

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

In the Matter of	)	
	)	
EchoStar Satellite Corporation	)	File Nos. 167-SAT-P/LA-95
	)	168-SAT-P/LA-95
Application for Authority to Construct, Launch, and Operate a Ka-band Satellite System in the Fixed-Satellite Service	)	54-SAT-AMEND-96

**ORDER AND AUTHORIZATION**

**Adopted: January 30, 2001**

**Released: January 31, 2001**

By the Chief, International Bureau:

**I. INTRODUCTION**

1. By this Order, we modify EchoStar Satellite Corporation's ("EchoStar") license<sup>1</sup> to launch and operate a satellite system in the geostationary-satellite orbit ("GSO") to provide fixed-satellite service ("FSS") in a portion of the Ka-band.<sup>2</sup> In particular, we authorize EchoStar to operate inter-satellite links ("ISLs").<sup>3</sup> In addition, we assign milestone requirements for construction, launch, and operation of the satellite system. This will ensure that EchoStar will make timely progress toward launching its satellites and making its advanced broadband communication services available to businesses and consumers. Failure by EchoStar to meet these deadlines will render this authorization null and void.

**II. BACKGROUND**

*The EchoStar License*

2. In May 1997, as part of the first Ka-band processing round, the International Bureau ("Bureau") authorized EchoStar to launch and operate a GSO satellite system to provide fixed-satellite services in the Ka-band.<sup>4</sup> EchoStar intends to use this system to provide video telephony, video

<sup>1</sup> See *In the Matter of EchoStar Corporation Application for Authority to Construct, Launch, and Operate a Ka-band Satellite System in the Fixed-Satellite Service*, 13 FCC Rcd 5664 (1997) ("*EchoStar Authorization Order*").

<sup>2</sup> The term "Ka-band" refers to the space-to-earth (downlink) frequencies at 17.7-20.2 GHz and the corresponding earth-to-space (uplink) frequencies at 27.5-30.0 GHz.

<sup>3</sup> ISLs are communication links between in-orbit satellites. ISLs operate in spectrum allocated to the inter-satellite service. International Telecommunication Union ("ITU") Radio Regulation S1.22.

<sup>4</sup> See generally *EchoStar Authorization Order*.

conferencing, voice communications, computer access to on-line information and entertainment services, and medical and technical tele-imaging.<sup>5</sup> EchoStar's system consists of two interconnected satellites assigned to two orbit locations.<sup>6</sup> The *Authorization Order* permits EchoStar to operate its service links--satellite transmission links to and from user units--in the 29.5-30.0 GHz bands for uplink transmissions and the 19.7-20.2 GHz band for downlink transmissions.<sup>7</sup> The *Authorization Order* did not include operating authority for inter-satellite link service.

#### *Inter-Satellite Links*

3. By employing ISLs, EchoStar's satellites will be able to communicate directly with each other, which, according to EchoStar, will extend the coverage region of satellites from different orbit locations. At the time we authorized EchoStar's Ka-band satellite system, we deferred assigning inter-satellite service ("ISS") frequencies.<sup>8</sup> In its application, EchoStar, as well as several other applicants, proposed to use ISLs in the 59.0 GHz frequency band. At that time, this band was not suitable for inter-satellite link service.

4. Specifically, spectrum in the 59.0 GHz range is shared on a co-equal basis with U.S. Government operations, including ongoing operations in the inter-satellite and Earth exploration-satellite services. The National Telecommunications and Information Administration ("NTIA") expressed concern regarding potential harmful interference between commercial ISL operations and these government services. In 1997, the United States presented proposals to the then-upcoming World Radiocommunication Conference ("WRC-97") concerning ISL operations in the 54.25-59.3 GHz and 64.0-71.0 GHz bands.<sup>9</sup> These proposals were designed to allow us to assign ISLs to all first-round Ka-band system applicants requesting them, while addressing NTIA's interference concerns. In view of the uncertainty surrounding this issue, we deferred awarding ISL frequencies pending the outcome of WRC-97.

5. The WRC-97 allocated an additional band at 64.0-71.0 GHz for ISLs for both non-geostationary orbit ("NGSO") and GSO systems, including those operating in the FSS.<sup>10</sup> The WRC

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<sup>5</sup> *EchoStar Authorization Order*, 13 FCC Rcd 5664 at ¶ 3.

<sup>6</sup> These are the 121° W.L. and 83° W.L. orbital locations.

<sup>7</sup> *EchoStar Authorization Order*, 13 FCC Rcd 5664 at ¶¶ 15 and 18.

<sup>8</sup> *EchoStar Authorization Order*, 13 FCC Rcd 5664 at ¶ 24.

<sup>9</sup> *See United States Proposals for the Work of the [WRC-97] Conference*, Document USWRC-97.10-E, dated July 24, 1997, Proposals for Agenda Item 1.9.4.3, entitled "The Existing Frequency Allocations Near 60 GHz and, if Necessary, Their Respective Allocation, with a View to Protecting the Earth Exploration-Satellite (passive) Service Systems Operating in the Unique Oxygen Absorption Frequency Band from About 50 GHz to About 70 GHz. (A Consequential Allocation to the Inter-Satellite Service in the 65-71 GHz Bands) (JPDP 12)."

<sup>10</sup> *See Final Acts of the 1997 World Radiocommunication Conference*, Geneva (1997); ITU Radio Regulations Article S5 (frequency allocations).

also limited ISL operations in the 54.25-59.3 GHz band to communications between GSO satellites.<sup>11</sup> Additionally, ITU Radio Regulation S5.556A states that satellites operating in the 54.25-56.9 GHz, 57-58.2 GHz and 59-59.3 GHz bands shall meet the specified power flux-density limit at all altitudes from 0 km to 1000 km above the Earth's surface.<sup>12</sup>

6. In June 1998, the Bureau requested that each Ka-band FSS licensee requesting ISL spectrum update its ISL request in light of the actions taken at WRC-97.<sup>13</sup> In addition, the Bureau asked each licensee to provide the Bureau with the specific frequency bands on which it proposes to operate its ISL service and to coordinate its proposed frequency bands with the other Ka-band licensees before it presented its proposal to the Commission. In response, the GSO FSS Ka-band licensees submitted a report in October 1998 (hereinafter the "*GSO FSS Sharing Report*"),<sup>14</sup> concluding that ISLs of the licensed GSO FSS systems could share the same frequencies with few constraints.

7. At the same time, Teledesic, L.L.C. ("Teledesic"), the only NGSO licensee employing ISLs in the same frequency bands, also submitted a sharing report (hereinafter the "*Teledesic Sharing Report*").<sup>15</sup> The *Teledesic Sharing Report* concluded that its ISLs could operate on the same frequencies as the GSO system ISLs, except for possible mutual interference in the limited case of GSO networks using ISL links among satellites that are separated by 157 to 162 longitudinal degrees.

8. After reviewing the *GSO FSS Sharing Report*, the Bureau concluded that it needed additional information to support the report's findings. Accordingly, the Bureau sent a letter to the parties, including EchoStar, requesting a description of the ISL arrangement, including which satellites at which licensed orbital locations will communicate with each other through the ISLs, the amount of ISL spectrum required by each satellite, and the justification for the amount of the ISL spectrum requested.<sup>16</sup> In its letter, the Bureau noted that applicants in other proceedings had also requested spectrum for ISLs, and that several of the applicants in the second Ka-band processing round also proposed systems using ISLs.<sup>17</sup> To maximize the number of systems that can operate in the bands available for ISLs, the Bureau said it will only authorize first round Ka-band licensees for the specific amount of ISL spectrum actually required for ISL

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<sup>11</sup> See ITU Radio Regulation S5.556A ("Use of the bands 54.25-56.9 GHz, 57-58.2 GHz and 59-59.3 GHz by the inter-satellite service is limited to satellites in the geostationary-satellite orbit.").

<sup>12</sup> *Id.* ("The single-entry power flux-density at all altitudes from 0 km to 1000 km above the Earth's surface produced by a station in the inter-satellite service, for all conditions and for all methods of modulation, shall not exceed -147dB(W/m<sup>2</sup>/100 MHz) for all angles of arrival.").

<sup>13</sup> See, e.g., Letter from Thomas S. Tycz, Chief, Satellite and Radiocommunication Division, FCC to David Moskowitz, Vice President and Legal Counsel, EchoStar Satellite Corporation (June 10, 1998).

<sup>14</sup> *Sharing of Various Frequency Bands Allocated to the Inter-Satellite Service* (October 9, 1998). The study did not examine sharing between GSO and NGSO systems sharing the same ISL frequencies.

<sup>15</sup> *Interference between Teledesic and GSO Inter-Satellite Links* (October 8, 1998).

<sup>16</sup> See, e.g., Letter from Thomas S. Tycz, Chief, Satellite and Radiocommunication Division, to David Moskowitz, Vice President and Legal Counsel, EchoStar Satellite Corporation (December 9, 1999).

<sup>17</sup> These parties include four from the second Ka-band processing round and five from the 40 GHz processing round. The 40 GHz service links are in segments contained in the 36-51.4 GHz band.

operations.<sup>18</sup>

9. In response, EchoStar requests to use 1000 MHz of spectrum within the 54.25-55.35 GHz band for ISLs.<sup>19</sup> EchoStar's ISL arrangement involves links between its two satellites at 83° W.L and 121° W.L. EchoStar stated that it requires 500 MHz of ISL spectrum in each direction for communication between the two satellites. EchoStar plans to divide the spectrum into 125 MHz channels, which will include provision for guardbands. EchoStar's plans include use of dual polarization that will provide eight transmit and eight receive channels for each spacecraft.

10. Separately, EchoStar filed an application for modification of its authorization to request an additional 500 MHz of spectrum (28.35-28.6 GHz and 29.25-29.5 GHz) for uplink operations and 500 MHz of spectrum (18.3-18.8 GHz) for downlink operations.<sup>20</sup>

### III. DISCUSSION

#### A. *Inter-Satellite Service*

11. Given the sharing studies done by the licensees and the actions taken at WRC-97, we can now assign specific ISL spectrum to EchoStar's system. First, the ISL sharing analyses performed by the GSO FSS licensees and Teledesic reasonably accommodate all of the first round licensees that requested ISLs. Second, the technical issues with respect to EchoStar's requested 54.25-55.35GHz band for ISL use have since been resolved. Specifically, the WRC-97 adopted a provision to limit these bands to GSO satellite transmissions and to establish a power flux density ("p.f.d.") limit for ISL operations.<sup>21</sup> These p.f.d. limits are to protect Government and non-Government NGSO satellites operating in the space research (passive) and Earth exploration-satellite (passive) services. Any non-Government systems requesting to operate ISLs in these bands will be required to coordinate with U.S. Government systems through NTIA's Interdepartment Radio Advisory Committee's Frequency Assignment Subcommittee ("FAS").

12. As noted above, EchoStar proposes to use 1000 megahertz of spectrum for its ISLs within the 54.25-55.35 GHz band based on its constellation deployment scenario. The EchoStar Ka-Band constellation will consist of two satellites located at 83° W.L and 121° W.L. with each satellite using 500 MHz bandwidth of ISL spectrum in each direction, a total of 1000 MHz. The 500 MHz of ISL spectrum requested by EchoStar for ISLs in each direction will be required to support four 125 MHz sub-channels operating at 155.5 Mbps. With the use of dual polarization, each satellite will be capable of reusing the same frequency assignments for its ISLs at each orbital location. Additionally, EchoStar's system will use

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<sup>18</sup> *Id.*

<sup>19</sup> See Letter from David K. Moskowitz, Senior Vice President and General Counsel, EchoStar Satellite Corporation, to Thomas S. Tycz, Chief, Satellite and Radiocommunication Division (January 19, 2000).

<sup>20</sup> See Application of EchoStar Satellite Corporation, File No. SAT-MOD-2000222-00061/62 (dated February 18, 2000).

<sup>21</sup> ITU-RR 5.556A establishes a single entry p.f.d. at an altitude between 0 km to 1000 km above the Earth's surface produced by a space station in the inter-satellite service.

the same amount of spectrum for its ISLs as it does for its service links. This will enable each satellite to communicate and transmit its full capacity of data to the other satellite and hence through its downlink. EchoStar further indicated that the use of the ISLs will enable each satellite the necessary flexibility to access and transmit its full capacity to any of EchoStar's earth stations within the network, and also allow the earth stations to access either satellites, directly or via the other satellite. We find that the 1000 megahertz of ISL spectrum requested by EchoStar is reasonable given the nature of the design of EchoStar's system and its proposed constellation deployment scenario. Although EchoStar did specify its preferred 1000 megahertz of spectrum within the 54.25-55.35 GHz band, we will assign EchoStar specific ISL frequencies in this Order so as not to delay system implementation. Consequently, we authorize EchoStar to conduct ISL operations in the 54.25-54.75 GHz and 54.85-55.35 GHz bands, subject to the relevant ITU Radio Regulations and coordination among the licensees pursuant to the *GSO FSS Sharing Report* and the *Teledesic Sharing Report*.<sup>22</sup> If EchoStar prefers to operate on a different 1000 megahertz of spectrum within its requested 54.25-55.35 GHz band, it may file a request for license modification.

*B. Milestones*

13. When we granted EchoStar its license in 1997, we were not in a position to assign it to a specific range of ISL frequencies. Consequently, we did not require EchoStar to begin building its satellite system by including implementation milestones in its license. We did, however, state that we would impose a strict milestone schedule once ISL frequencies were authorized.<sup>23</sup>

14. In authorizing ISL frequencies, we are now in a position to impose system implementation milestones as a condition of EchoStar's modified license. As in all other satellite services, Ka-band licensees are required to adhere to a strict timetable for system implementation. Requiring licensees to adhere to implementation deadlines prevents the valuable orbit-spectrum resource from being held indefinitely by licensees who are unable or unwilling to proceed with their plans. Specifically, Section 25.145(f) of the Commission's rules requires Ka-band GSO FSS licensees "[1] to begin construction of its first satellite within one year of grant, [2] to begin construction of the remainder within two years of grant, [3] to launch at least one satellite into each of its assigned orbit locations within five years of grant, and [4] to launch the remainder of its satellites by the date required by the International Telecommunication Union [ITU] to assure international recognition and protection of those satellites."<sup>24</sup> Failure to meet any of these construction milestones will render those satellite authorizations null and void.

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<sup>22</sup> See *In the Matter of Amendment of Part 2 of the Commission's Rules to Allocate Additional Spectrum to the Inter-Satellite, Fixed, and Mobile Services and to Permit Unlicensed Devices to Use Certain Segments in the 50.2-50.4 GHz and 51.4-71.0 GHz Bands*, ET Docket No. 99-261, Report and Order, FCC 00-442 (rel. December 22, 2000) at ¶ 50.

<sup>23</sup> *EchoStar Authorization Order*, 13 FCC Rcd 5664 at ¶ 25.

<sup>24</sup> 47 C.F.R. § 25.145(f). See also *Rulemaking to Amend Parts 1, 2, 21, and 25 of the Commission's Rules to Redesignate the 27.5-29.5 GHz Frequency Band, to Reallocate the 29.5-30.0 GHz Frequency Band, to Establish Rules and Policies for Local Multipoint Distribution Service and for Fixed Satellite Services*, CC Docket No. 92-297, Third Report and Order, 12 FCC Rcd 22310, 22334-35 ¶ 61 & n.77 (1997).

15. The dates by which the EchoStar licensed satellites must be “brought into use” to protect the date priority of the U.S. ITU filings for its service links are in June 2005.<sup>25</sup> We recognize that, in this case, applying this ITU “bringing into use” dates to the last implementation milestone has the incongruous result of our rules requiring EchoStar to launch one satellite into each of its assigned orbit locations by January 2006, *i.e.*, after the date EchoStar is required to bring its satellite locations into use to protect the date priority of the U.S. ITU filings for its orbital locations. To address this misalignment, we require EchoStar to launch its satellite into each licensed orbit location, which “brings into use” all of the frequency assignments it plans to operate at that orbit location by the appropriate June 2005 ITU “bringing into use” date. This will protect the United States’ and thus, EchoStar’s ability to coordinate and gain international recognition for the satellites at each of its assigned orbit locations. Moreover, we do not anticipate that meeting this milestone will present undue difficulties. First, it is consistent with EchoStar’s business plan. Second, EchoStar has had almost four years since we granted its license in May 1997 to finalize its system design for everything except its ISLs. Third, the launch milestone imposed here still provides EchoStar with more than four years to incorporate ISLs into its system and launch the satellites. In light the actions taken at WRC-97 regarding ISLs and the licensees’ 1998 studies demonstrating they can share ISL spectrum, we expect that EchoStar will have already made significant progress in incorporating its requested ISL frequencies into its system.<sup>26</sup>

C. *Miscellaneous Issues*

16. EchoStar has also requested authority to modify its license by adding 500 megahertz of uplink spectrum and 500 megahertz of downlink spectrum. This modification application raises issues that will require further Commission consideration. We defer action on this application to a future proceeding so as not to delay implementation of EchoStar’s system as currently authorized.

#### IV. CONCLUSION

17. Accordingly, upon review, we modify EchoStar’s Ka-band system license to include ISL frequencies. In addition, we assign milestone requirements for construction, launch and operation of the satellite system. These actions provide EchoStar with the opportunity to provide a variety of advanced broadband communications services to businesses and consumers.

#### V. ORDERING CLAUSES

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<sup>25</sup> The exact date is nine years after the date the ITU publishes the Advanced Publication Information for the concerned frequency assignment at each orbit location. *See* ITU Radio Regulations S.11.44, as modified by Final Acts of the 2000 World Radiocommunication Conference, Istanbul (2000). Thus, the ITU Radio Regulations require that:

the USA satellite advanced published at 121° W.L. be brought into use by June 25, 2005; and  
the USA satellite advanced published at 83° W.L. be brought into use by June 25, 2005.

<sup>26</sup> Indeed, EchoStar has represented it has made significant progress in system implementation. *See* Annual Statement from David K. Moskowitz, Senior Vice President and General Counsel, EchoStar Satellite Corporation to Ms. Magalie Roman Salas, Secretary, Federal Communications Commission (June 30, 2000).

18. IT IS ORDERED that the license granted by *Order and Authorization*, 13 FCC Rcd 5664 (Int'l Bur. 1997) IS FURTHER MODIFIED to assign the 54.25-54.75 GHz and 54.85-55.35 GHz bands for inter-satellite link operations, in accordance with *Amendment of Part 2 of the Commission's Rules to Allocate Additional Spectrum to the Inter-Satellite, Fixed, and Mobile Services and to Permit Unlicensed Devices to Use Certain Segments in the 50.2-50.4 GHz and 51.4-71.0 GHz Bands*, ET Docket No. 99-261, Report and Order, FCC 00-442 (rel. December 22, 2000).

19. IT IS FURTHER ORDERED that EchoStar Satellite Corporation, must coordinate its inter-satellite link operations in accordance with the reports submitted to the Commission entitled, "Sharing of Various Frequency Bands Allocated to the Inter-Satellite Service" (October 9, 1998) and "Interference Between Teledesic and GSO Inter-Satellite Links" (October 9, 1998), with the other Ka-band licensees that are included in the referenced reports.

20. IT IS FURTHER ORDERED that, EchoStar Satellite Corporation, Inc shall coordinate the inter-satellite link operations in the 54.25-54.75 GHz and 54.85-55.35 GHz bands through NTIA's Interdepartment Radio Advisory Committee's Frequency Assignment Subcommittee.

21. IT IS FURTHER ORDERED that EchoStar Satellite Corporation's authorization shall become NULL and VOID with no further action on the Commission's part in the event the space station is not constructed, launched, and placed into operation in accordance with the technical parameters and terms and conditions of the authorization by the following dates:

Commence Construction

First Satellite	January 2002
Remaining Satellite	January 2003

Launch and Operate

Satellite licensed at 121° W.L.	June 25, 2005
Satellite licensed at 83° W.L.	June 25, 2005

22. IT IS FURTHER ORDERED that EchoStar Satellite Corporation is subject to all terms and conditions in its original *Authorization Order*, 13 FCC Rcd 5664 (1997).

23. IT IS FURTHER ORDERED that the license term for each space station is ten years and that each license will begin to run on the date EchoStar Satellite Corporation certifies to the Commission that a satellite has been successfully placed into orbit and the operations fully conform to the terms and conditions of this authorization.

24. IT IS FURTHER ORDERED that EchoStar Satellite Corporation is afforded thirty days from the date of the release of this order and authorization to decline this authorization as conditioned. Failure to respond within that period will constitute formal acceptance of the authorization as conditioned.

25. This Order is issued pursuant to Section 0.261 of the Commission's rule on delegations of

authority, 47 C.F.R. § 0.261, and is effective upon release. Petitions for reconsideration under Section 1.106 or applications for review under Section 1.115 of the Commission's rules, 47 C.F.R. §§ 1.106, 1.115, may be filed within 30 days of the date of public notice of this Order (*see* 47 C.F.R. § 1.4(b)(2)).

**FEDERAL COMMUNICATIONS COMMISSION**

Donald Abelson  
Chief, International Bureau