S. authorized 17/24 GHz BSS space stations and U.S. authorized DBS space stations with co-frequency assignments may not be licensed to operate at locations separated by less than 0.2 degrees in orbital longitude.
- (h) All operational 17/24 GHz BSS space stations must be maintained in geostationary orbits that:
- (1) do not exceed 0.075° of inclination.
 - (2) operate with an apogee less than or equal to 35,806 km above the surface of the Earth, and with a perigee greater than or equal to 35,766 km above the surface of the Earth (*i.e.*, an eccentricity of less than 4.7×10^{-4}).
- (i) U.S. authorized DBS networks may claim protection from space path interference arising from the reverse-band operations of U.S. authorized 17/24 GHz BSS networks to the extent that the DBS space station operates within the bounds of inclination and eccentricity listed below. When the geostationary orbit of the DBS space station exceeds these bounds on inclination and eccentricity, it may not claim protection from any additional space path interference arising as a result of its inclined or eccentric operations and may only claim protection as if it were operating within the bounds listed below:
- (1) the DBS space station's orbit does not exceed 0.075° of inclination, and
 - (2) the DBS space station's orbit maintains an apogee less than or equal to 35,806 km above the surface of the Earth, and a perigee greater than or equal to 35,766 km above the surface of the Earth (*i.e.*, an eccentricity of less than 4.7×10^{-4}).

APPENDIX C

Final Regulatory Flexibility Analysis

As required by the Regulatory Flexibility Act of 1980, as amended (RFA),¹ the Further Notice of Proposed Rulemaking (*FNPRM*) in this proceeding, *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 Frequency Band for Fixed Satellite Services Providing Feeder Links to the Broadcasting-Satellite Service and for the Satellite Services Operating Bi-directionally in the 17.3-17.8 GHz Frequency Band*, IB Docket No. 06-123, adopted on May 2, 2007 and released on May 4, 2007, incorporated an Initial Regulatory Flexibility Analysis (IRFA).² The Commission sought written public comment on the proposals in the *FNPRM*, including comment on the IRFA. This present Final Regulatory Flexibility Analysis (FRFA) conforms to the RFA.³

A. Need for, and Objectives of, the Report and Order

The *FNPRM* sought to mitigate space path interference for the 17/24 GHz Broadcasting-Satellite Service (BSS). It sought comment and developed a record on approaches to mitigate space path interference in the 17.3-17.8 GHz band that may occur when the transmitted signals from 17/24 GHz BSS space stations are received by the feeder link receivers on space stations operating in the DBS service. Further, the *FNPRM* sought comment on avoiding harmful levels of space path interference into DBS space station receivers by establishing a power flux density (pfd) value at the victim (*i.e.*, DBS) space station receiver, on proposed minimal orbital separation requirements and the specific information that 17/24 GHz BSS applicants should be required to submit to the Commission.

The objective of the Second Report and Order is to mitigate space path interference from 17/24 GHz Broadcasting-Satellite Service (BSS) received by adjacent DBS space stations. To this end, the Second Report and Order adopts a pfd coordination trigger and antenna off-axis gain information requirements. We also adopt a minimum orbital separation requirement of 0.2° and place bounds on orbital inclination and eccentricity. Further, we adopt procedural requirements for information submission, procedures to follow in the event of harmful interference, in the event of BSS space path interference into the telecommand links of DBS networks. Finally, we adopt procedures to bring current authorizations and current applications in line with the new rules adopted today.

B. Summary of Significant Issues Raised by Public Comments in Response to the IRFA

No parties filed comments that separately or specifically addressed the IRFA.

C. Description and Estimate of the Number of Small Entities to Which Rules Will Apply

¹ See 5 U.S.C. § 603. The Small Business Regulatory Enforcement Fairness Act of 1996, Pub. L. No. 104-121, Title II, 110 Stat. 857 (1996) amended the RFA (*see* 5 U.S.C. § 601-612).

² See *Report and Order and FNPRM*, 22 FCC Rcd 8842, Appendix H.

³ See 5 U.S.C. § 604.

The RFA directs agencies to provide a description of and, where feasible, an estimate of the number of small entities that may be affected by the rules adopted herein.⁴ The RFA generally defines the term "small entity" as having the same meaning as the terms "small business," "small organization," and "small governmental jurisdiction."⁵ In addition, the term "small business" has the same meaning as the term "small business concern" under the Small Business Act.⁶ A small business concern is one that: (1) is independently owned and operated; (2) is not dominant in its field of operation; and (3) satisfies any additional criteria established by the Small Business Administration (SBA).⁷ Below, we further describe and estimate the number of small entity licensees that may be affected by the adopted rules.

Satellite Telecommunications and All Other Telecommunications.

Regarding future satellite use of the bands that are the subject of this rulemaking, the applicable definition of small entity is the definition under the Small Business Administration (SBA) rules applicable to Satellite Telecommunications. This definition provides that a small entity is one with \$12.5 million or less in annual receipts. According to 2007 Census Bureau data, there are 512 satellite communication firms that operated for the entire year.⁸ Of this total, 464 firms had annual receipts of under \$10 million, and 18 firms had receipts of \$10 million to \$24,999,999.⁹ Generally, GSO systems, such as the 17/24 GHz BSS and DBS systems at issue here, cost hundreds of millions of dollars to construct, launch and operate. Therefore, the GSO companies, or their parent companies, rarely qualify under this definition as a small entity. There are no small entities affected by this action because only Federal agencies currently make use of these services.

The second category, ie. "All Other Telecommunications" comprises "establishments primarily engaged in providing specialized telecommunications services, such as satellite tracking, communications telemetry, and radar station operation. This industry also includes establishments primarily engaged in providing satellite terminal stations and associated facilities connected with one or more terrestrial systems and capable of transmitting telecommunications to, and receiving telecommunications from, satellite systems."¹⁰ For this category, Census Bureau data for 2007 show that there were a total of 2,383 firms that operated for the entire year.¹¹ Of this total, 2,347 firms had annual receipts of under \$10

⁴ 5 U.S.C. § 604(a)(3).

⁵ 5 U.S.C. § 601(6).

⁶ 5 U.S.C. § 601(3) (incorporating by reference the definition of "small business concern" in 15 U.S.C. § 632). Pursuant to the RFA, the statutory definition of a small business applies "unless an agency, after consultation with the Office of Advocacy of the Small Business Administration and after the opportunity for public comment, establishes one or more definitions of such term which are appropriate to the activities of the agency and publishes such definition(s) in the Federal Register." 5 U.S.C. § 601(3).

⁷ Small Business Act, 15 U.S.C. § 632 (1996).

⁸ U.S. Census Bureau, 2007 Economic Census, Subject Series: Information, "Establishment and Firm Size (Including Legal Form of Organization)," Table 4, NAICS code 517410 (issued Nov. 2010) available at http://factfinder.census.gov/servlet/IBQTable?_bm=y&-geo_id=&-skip=900&-ds_name=EC0751SSSZ4&-lang=en. ("2007 Census Data").

⁹ *Id.*

¹⁰ U.S. Census Bureau, 2007 NAICS Definitions, "517919 All Other Telecommunications"; <http://www.census.gov/naics/2007/def/ND517919.HTM#N517919>.

¹¹ U.S. Census Bureau, 2007 Economic Census, Subject Series: Information, "Establishment and Firm Size (Including Legal Form of Organization)," Table 4, NAICS code 517910 (issued Nov. 2010) available at (continued...)

million and 12 firms had annual receipts of \$10 million to \$24,999,999.¹²

Space Station Licensees (Geostationary). Commission records reveal that there are nine space station licensees operating BSS and DBS space stations. While we do not request or collect annual revenue information concerning such licensees and operators, GSO FSS systems, such as the 17/24 GHz BSS and DBS systems at issue here, cost hundreds of millions of dollars to construct, launch and operate. Therefore, the NGSO and GSO FSS companies, or their parent companies, rarely qualify under this definition as a small entity.

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

The *FNPRM* sought comment on various issues related to the mitigation of harmful interference in the reverse band operating environment, which is unique to operation in the 17/24 GHz BSS. None of the proposed methods are intended to increase the projected reporting, recordkeeping, and other compliance requirements. Specifically, we adopt a pfd coordination trigger and antenna off-axis gain information requirements. We also adopt a minimum orbital separation requirement of 0.2° and place bounds on orbital inclination and eccentricity. The Second Report and Order also adopts procedural requirements for information submission, and procedures to follow in the event of harmful interference into the telecommand links of DBS networks. Finally, we adopt procedures to bring authorizations and pending applications in line with the new rules.

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

The RFA requires that, to the extent consistent with the objectives of applicable statutes, the analysis shall discuss significant alternatives such as: (1) the establishment of differing compliance or reporting requirements or timetables that take into account the resources available to small entities; (2) the clarification, consolidation, or simplification of compliance and reporting requirements under the rule for small entities; (3) the use of performance, rather than design, standards; and (4) an exemption from coverage of the rule, or any part thereof, for small entities.¹³

As discussed above, small entities will not be affected by this Second Report and Order. The *FNPRM* solicited comment on methods to mitigate against space path interference between DBS and 17/24 GHz BSS satellites (space path interference). The *FNPRM* sought comment on what requirements including setting power level limits – including a pfd coordination trigger and projected antenna off-axis gain information requirements – and requiring technical showings would be reasonable to request from applicants seeking to operate 17/24 GHz BSS space stations. The *FNPRM* sought input from commenters to ensure that the information provided by the 17/24 GHz BSS space station applications would be sufficient to prevent interference with DBS providers, while at the same time ensuring that these submissions would not be overly burdensome. The Second Report and Order adopts rules requiring 17/24 GHz BSS applicants to provide with their applications technical showings demonstrating that they comply with the pfd coordination trigger and the off-axis gain information.

(Continued from previous page)

http://factfinder.census.gov/servlet/IBQTable?_bm=y&-geo_id=&-_skip=900&-ds_name=EC0751SSSZ4&-_lang=en.

¹² *Id.*

¹³ 5 U.S.C. § 603(c)(1), (c)(4).

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

None.

Report to Congress: The Commission will send a copy of the Second Report and Order, including this FRFA, in a report to be sent to Congress pursuant to the Congressional Review Act. In addition, the Commission will send a copy of the Second Report and Order, including this FRFA, to the Chief Counsel for Advocacy of the SBA. A copy of the Second Report and Order and FRFA (or summaries thereof) also will be published in the Federal Register.¹⁴

¹⁴ See 5 U.S.C. § 604(b).

APPENDIX D

Appendix F Locations, BSS Grants and Pending Applications and U.S. DBS Region 2 Plan Locations

Appendix F Locations (all locations are W.L.)	BSS Grants and Pending Applications ¹ (all locations are W.L.)	U.S. DBS Region 2 Plan Locations (all locations are W.L.)
43.0°		
47.0°		
51.0°		
55.0°		
59.0°		
63.0°	62.15°	61.5°
67.0°	67.5°	
71.0°	70.0°	
75.0°	75.0°	
79.0°	79.0°	
83.0°		
87.0°		
91.0°		
95.0°	95.0°	
99.0°	99.175°	101.0°
103.0°	102.825°; 103.15°	
107.0°	107.0°	
111.0°	110.4°; 110.9°	110.0°
115.0°	115.0°	
119.0°	118.8°	119.0°
123.0°		
127.0°		
131.0°		
135.0°		
139.0°		
143.0°		
147.0°		148.0°
151.0°		
155.0°		157.0°
159.0°		
163.0°		
167.0°		166.0°
171.0°		
175.0°		175.0°
179.0°		

¹ One operator recently submitted a letter surrendering five 17/24 GHz BSS authorizations. Letter from Pantelis Michalopoulos and Christopher Bjornson, Counsel for EchoStar Corporation and EchoStar Satellite Operating Corporation, to Marlene H. Dortch, Secretary, Federal Communications Commission, dated May 24, 2011.

APPENDIX E

Satellite Angular Separation Values as a Function of Orbital Eccentricity and Orbital Inclination

