

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554**

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)

In the Matter of)

)

ECHOSTAR CORPORATION) File No. SAT-MOD-2010____-____

) Call Sign S2454

Application for Modification of Authority to)

Provide DBS Service at 86.5° W.L. Using)

the EchoStar 8 Satellite)

)

APPLICATION FOR MODIFICATION

Pursuant to Sections 308 and 309 of the Communications Act of 1934, as amended,¹ and Section 25.117(d) of the Commission’s rules,² EchoStar Corporation (“EchoStar”) respectfully requests a modification of its authority to operate a Direct Broadcast Satellite (“DBS”) satellite system on the 32 DBS frequency channels available at the 86.5° W.L. orbital location.³ Specifically, EchoStar requests authority to operate on the DBS frequencies at that location by using the EchoStar 8 satellite, which currently operates at 77° W.L. as a Mexican-licensed satellite. EchoStar 8 will be relieved from duty at that slot after the launch of QuetzSat 1, set for the fourth quarter of 2011. EchoStar expects to soon request Special Temporary Authority (“STA”) to move EchoStar 8 to 86.5° W.L. upon QuetzSat 1’s successful launch and testing.

¹ 47 U.S.C. §§ 308, 309.

² 47 C.F.R. § 25.117(d).

³ See EchoStar Satellite L.L.C. Application to Construct, Launch and Operate a Direct Broadcast Satellite at the 86.5° W.L. Orbital Location, *Order and Authorization*, 21 FCC Rcd. 14045 (2006) (“86.5° W.L. Order”).

The grant of this application is in the public interest and will not cause harmful interference to any authorized user of the spectrum. The launch of a new satellite to 77° W.L. creates the opportunity to use EchoStar's 86.5° W.L. licensed location in an efficient, and indeed optimal, manner by means of an already constructed in-orbit satellite that is, moreover, healthy and fully operational. The satellite is capable of operating on all 32 channels at 86.5° W.L., and its launch will permit EchoStar's customer, DISH Network L.L.C. ("DISH"), to provide DBS service across that spectrum.⁴ Thus, the move of EchoStar 8 will achieve the same spectrum utilization, except that it will allow EchoStar to bring the orbital slot into use years earlier than contemplated by its authorization. This significant acceleration will be accomplished without loss of any services from 77° W.L. since QuetzSat 1 will simply replace EchoStar 8 at that orbital location.

EchoStar notes that this application is *not* subject to the Commission's 2005 moratorium for new DBS applications since it is not a request for a new space station, but rather one for modification to an existing satellite license.⁵

EchoStar requests that, in granting this application, the Commission also confirm that EchoStar has met its November 29, 2010 milestone for its authorization at 86.5° W.L., as well as the ultimate milestone for operations once EchoStar moves the satellite to 86.5° W.L. and brings it into use before November 29, 2012. The November 29, 2010 milestone is for completing

⁴ EchoStar has requested STA to move an older satellite, EchoStar 4, to 86.5° W.L. and operate it there. *See* File Nos. SAT-STA-20100920-00199 (filed Sept. 20, 2010); SAT-STA-20100920-00197 (filed Sept. 20, 2010); SAT-STA-20100920-00198 (filed Sept. 20, 2010). EchoStar's current plan is for EchoStar 4 to remain at 86.5° W.L. after the arrival of EchoStar 8, possibly as a spare subject to appropriate Commission authority.

⁵ *See* Public Notice, Direct Broadcast Satellite (DBS) Auction Nullified: Commission Set Forth Refund Procedures for Auction No. 52 Winning Bidders and Adopts a Freeze on All New DBS Service Applications, FCC 05-213, at 2 (rel. Dec. 21, 2005) ("This freeze is limited to applications for new space stations or for new requests for market access by foreign-licensed space stations. This freeze does not apply to . . . modifications to existing satellite licenses.").

construction of the first satellite in EchoStar's system. Construction of EchoStar 8 is, of course, complete, and moreover, EchoStar 8 will use the entire DBS spectrum at 86.5° W.L., obviating the need for an additional operational satellite.

I. BACKGROUND AND INTRODUCTION

On November 26, 2006, the Commission authorized EchoStar Satellite L.L.C., a predecessor-in-interest of EchoStar, to construct a new DBS satellite at the 86.5° W.L. orbital location.⁶ The milestone schedule incorporated in the authorization required EchoStar to complete contracting for its proposed satellite within one year of the date of the grant; complete its critical design review within two years; complete construction of the first satellite in the system within four years; and operate its satellite within six years.⁷ EchoStar has complied with all of the milestones to date – *i.e.*, with the first two milestones.

Due to fleet management and efficiency considerations, EchoStar has changed its business plans and is now seeking to avail itself of an opportunity for optimal fleet allocation – the opportunity presented by the freeing up of EchoStar 8. Maximizing efficiency has become especially paramount in light of certain setbacks, well known to the Commission, suffered by EchoStar's and DISH's satellite fleets. At 148° W.L., two satellites, EchoStar 2 and EchoStar 5,

⁶ 86.5° W.L. *Order* ¶ 1. As a condition of the *Order and Authorization*, the Commission mandated that EchoStar file a modification application specifying its end-of-life planned operations for the satellite and submitting an orbital debris mitigation statement. *Id.* ¶ 28(e). Authority to launch and operate the satellite will “be granted if the information submitted demonstrates that EchoStar's orbital debris mitigation plans are in the public interest.” *Id.* On December 29, 2008, EchoStar submitted such a modification application providing the orbital debris mitigation plan, which remains pending. *See* File No. SAT-MOD-20081229-00239 (filed Dec. 29, 2008). The orbital debris mitigation plan for the EchoStar 8 satellite is included in the Technical Annex. *See* Technical Information to Supplement Schedule S § A.8 at 6-9 (“Technical Annex”) (attached hereto as Attachment A).

⁷ 86.5° W.L. *Order* ¶ 30.

were prematurely lost.⁸ EchoStar 3, for its part, experienced diminishing operating capacity at the 61.5° W.L. nominal orbital location, an important one for DISH, because of the large number of consumer dishes pointed to that location on the horizon.⁹

As a result, EchoStar has had to allocate not one, but two, of its new satellites, the recently launched EchoStar 15 and the under-construction EchoStar 16, to do duty for EchoStar 3, at the 61.5° W.L. slot. At the same time, EchoStar is working with QuetzSat to launch a new satellite to 77° W.L., relieving EchoStar 8 and freeing up that satellite, a healthy and relatively young one, to make fully productive use of 86.5° W.L. EchoStar believes that this fleet redeployment will not only optimize efficiency, but will also increase and expedite the DBS service available to consumers. EchoStar concluded that the EchoStar 4 and EchoStar 8 satellites are the most suitable satellites available for service at the 86.5° W.L. orbital location.

EchoStar notes that, to accelerate use of the 86.5° W.L. slot even further, it has also requested STA and licensing authority to relocate¹⁰ and operate¹¹ the EchoStar 4 satellite at the 86.5° W.L. orbital location. That satellite will retransmit, among other things, high-definition (“HD”) local stations in southern markets. Those applications remain pending. Upon the move of EchoStar 8 to 86.5° W.L., the EchoStar 4 satellite will likely remain at that location as a spare.

⁸ See File No. SAT-MOD-20091027-00114 (filed Oct. 27, 2009).

⁹ See File No. SAT-STA-20100226-00037 (granted Apr. 6, 2010).

¹⁰ See File No. SAT-STA-20100920-00199 (filed Sept. 20, 2010). In addition, EchoStar has requested STA to operate four TT&C earth stations with EchoStar 4 during the relocation from 77° W.L. to 86.5° W.L., and to broadcast operations with earth stations from EchoStar 4 at 86.5° W.L. See File Nos. SES-STA-20101006-01256; SES-STA-20101006-01264; SES-STA-20101006-01255; SES-STA-20101006-01254.

¹¹ See File Nos. SAT-STA-20100920-00198 (filed Sept. 20, 2010) (180-day STA); SAT-STA-20100920-00197 (filed Sept. 20, 2010) (30-day STA); File No. SAT-LOA-20101112-00235 (filed Nov. 12, 2010) (permanent application).

EchoStar 8 is currently a Mexican-licensed satellite operating at the 77° W.L. orbital location. The satellite's operation at that slot was made subject to an exchange of letters between the Commission and the Mexican Administration.¹² EchoStar 8's stay at 77° W.L. is further governed by the license granted to EchoStar's partner, QuetzSat, S. de R.L. de C.V. ("QuetzSat"), to use the nominal 77° W.L. orbital location, and by agreements among EchoStar, SES Global Latin America, S.A. ("SES"), and QuetzSat.¹³

Under these documents, while at 77° W.L., EchoStar 8 is under the direct control of QuetzSat, which is allowed to use the nominal 77° W.L. orbital location pursuant to the February 2, 2005 BSS Concession.¹⁴ The eventuality of moving EchoStar 8 from 77° W.L. was contemplated with specificity in the letters exchanged between the U.S. and Mexican Administrations. These letters provide a clear roadmap and confirm that Commission action on the relocation of the satellite is not contingent on any prior Mexican action. The U.S. letter states: "The agreement provides that the Service Term for . . . EchoStar 8 at the 77° W.L. orbital location will run . . . until the earliest of . . . the in-service date of QuetzSat-1 at the 77° W.L. orbital location. . . . Operations of the . . . EchoStar 8 satellite[] at any location other than at the 77° W.L. orbital location will be subject to licensing by the FCC."¹⁵

The U.S. letter further states the following:

¹² See Stamp Grant, File No. SAT-T/C-20090217-00026, Annex A, 2 (granted Sept. 17, 2010) ("EchoStar 8 Order") ("EchoStar 8 spacecraft will operate at the 77° W.L. orbit location subject to Mexican authority.").

¹³ See Satellite Relocation and Use Agreement for the 77° W.L. Orbital Location ("77° W.L. Agreement"), *filed in* File No. SAT-STA-20080616-00121, Attachment 3 (granted Oct. 31, 2008) ("EchoStar 8 STA Application").

¹⁴ BSS Concession, *filed in* EchoStar 8 STA Application, Attachment 2.

¹⁵ Letter from Robert G. Nelson, Chief, Satellite Division, FCC, to Lic. Héctor Olavarría Tapia, Director General de Política de Telecomunicaciones y de Radiodifusión, Secretaría de Comunicaciones y Transportes (July 26, 2010), *filed in* EchoStar 8 Order, Annex A at 2-3.

[I]n the event that there are any provisions in the Concession, or any provisions in the Mexican laws and regulations governing the telecommunications operations of EchoStar that would preclude or otherwise limit the exercise of EchoStar's contractual rights within the time frames specified in the EchoStar/SES Agreement, the FCC would appreciate the opportunity to consult with SCT prior to any exercise of such licensing authority or application of such law or regulation by SCT.¹⁶

In response, the Mexican letter acknowledges those provisions and states the following:

[T]he application of our laws and regulations, including our Administration's international obligations regarding the use of 77° W orbital position, is governed by the concession granted to QuetzSat Therefore, in this matter, no regulation of the Concession contained in our Laws or in our guidelines may be applied to prevent or directly limit EchoStar from exercising its contractual rights with SES. With respect to any notifications, consultations and correspondence between our agencies, we recorded the FCC contact information and we confirm the Secretariat's corresponding contact information.¹⁷

Thus, the existing letter exchange requires no further action from the Mexican Administration. QuetzSat intends to notify the Mexican Administration of the departure of EchoStar 8 from 77° W.L. once QuetzSat 1 is operational.

II. TECHNICAL INFORMATION IN SUPPORT OF THE APPLICATION

Under the Commission's rules, 47 C.F.R. § 25.117(1)(d)(1), modification applications need to identify only "those items of information listed in 25.114 that change," provided that the applicant certifies that the remaining information has not changed. The attached Schedule S and Technical Annex provide detail on all items that have changed relative to the information

¹⁶ *Id.*, Annex A at 3.

¹⁷ Letter from Lic. Héctor Olavarría Tapia, Director General de Política de Telecomunicaciones y de Radiodifusión, Secretaría de Comunicaciones y Transportes, to Robert G. Nelson, Chief, Satellite Division, FCC (Aug. 20, 2010), *filed in* EchoStar 8 Order, Annex A at 11.

submitted in EchoStar's prior applications for the 86.5° W.L. slot. EchoStar certifies that the remaining information has not changed.

The Technical Annex demonstrates that the operation of EchoStar 8 will be within the authorized parameters under EchoStar's license, and indeed will be at power levels lower than those reflected in that license.¹⁸ The Technical Annex further shows that the operation of EchoStar 8 at 86.5° W.L. will not cause harmful interference to any other satellite operator or authorized user of the spectrum.¹⁹

The proposed operation does not implicate the geographic service requirements of Section 25.148(c) of the Commission's rules, 47 C.F.R. § 25.148(c), since service to Alaska and Hawaii is not technically feasible from the 86.5° W.L. orbital location.²⁰

III. GRANT OF THIS APPLICATION IS IN THE PUBLIC INTEREST

The authority requested in this application is in the public interest as U.S. consumers will have access to additional DBS satellite capacity, thereby increasing the video programming options available to them, years earlier than currently contemplated under EchoStar's license. As mentioned, the EchoStar 8 satellite will use the entire allocated spectrum at 86.5° W.L. on all 32 channels. Among other things, EchoStar's customer, DISH, will use EchoStar 8 to provide HD local-into-local broadcast stations to the United States from the 86.5° W.L. orbital location.

¹⁸ Technical Annex at Appendix 1.

¹⁹ *Id.* § A.7 at 4-6.

²⁰ 47 C.F.R. § 25.148(c); *see also* 86.5° W.L. Order ¶ 19 (“Given the very low elevation angles to the 86.5° W.L. orbital location from Alaska and Hawaii, it is very unlikely that service to these states from EchoStar-86.5W would be technically feasible. Therefore, we will not require EchoStar-86.5W to provide service to Alaska and Hawaii from the 86.5° W.L. orbital location.”).

EchoStar and DISH will also use the satellite to carry other kinds of programming, such as international programming.

The satellite's operation at 86.5° W.L. also will not result in any harmful interference, as shown by the attached technical narrative.²¹ Until the satellite has been fully coordinated, and in the event operations of the EchoStar 8 satellite network cause harmful interference into another network, EchoStar will either cease operations, or reduce transmission levels appropriately, immediately upon notification of such interference. EchoStar has already reached a coordination agreement covering the operations at 86.5° W.L. with Telesat Canada.

Nor will the relocation of EchoStar 8 from 77° W.L. result in an interruption of service. EchoStar plans to move EchoStar 8 once QuetzSat-1 becomes operational, which is expected in the fourth quarter of 2011. EchoStar will then release EchoStar 8 from service at 77° W.L. and relocate the satellite to 86.5° W.L.

Similarly, EchoStar is committed to providing service from the 148° W.L. orbital location with another suitable satellite.²² In a May 10, 2010 letter to the Commission, EchoStar's sister company DISH noted that it may resume operations over the 32 DBS channels at 148° W.L. "using the EchoStar 8 satellite, or another satellite in DISH's fleet if one were to become available."²³ DISH further noted that "[s]hould another satellite become available earlier than EchoStar 8, DISH may request authority to operate that satellite at 148° W.L."²⁴ EchoStar and DISH are evaluating suitable options, and have identified EchoStar 3 as one potential satellite to provide service at 148° W.L.

²¹ Technical Annex at Appendix 1.

²² See File No. SAT-MOD-20091027-00114 (filed Oct. 27, 2009).

²³ Letter from Pantelis Michalopoulos, Counsel for DISH Operating L.L.C., to Marlene Dortch, Secretary, FCC, at 1 (May 10, 2010).

²⁴ *Id.*

IV. COMPLETION OF CONSTRUCTION MILESTONE

EchoStar respectfully requests that, upon grant of this modification application, the Bureau confirm that EchoStar has met its completion of construction milestone under the 86.5° W.L. *Order and Authorization* and that, upon commencement of EchoStar 8's operations at 86.5° W.L. prior to November 29, 2012, it will also satisfy the operations milestone for its licensed system.²⁵ Section 25.148(b)(2) of the Commission's rules requires "all persons who receive new or additional DBS authorizations after January 19, 1996 [to] complete construction of the first satellite in their respective DBS systems within four years of grant of the authorization."²⁶ Simply put, the EchoStar 8 satellite is already complete. In contrast with the satellite deemed insufficient for purposes of another licensee's milestone, EchoStar 8 will "provide service commensurate with the level and scope of the proposed [86.5° W.L.] space station, upon which [EchoStar's] authorization is based."²⁷ Thus, EchoStar has satisfied its third milestone for the 86.5° W.L. orbital location.

Alternatively, EchoStar requests a waiver of Section 25.148(b)(2)²⁸ for good cause pursuant to Section 1.3 of the Commission's rules.²⁹ Commission rules may be waived under

²⁵ 86.5° W.L. *Order* ¶ 30.

²⁶ 47 C.F.R. § 25.148(b)(2).

²⁷ *See* Star One, S.A., Petition for Declaratory Ruling to be Added to the Permitted List, *Order*, DA 10-1957 ¶ 8 (Oct. 13, 2010). Although the Commission held that Star One had not met its completion of construction milestone, the space station that Star One proposed to substitute "has been in orbit for more than 15 years, is nearing the end of its useful life, and operates only in the C-band." *Id.* By contrast, EchoStar 8 has only been in operation for eight years, still has many years of useful life ahead, and will provide DBS services. In other words, EchoStar 8 will provide the same service that is contemplated in the 86.5° W.L. *Order*.

²⁸ 47 C.F.R. § 25.148(b)(2).

²⁹ *Id.* § 1.3.

Section 1.3 of the Commission's rules if there is good cause to do so.³⁰ The public interest, convenience and necessity must be served, and the relief requested must not undermine the policy objective of the rule.³¹ Here, waiver of the completion of construction milestone will do just that – serve the public interest without undermining the policy objective of Section 25.148(b)(2).³²

The waiver is supported by precedent. The Commission has previously granted a waiver of the completion of construction milestone where the licensee, Dominion Video Satellite, Inc. (“Dominion”), proposed to provide service by use of an existing satellite.³³ In that case, the Commission held that waiver served the public interest because, among other things, (1) waiver will facilitate deployment of service to the public without causing harmful interference; and (2) use of the existing satellite “will make efficient use of the existing DBS infrastructure . . . [because] the spectrum/orbit resource will be put to use more quickly and efficiently than if [the Commission] were to revoke [the licensee's] authorization and re-license the channels, either by auction or another licensing mechanism.”³⁴ In the Commission's words, “[t]aking advantage of the transponder capacity that is already in orbit will avoid the enormous expense and delay involved in constructing and launching a separate satellite.”³⁵

Here too, waiver would serve the public interest because EchoStar will make efficient use of the 86.5° W.L. orbital location to provide DBS service. The proposed EchoStar 8 satellite will

³⁰ *See id.*

³¹ *See WAIT Radio v. FCC*, 418 F.2d 1153, 1157 (D.C. Cir. 1969).

³² 47 C.F.R. § 25.148(b)(2).

³³ *See Dominion Video Satellite, Inc., Order and Authorization*, 14 FCC Rcd. 8182 ¶ 1 (1999).

³⁴ *Id.* ¶¶ 8-11.

³⁵ *Id.*

provide service from 86.5° W.L. following the launch of QuetzSat 1, anticipated in the fourth quarter of 2011, without causing harmful interference. This will be accomplished using the transponder capacity on EchoStar 8 already in orbit. In fact, a waiver here is much more amply warranted than in the Dominion case. There, Dominion would only obtain a ride in the sky by leasing part of a satellite owned and operated by another licensee (EchoStar). Here, EchoStar will fully own and operate the EchoStar 8 satellite.

The objective of the Commission's milestone policy is to "ensure that licensees provide service to the public in a timely manner, to prevent warehousing of scarce orbit and spectrum resources."³⁶ Grant of this application will further advance, not undermine, this public policy objective by ensuring timely, and indeed accelerated, service from all 32 channels following the launch of QuetzSat 1 – well before the November 2012 operations milestone.³⁷

V. WAIVER PURSUANT TO SECTION 304 OF THE ACT

In accordance with Section 304 of the Communications Act of 1934, as amended 47 U.S.C. § 304, EchoStar hereby waives any claim to the use of any particular frequency or of the electromagnetic spectrum as against the regulatory power of the United States because of the previous use of the same, whether by license or otherwise.

VI. CONCLUSION

For the foregoing reasons, EchoStar respectfully requests the grant of its application for modification of authority to provide DBS service over the 32 frequency channels at the 86.5° W.L. orbital location by using the EchoStar 8 satellite, and confirmation that EchoStar has met

³⁶ *Amendment of the Commission's Space Station Licensing Rules*, 18 FCC Rcd. 10760 ¶ 173 (2000).

³⁷ 86.5° W.L. Order ¶ 30.

its completion of construction milestone, and that it will meet the operations milestone, too, upon timely commencement of operations at 86.5° W.L.

Respectfully submitted,

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EHOSTAR-8 AT 86.5° W.L.

ATTACHMENT A

Technical Information to Supplement Schedule S

A.1 Scope

This attachment contains the information required by § 25.114(c) and other sections of the FCC § 25 rules that cannot be entered into the Schedule S software regarding the proposed operation of the EHOSTAR-8 satellite at 86.5° W.L.

A.2 General Description of Overall System Facilities, Operations and Services (§ 25.114(d)(1))

The EHOSTAR-8 satellite will operate at the 86.5° W.L. orbital location and will provide BSS services to CONUS and Mexico. The satellite was designed to provide 32 channels in medium power mode or 16 channels in high power mode.

The satellite will be biased such that the beams are steered towards the south in order to protect the operations of Telesat Canada at the nominal 82° W.L. and 91° W.L. locations. The CONUS beam will be operated in normal-mode only with a peak downlink EIRP of 54.6 dBW. The Mexican beam can be operated either in normal-mode or high-powered-mode, the latter with a peak downlink EIRP of 57.3 dBW.

EchoStar will use its two main feeder link earth station facilities with the EHOSTAR-8 satellite. These are located in Cheyenne, WY and Gilbert, AZ. Spacecraft TT&C functions will take place from EchoStar's primary TT&C earth station and satellite control facility located in Cheyenne, WY and the back-up facility located in Gilbert, AZ.

A.3 Predicted Space Station Antenna Gain Contours
(§ 25.114(d)(3))

The ECHOSTAR-8 antenna gain contours for the receive and transmit beams, as required by § 25.114(d)(3), are given in GXT format and embedded in the associated Schedule S submission. These contours reflect the planned biasing of the satellite and adjustment of the reflectors.

A.4 Services to be Provided
(§ 25.114(d)(4))

The ECHOSTAR-8 satellite will provide a range of DBS services to millions of small and inexpensive subscriber receive-only earth terminals. The proposed operation does not implicate the geographic service requirements of Section 25.148(c) of the Commission's rules, 47 C.F.R. § 25.148(c), since service to Alaska and Hawaii is not technically feasible from the 86.5° W.L. orbital location. *See* 47 C.F.R. § 25.148(c); *see also* 86.5° W.L. Order ¶ 19 ("Given the very low elevation angles to the 86.5° W.L. orbital location from Alaska and Hawaii, it is very unlikely that service to these states from EchoStar-86.5W would be technically feasible. Therefore, we will not require EchoStar-86.5W to provide service to Alaska and Hawaii from the 86.5° W.L. orbital location.").

Representative link budgets, which include details of the transmission characteristics, performance objectives and earth station characteristics, are provided in the associated Schedule S submission.

A.5 Satellite Transponder Frequency Responses
(§ 25.114(c)(4)(vii))

The typical receiver and transmitter frequency responses of each RF channel, as measured between the receive antenna input and transmit antenna, fall within the limits shown in Table A.5-1 below.

In addition, the frequency tolerances of § 25.202(e) and the out-of-band emission limits of § 25.202(f) (1), (2) and (3) will be met.

Table A.5-1: Typical Receiver and Transmitter Filter Responses

Offset from Channel Center Frequency (MHz)	Receiver Filter Response (dB)	Transmitter Filter Response (dB)
± 5	> -0.5	> -0.4
± 7	> -0.7	> -0.5
±9	> -1.0	> -0.8
± 11	> -1.5	> -1.7
±12	> -2.0	> -3.6
±17.5	< -18	< -8
±20.2	< -38	< -18
±27.2	< -50	< -35

A.6 TT&C Characteristics
(§ 25.114(c)(4)(i) and § 25.114(c)(9))

A summary of the TT&C subsystem performance is given in Table A.6-1.

Table A.6-1: Summary of the on-station TT&C Subsystem Performance

Parameter	Performance
On-Station Command Frequency	17799 MHz
Uplink Flux Density	Between -72.6 and -82.6 dBW/m ²
Uplink Polarization	RHCP
On-Station Telemetry Frequencies	12,206 MHz 12,207 MHz
Maximum Downlink EIRP	21.1 dBW
Downlink Polarization	LHCP

A.7 Interference Analyses
(§ 25.114(d)(13))

The ECHOSTAR-8 satellite network will operate on an unprotected, non-harmful interference basis, until fully coordinated. Pending coordination, in the event operations of the ECHOSTAR-8 satellite network cause harmful interference into another network, EchoStar will either cease operations, or reduce transmission levels appropriately, immediately upon notification of such interference.

The analyses of the proposed ECHOSTAR-8 satellite network with respect to the limits in Annex 1 to Appendices 30 and 30A are provided in Appendices 1 and 2 to this document. The results of these analyses are discussed below.

Appendix 1 shows that the proposed ECHOSTAR-8 satellite network meets the ITU criteria in Annex 1 to Appendix 30, except for § 4.2.3 c) of Article 4 of Appendix 30/30A. There are a number of adjacent Region 2 BSS networks that were deemed to be affected (*see* Annex 1 to Appendix 1). The affected foreign administrations are Bahamas, Bolivia, Canada, Cuba, Dominican Republic, Haiti, Holland, Jamaica, Mexico, Peru and the UK. Each of the affected networks is discussed below:

- The affected networks of the Bahamas, Bolivia, Cuba, Dominican Republic, Haiti, Jamaica and Peru are all original Plan networks. None of these networks are currently operational, nor can we find any evidence that any of these networks are under construction or scheduled for launch.
- The Canadian networks at the nominal 82° W.L. and 91° W.L. locations are deemed to be affected. The Canadian networks are assigned to Telesat Canada. EchoStar and Telesat Canada have executed a coordination agreement for EchoStar operations at 86.5° W.L. Telesat Canada has informed EchoStar as to the maximum downlink EIRP levels that EchoStar's operations can cause over Canadian territory. The beams of the ECHOSTAR-8 satellite will be biased towards the south specifically to protect the Canadian networks to these protection levels.
- Mexico's networks at the nominal 77° W.L. location are deemed to be affected. The Mexican networks are assigned to QuetzSat. EchoStar will coordinate the operations of the ECHOSTAR-8 satellite network with QuetzSat. Coordination should be straightforward given the 9.5 degree orbital separation.
- Holland's network at 58° W.L. is deemed to be affected. We can find no evidence that this network is under construction or scheduled for launch. In the event the network were to progress, it is expected that coordination could be achieved given the large orbital separation and the small OEPM degradation caused to the network.

- The UK has five networks at 86.5° W.L. We can find no evidence that any of the networks are under construction or scheduled for launch.

In addition, the USA's USABSS-15 network at 110° W.L. was deemed to be affected. This network receives a small OEPM degradation, and it is assigned to EchoStar's affiliate, DISH Network L.L.C.

Based on the preceding, EchoStar concludes that operation of the ECHOSTAR-8 satellite will not cause harmful interference, or even unacceptable interference, into any adjacent operational satellite network.

Appendix 2 shows that the proposed ECHOSTAR-8 satellite network meets all of the ITU criteria in Annex 1 to Appendix 30A.

A.8 Orbital Debris Mitigation Plan

(§ 25.114(d)(14))

A.8.1 Spacecraft Hardware Design

The ECHOSTAR-8 satellite was designed and manufactured by Space Systems/Loral and was launched in 2002. The satellite is not expected to undergo any planned release of debris during its operation. EchoStar and the satellite manufacturer have assessed and limited the probability of the satellite becoming a source of debris by collisions with small debris or meteoroids of less than one centimeter in diameter that could cause loss of control and prevent post-mission disposal. Such probability has been limited through component placement and the use of redundant systems.

The ECHOSTAR-8 satellite has separate TT&C and propulsion subsystems that are necessary for end-of-life disposal. The spacecraft TT&C system, vital for orbit raising, is extremely rugged with regard to meteoroids smaller than 1 cm, by virtue of its redundancy, shielding,

separation of components and physical characteristics. An omni-directional antenna and wide angle horn system are used principally during orbit raising. The command receivers, decoders, telemetry encoders and transmitters are located within a shielded area, and are redundant and physically separated. A single rugged thruster and shielded propellant tank provides the energy for orbit raising. Otherwise, there are no single points of failure in the system.

A.8.2 Accidental Explosion Assessment **(§ 25.144(d)(14)(ii))**

EchoStar has assessed and limited the probability of accidental explosions during and after completion of mission operations. A Failure Mode Verification Analysis has also been conducted, and the probability of accidental explosions has been limited through extensive monitoring of ECHOSTAR-8 satellite's batteries and fuel tanks for pressure and temperature. Furthermore, bipropellant mixing is prevented by the use of valves that prevent backwards flow in propellant lines and pressurization lines. Excessive battery charging or discharging is limited by a monitoring and control system, which will automatically limit the possibility of fragmentation. Corrective action, if not automatically undertaken, will be immediately undertaken by the spacecraft operator to avoid destruction and fragmentation. Thruster temperatures, impulse and thrust duration are carefully monitored, and any thruster may be turned off via redundant valves. At the end of the satellite's life, all energy sources will be depleted. Specifically, the batteries will be left in a permanent state of discharge, chemical propulsion systems will be depleted, and the electrical propulsion system will be disabled.

A.8.3 Safe Flight Profiles **(§ 25.144(d)(14)(iii))**

In considering current and planned satellites that may have a station-keeping volume that overlaps with the ECHOSTAR-8 satellite, EchoStar has reviewed the lists of FCC licensed satellite networks, as well as those that are currently under consideration by the FCC. In addition, networks for which a request for coordination has been submitted to the ITU within ± 0.15 degrees of 86.5° W.L. have been reviewed.

There are no operational satellites in the immediate vicinity of 86.5° W.L. The only pending application before the Commission to use an orbital location in the vicinity of 86.5°W.L. is EchoStar's application to operate the EchoStar 4 satellite at 86.5°W.L. EchoStar will coordinate operations between its two satellites to prevent collisions.

With respect to ITU networks, Canada has two 17/24 GHz networks at 86.5° W.L. and the UK has five BSS networks at 86.5° W.L. EchoStar can find no evidence that any of these networks are under construction or scheduled for launch.

Based on the preceding, EchoStar concludes there is no requirement to physically coordinate the ECHOSTAR-8 satellite with another satellite operator at the present time.

A.8.4 Post Mission Disposal Plan
(§ 25.144(d)(14)(iv))

At the end of the operational life of the ECHOSTAR-8 satellite, EchoStar will maneuver the satellite to a disposal orbit with a minimum perigee of 360 km above the normal GSO operational orbit. This proposed disposal orbit altitude exceeds the minimum required by § 25.283, which is calculated below.

The input data required for the calculation is as follows:

$$\text{Total Solar Pressure Area "A"} = 112 \text{ m}^2$$

$$\text{"M"} = \text{Dry Mass of Satellite} = 1807 \text{ kg}$$

$$\text{"C}_R\text{"} = \text{Solar Pressure Radiation Coefficient (worst case)} = 2$$

Using the formula given in § 25.283, the Minimum Disposal Orbit Perigee Altitude is calculated as follows:

$$\begin{aligned} &= 36,021 \text{ km} + 1000 \times C_R \times A/m \\ &= 36,021 \text{ km} + 1000 \times 2 \times 112/1807 \\ &= 36,145 \text{ km} \\ &= 359 \text{ km above GSO (35,786 km)} \end{aligned}$$

Thus, the designed disposal orbit of 360 km above GSO exceeds the required minimum by a margin of 1 km. Maneuvering the satellite to the disposal orbit will require 6 kg of propellant, and this quantity of fuel, taking account of all fuel measurement uncertainties, will be reserved to perform the final orbit raising maneuvers. The fuel reserve was calculated using two methods. The first method applied was the pressure-volume temperature method, which uses tank pressure and temperature information to determine remaining propellant. The second method applied was the bookkeeping method, which evaluates the flow rate at average pressure and total thruster on-time of orbital maneuvers to determine the amount of propellant used. EchoStar has assessed fuel gauging uncertainty and has provided an adequate margin of fuel to address such uncertainty.

**CERTIFICATION OF PERSON RESPONSIBLE FOR PREPARING
ENGINEERING INFORMATION**

I hereby certify that I am the technically qualified person responsible for preparation of the engineering information contained in this application, that I am familiar with Part 25 of the Commission's rules, that I have either prepared or reviewed the engineering information submitted in this application and that it is complete and accurate to the best of my knowledge and belief.

/s/

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**APPENDIX 1 TO
ATTACHMENT A (TECHNICAL INFORMATION TO SUPPLEMENT
SCHEDULE S)**

Analysis of ANNEX 1 of Appendix 30

1 Limits for the interference into frequency assignments in conformity with the Regions 1 and 3 Plan or with the Regions 1 and 3 List or into new or modified assignments in the Regions 1 and 3 List

Does not apply to the Region 2 Plan.

2 Limits to the change in the overall equivalent protection margin for frequency assignments in conformity with the Region 2 plan

With respect to § 4.2.3 c) of Article 4, an administration in Region 2 is considered as being affected if the overall equivalent protection margin²⁸ corresponding to a test point of its entry in the Region 2 Plan, including the cumulative effect of any previous modification to that Plan or any previous agreement, falls more than 0.25 dB below 0 dB, or, if already negative, more than 0.25 dB below the value resulting from:

- the Region 2 Plan as established by the 1983 Conference; or*
- a modification of the assignment in accordance with this Appendix; or*
- a new entry in the Region 2 Plan under Article 4; or*
- any agreement reached in accordance with this Appendix. (WRC-03)*

The MSPACE analysis was performed utilizing the Region 2 BSS Plan as contained in IFIC 2681. The CONUS beam was assumed to operate with a peak downlink EIRP of 54.6 dBW, while the Mexican beam was assumed to transmit with a peak downlink EIRP of 57.3 dBW. The results of the analysis are contained in Annex 1 to this Appendix. As shown, the affected foreign administrations are Bahamas, Bolivia, Canada, Cuba, Dominican Republic, Haiti, Holland, Jamaica, Mexico, Peru and the UK. The results are discussed below for each of these administrations:

²⁸ For the definition of the overall equivalent protection margin, see § 1.11 of Annex 5.

- The affected networks of the Bahamas, Bolivia, Cuba, Dominican Republic, Haiti, Jamaica and Peru are all original Plan networks. None of these networks is currently operational. Until coordination, the ECHOSTAR-8 satellite network will operate on an unprotected, non-harmful interference basis, and in the event operations of the ECHOSTAR-8 satellite network cause harmful interference into these and any other network, EchoStar will either cease operations, or reduce transmission levels appropriately, immediately upon notification of such interference.
- The Canadian networks at the nominal 82° W.L. and 91° W.L. locations are deemed to be affected. The Canadian networks are assigned to Telesat Canada. EchoStar and Telesat Canada have executed a coordination agreement. The beams of the ECHOSTAR-8 satellite will be biased towards the south specifically to protect the Canadian networks to the protection levels required by Telesat Canada.
- Mexico's networks at the nominal 77° W.L. location are deemed to be affected. The Mexican networks are assigned to QuetzSat. EchoStar will coordinate the operations of the ECHOSTAR-8 satellite network with QuetzSat. Coordination should be straightforward given the 9.5 degree orbital separation.
- Holland's network at 58° W.L. is deemed to be affected. We can find no evidence that this network is under construction or scheduled for launch.
- The UK has five networks at 86.5° W.L. We can find no evidence that any of the networks are under construction or scheduled for launch.

3 Limits to the change in the power flux-density to protect the broadcasting-satellite service in Regions 1 and 2 in the band 12.2-12.5 GHz and in Region 3 in the band 12.5-12.7 GHz

With respect to § 4.2.3 a), 4.2.3 b) or 4.2.3 f) of Article 4, as appropriate, an administration in Region 1 or 3 is considered as being affected if the proposed modification to the Region 2 Plan would result in exceeding the following power flux-density values, at any test point in the service area of its overlapping frequency assignments:

$-147 \text{ dB}(W/(m^2 \cdot 27 \text{ MHz}))$	<i>for $0^\circ \leq \theta < 0.23^\circ$</i>
$-135.7 + 17.74 \log \theta \text{ dB}(W/(m^2 \cdot 27 \text{ MHz}))$	<i>for $0.23^\circ \leq \theta < 2.0^\circ$</i>
$-136.7 + 1.66 \theta^2 \text{ dB}(W/(m^2 \cdot 27 \text{ MHz}))$	<i>for $2.0^\circ \leq \theta < 3.59^\circ$</i>
$-129.2 + 25 \log \theta \text{ dB}(W/(m^2 \cdot 27 \text{ MHz}))$	<i>for $3.59^\circ \leq \theta < 10.57^\circ$</i>
$-103.6 \text{ dB}(W/(m^2 \cdot 27 \text{ MHz}))$	<i>for $10.57^\circ \leq \theta$</i>

where θ is the minimum geocentric orbital separation in degrees between the wanted and interfering space stations, taking into account the respective East-West station-keeping accuracies. (WRC-03)

The closest Regions 1 or 3 BSS network is the Russian INTERSPUTNIK-47.5W-B network at 47.5°W, which is greater than 10.57 degrees from the 86.5° W.L. location, therefore the -103.6 dB(W/(m² · 27 MHz)) PFD level applies for this network and all other Regions 1 and 3 networks. The GIMS Appendix 30 pfd tool was used to assess compliance with this Section. Using the antenna gain contours and power levels of the beams the GIMS pfd tool showed that no administrations are affected. Therefore, the ECHOSTAR-8 satellite network is compliant with this Section.

4 Limits to the power flux-density to protect the terrestrial services of other administrations^{29, 30, 31}

With respect to § 4.2.3 d) of Article 4, an administration in Region 1, 2 or 3 is considered as being affected if the consequence of the proposed modification to an existing assignment in the Region 2 Plan is to increase the power flux-density arriving on any part of the territory of that administration by more than 0.25 dB over that resulting from that frequency assignment in the Region 2 Plan at the time of entry into force of the Final Acts of the 1985 Conference. The same administration is considered as not being affected if the value of the power flux-density anywhere in its territory does not exceed the limits expressed below.

With respect to § 4.1.1 d) or § 4.2.3 d) of Article 4, an administration in Region 1, 2 or 3 is considered as being affected if the proposed new assignment in the Regions 1 and 3 List, or if the proposed new frequency assignment in the Region 2 Plan, would result in exceeding a power flux-density, for any angle of arrival, at any point on its territory, of:

$$\begin{array}{ll}
 -148 \text{ dB}(W/(m^2 \cdot 4 \text{ kHz})) & \text{for } \theta \leq 5^\circ \\
 -148 + 0.5 (\theta - 5) \text{ dB}(W/(m^2 \cdot 4 \text{ kHz})) & \text{for } 5^\circ < \theta \leq 25^\circ \\
 -138 \text{ dB}(W/(m^2 \cdot 4 \text{ kHz})) & \text{for } 25^\circ < \theta \leq 90^\circ
 \end{array}$$

where θ represents the angle of arrival. (WRC-03)

The GIMS pfd tool was used to determine the administrations whose terrestrial services may be affected by the ECHOSTAR-8 satellite network. The GIMS pfd tool showed that no Administrations are affected and therefore the ECHOSTAR-8 satellite is compliant with this Section.

²⁹ See § 3.18 of Annex 5.

³⁰ In the band 12.5-12.7 GHz in Region 1, these limits are applicable only to the territory of administrations mentioned in Nos. **5.494** and **5.496**.

³¹ See Resolution **34**.

5 (Not used.)

6 **Limits to the change in the power flux-density of assignments in the Regions 1 and 3 Plan or List to protect the fixed-satellite service (space-to-earth) in the band 11.7-12.2 GHz³² in Region 2 or in the band 12.2-12.5 GHz in Region 3, and of assignments in the Region 2 plan to protect the fixed-satellite service (space-to-earth) in the band 12.5-12.7 GHz in Region 1 and in the band 12.2-12.7 GHz in Region 3**

With respect to § 4.2.3 e), an administration is considered as being affected if the proposed modification to the Region 2 Plan would result in an increase in the power flux-density over any portion of the service area of its overlapping frequency assignments in the fixed-satellite service in Region 1 or 3 of 0.25 dB or more above that resulting from the frequency assignments in the Region 2 Plan at the time of entry into force of the Final Acts of the 1985 Conference.

With respect to § 4.1.1 e) or 4.2.3 e) of Article 4, an administration is considered as not being affected if the proposed new or modified assignment in the Regions 1 and 3 List, or if a proposed modification to the Region 2 Plan, gives a power flux-density anywhere over any portion of the service area of its overlapping frequency assignments in the fixed-satellite service in Region 1, 2 or 3 of less than:

$$\begin{array}{ll} -186.5 \text{ dB}(W/(m^2 \cdot 40 \text{ kHz})) & \text{for } 0^\circ \leq \theta < 0.054^\circ \\ -164.0 + 17.74 \log \theta \text{ dB}(W/(m^2 \cdot 40 \text{ kHz})) & \text{for } 0.054^\circ \leq \theta < 2.0^\circ \\ -165.0 + 1.66 \theta^2 \text{ dB}(W/(m^2 \cdot 40 \text{ kHz})) & \text{for } 2.0^\circ \leq \theta < 3.59^\circ \\ -157.5 + 25 \log \theta \text{ dB}(W/(m^2 \cdot 40 \text{ kHz})) & \text{for } 3.59^\circ \leq \theta < 10.57^\circ \\ -131.9 \text{ dB}(W/(m^2 \cdot 40 \text{ kHz})) & \text{for } 10.57^\circ \leq \theta \end{array}$$

where θ is the minimum geocentric orbital separation in degrees between the wanted and interfering space stations, taking into account the respective East-West station-keeping accuracies.

The GIMS pfd tool was used to verify compliance with this Section. All Regions 1 and 3 FSS satellites are greater than 10.57° from the 86.5°W.L. location, therefore the -131.9 dB (W/(m² · 40 kHz)) level applies. The results of the GIMS analysis shows that no administrations are affected. Therefore the ECHOSTAR-8 satellite network is compliant with this Section.

³² Including assignments operating under No. 5.485.

7 Limits to the change in equivalent noise temperature to protect the fixed-satellite service (earth-to-space) in Region 1 from modifications to the Region 2 plan in the band 12.5-12.7 GHz

With respect to § 4.2.3 e) of Article 4, an administration of Region 1 is considered as being affected if the proposed modification to the Region 2 Plan would result in:

- the value of $\Delta T/T$ resulting from the proposed modification is greater than the value of $\Delta T/T$ resulting from the assignment in the Region 2 Plan as of the date of entry into force of the Final Acts of the 1985 Conference; and*
- the value of $\Delta T/T$ resulting from the proposed modification exceeds 6%,*

using the method of Appendix 8 (Case II). (WRC-03)

From a review of the available ITU space network databases there are no assignments registered in the Earth-to-space direction in the frequency band 12.5-12.7 GHz. Therefore, no Region 1 space stations can be affected, and the ECHOSTAR-8 satellite network is compliant with this Section.

Annex 1 to Appendix 1 to Technical Annex

ECHOSTAR-8

MSPACE Results

Admin	Orbital Position (degrees E)	Network	Max. OEPM Degradation (dB)
BAH	-87.20	BAHIFRB1	19.269
BOL	-87.20	BOL00001	1.282
JMC	-92.30	CRBBAH01	0.612
JMC	-92.30	CRBBLZ01	3.691
JMC	-92.30	CRBJMC01	0.927
JMC	-92.70	JMC00002	0.829
CUB	-89.20	CUB00001	5.504
DOM	-83.30	DOMIFRB2	0.262
HTI	-83.30	HTI00002	2.158
PRU	-85.80	PRU00004	1.617
CAN	-82.00	CAN-BSS1	1.255
CAN	-91.10	CAN-BSS2	1.752
MEX	-77.00	MEX-TDH1	1.366
MEX	-76.80	MEX-TVD1	0.937
MEX	-77.20	MEX-TVD2	0.591
MEX	-77.00	QUETZSAT-77	1.997
USA	-110.00	USABSS-15	0.306
G	-86.50	USAT-S3	31.369
G	-86.50	USAT-S3 MOD-A	29.846
G	-86.50	USAT-S3 MOD-B	30.086
G	-86.50	USAT-S3 MOD-C	30.215
G	-86.50	USAT-S3 MOD-D	29.846
HOL	-58.00	NSS-BSS 58W	0.361

**APPENDIX 2 TO
ATTACHMENT A (TECHNICAL INFORMATION TO SUPPLEMENT
SCHEDULE S)**

Analysis of ANNEX 1 of Appendix 30A

1 (SUP - WRC-2000)

2 (SUP - WRC-2000)

3 **Limits to the change in the overall equivalent protection margin with respect to frequency assignments in conformity with the Region 2 feeder-link plan³³** (WRC-2000)

With respect to the modification to the Region 2 feeder-link Plan and when it is necessary under this Appendix to seek the agreement of any other administration of Region 2, except in cases covered by Resolution 42 (Rev.WRC-03), an administration is considered as being affected if the overall equivalent protection margin³⁴ corresponding to a test point of its entry in that Plan, including the cumulative effect of any previous modification to that Plan or any previous agreement, falls more than 0.25 dB below 0 dB, or, if already negative, more than 0.25 dB below the value resulting from:

- the feeder-link Plan as established by the 1983 Conference; or*
- a modification of the assignment in accordance with this Appendix; or*
- a new entry in the feeder-link Plan under Article 4; or*
- any agreement reached in accordance with this Appendix except for Resolution 42 (Rev.WRC-03). (WRC-03)*

See the results described under Section 2 of Appendix 30 Annex 1 Analysis.

³³ With respect to § 3 the limit specified relates to the overall equivalent protection margin calculated in accordance with § 1.12 of Annex 3.

³⁴ For the definition of the overall equivalent protection margin, see § 1.11 of Annex 5 to Appendix 30.

4 Limits to the interference into frequency assignments in conformity with the Regions 1 and 3 feeder-link Plan or with the Regions 1 and 3 feeder-link List or proposed new or modified assignments in the Regions 1 and 3 feeder-link list (WRC-03)

Does not apply to the Region 2 Plan.

5 Limits applicable to protect a frequency assignment in the bands 17.3-18.1 GHz (Regions 1 and 3) and 17.3-17.8 GHz (Region 2) to a receiving space station in the fixed-satellite service (earth-to-space)

An administration in Region 1 or 3 is considered as being affected by a proposed modification in Region 2, with respect to § 4.2.2 a) or 4.2.2 b) of Article 4, or an administration in Region 2 is considered as being affected by a proposed new or modified assignment in the Regions 1 and 3 feeder-link List, with respect to § 4.1.1 c) of Article 4, when the power flux-density arriving at the receiving space station of a broadcasting-satellite feeder-link would cause an increase in the noise temperature of the feeder-link space station which exceeds the threshold value of $\Delta T/T$ corresponding to 6%, where $\Delta T/T$ is calculated in accordance with the method given in Appendix 8, except that the maximum power densities per hertz averaged over the worst 1 MHz are replaced by power densities per hertz averaged over the necessary bandwidth of the feeder-link carriers. (WRC-03)

The following table shows the results of $\Delta T / T$ calculations for the closest Regions 1 and 3 feeder link space stations, based on the Region 1 and 3 Plan and List. As shown, the $\Delta T / T$'s are well below the allowed 6% level. Therefore, the ECHOSTAR-8 satellite network is in conformity with this Section.

Closest Region 1 or 3 Feeder Link Space Station			E/S Lat (°N)	E/S Long (°E)	Range (km)	E/S Gain towards Victim Satellite (dBi)	Victim Satellite Rx System Noise Temp (K)	Calculated $\Delta T/T$ (%)
Network Name	Orbital Position	Peak Receive Antenna Gain (dBi)						
INTERSPUTNIK-47.5W-B	-47.5	37	33.3	-111.8	40296	-10	600	0.01%
MCO-BSS-40.5W	-40.5	35.9	33.3	-111.8	40921	-10	600	0.01%
IRL21100	-37.2	48.08	33.3	-111.8	41222	-10	600	0.15%
NGR11500	-37.2	38.47	33.3	-111.8	41222	-10	600	0.02%
DBL-G4-37.2W	-37.2	35	33.3	-111.8	41222	-10	300	0.01%
AND34100	-37	48.88	33.3	-111.8	41241	-10	600	0.18%
GMB30200	-37	47.69	33.3	-111.8	41241	-10	600	0.14%
GUI19200	-37	42.29	33.3	-111.8	41241	-10	600	0.04%
POR_100	-37	47.17	33.3	-111.8	41241	-10	600	0.12%
MTN_100	-36.8	37.55	33.3	-111.8	41259	-10	600	0.01%
SMR31100	-36.8	48.88	33.3	-111.8	41259	-10	600	0.18%

6 Limits applicable to protect a frequency assignment in the band 17.8-18.1 GHz (Region 2) to a receiving feeder-link space station in the fixed-satellite service (earth-to-space) (WRC-03)

Does not apply to Region 2 Plan.