

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

In the Matter of)	
)	
Teledesic LLC)	File Nos. 22-DSS-P/LA-94,
)	43-SAT-AMEND-95,
Application for Authority to Construct, Launch,)	127 SAT-AMEND-95,
and Operate a Ka-band Satellite System in the)	195-SAT-ML-97.
Fixed-Satellite Service)	

ORDER AND AUTHORIZATION

Adopted: January 30, 2001

Released: January 31, 2001

By the Chief, International Bureau:

I. INTRODUCTION

1. By this Order, we modify Teledesic LLC's ("Teledesic")'s license¹ to launch and operate a satellite system in non-geostationary-satellite orbit ("NGSO") to provide fixed-satellite services ("FSS") in a portion of the Ka-band.² In particular, we modify Teledesic's Ka-band system license to allow it to operate inter-satellite service links ("ISLs").³ By employing ISLs, Teledesic's satellites will be able to communicate directly with each other. In addition, we assign milestone requirements for construction, launch, and operation of the satellite system. This will ensure that Teledesic will make timely progress toward launching its satellites and making its advanced broadband communication services available to businesses and consumers around the world. Failure by Teledesic to meet its milestones will render this authorization null and void.

¹ See *In the Matter of Teledesic Corporation Application for Authority to Construct, Launch, and Operate a Low Earth Orbit Satellite System in the Domestic and International Fixed Satellite Service*, 12 FCC Rcd. 3154 (F.C.C., Mar 14, 1997) ("*Teledesic Authorization Order*"). 12 FCC Rcd. 3154 (1997). We subsequently granted Teledesic's application for minor modification of its license. See *In the Matter of Teledesic LLC, for Minor Modification of License to Construct, Launch, and Operate a Low Earth Orbit Satellite System in the Domestic and International Fixed Satellite Service*, 14 FCC Rcd 2261 (1999) ("*Teledesic Modification Order*") (recon. pending). Teledesic Corporation changed its name to Teledesic, LLC by pro forma assignment of its license, granted on January 26, 1998. See Letter from Thomas S. Tycz, Chief, Satellite and Radiocommunication Division, to Mark A. Grannis, Counsel to Teledesic LLC (January 26, 1998).

² The term "Ka-band" generally 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.

³ 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.

II. BACKGROUND

The Teledesic License

2. In March 1997, as part of the first Ka-band processing round, the International Bureau (“Bureau”) authorized Teledesic to launch and operate an NGSO satellite system to provide fixed-satellite services in the Ka-band.⁴ Teledesic intends to use this system to provide a variety of advanced interactive broadband information services to users in rural and remote parts of the United States and the world. The system, as modified, consists of 288 satellites, twenty four satellites in each of 12 orbital planes.⁵ The Authorization Order permits Teledesic to operate its service links-- transmission links to and from user units--in the 28.6-29.2 GHz band for uplink transmissions and 18.8-19.3 GHz band for its downlink transmissions.⁶ The Authorization Order also permits Teledesic to operate its “Gigalink,” or gateway terminal links, on a secondary non-interference basis in the 27.6-28.4 GHz (uplink) and 17.8-18.6 GHz (downlink) bands.⁷ Neither Teledesic’s May 1997 Authorization Order or subsequent January 1999 Modification Order included operating authority for inter-satellite link service.

Inter-Satellite Links

3. In its original application, Teledesic proposed to operate ISLs in the 59.5-60.5 GHz and 62.5-63.5 GHz frequency bands. When we awarded Teledesic its license in 1997, we deferred ISL spectrum to Teledesic because neither of these bands were available at that time for this service.⁸

4. Specifically, these bands were shared on a co-equal basis with U.S. Government operations, including ongoing operations in the inter-satellite and Earth exploration-satellite service. 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 64-71 GHz bands.⁹ 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.

⁴ *Teledesic Authorization Order* at 3160-3161, ¶16.

⁵ *Teledesic Modification Order* at 2262-63, ¶ 3. Teledesic had originally requested and been authorized for a constellation of 840 NGSO satellites in 21 orbit planes. *See Teledesic Authorization Order* at 3156, ¶4.

⁶ *Teledesic Authorization Order* at 3160-61, ¶ 16.

⁷ *Id.* at 3161-62, ¶19.

⁸ *Id.* at 3163-64, ¶ 21.

⁹ *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).”

5. Among other actions taken with respect to ISLs, WRC-97 allocated an additional band at 64-71 GHz for ISLs for both NGSO and GSO systems, including those operating in the FSS.¹⁰ In June 1998, the International Bureau requested that each Ka-band FSS licensee requesting ISL spectrum update its ISL request in light of the actions taken at WRC-97.¹¹ In addition, the Bureau asked each applicant 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, Teledesic, the only NGSO licensee in the first Ka-band processing round, submitted a sharing report (hereinafter the “*Teledesic Sharing Report*”).¹² *Teledesic’s Sharing Report* concluded that its ISLs could operate on the same frequencies as the GSO system ISLs, except in the limited case of ISLs between GSO satellites located in the portions of the orbit arc between 157 and 162 degrees. At the same time, the GSO FSS Ka-band licensees requesting ISL spectrum submitted a report (hereinafter the “*GSO FSS Sharing Report*”),¹³ concluding that their ISLs could share the same frequencies with few constraints.

6. After reviewing the *Teledesic Sharing Report*, the Bureau concluded that it needed additional information to support the report’s findings. Accordingly, the Bureau sent a letter to Teledesic, requesting a description of ISL arrangement, the amount of ISL spectrum required by each satellite, and the justification for the amount of the ISL spectrum requested.¹⁴ In its letter, the Bureau noted that there are additional requests from applicants requesting ISL spectrum in the 40 GHz band and 2 GHz band, and that several of the applicants in the second Ka-band processing round also proposed systems using ISLs.¹⁵ To maximize the number of systems that could operate in the bands available for ISLs, the Bureau said it would only authorize first round Ka-band licensees for the specific amount of ISL spectrum actually required for ISL operations. In response, Teledesic requested use of the 66.0-67.0 GHz and 69.0-70.0 GHz frequency bands for radiofrequency ISLs in the event that its planned optical link ISLs prove infeasible.¹⁶

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

¹¹ See e.g. Letter from Thomas S. Tycz, Chief, Satellite and Radiocommunication Division, to Mark A. Grannis, Counsel to Teledesic LLC (June 10, 1998).

¹² *Interference between Teledesic and GSO Inter-Satellite Links* (October 8, 1998).

¹³ *Sharing of Various Frequency Bands Allocated to the Inter-Satellite Service* (October 9, 1998). The study did not examine sharing between GSO and non-GSO systems sharing the same ISL frequencies.

¹⁴ See Letter from Thomas S. Tycz, Chief, Satellite and Radiocommunication Division, to Mark A. Grannis, Counsel to Teledesic LLC (December 9, 1999).

¹⁵ These parties include four from the second Ka-band processing round, one from the 2 GHz band, and five from the 40 GHz processing round. The 2 GHz service links are at 1990-2025 MHz and 2165-2200 MHz. The 40 GHz service links are in segments contained in the 36-51.4 GHz band.

¹⁶ See Letter from Mark A. Grannis, Counsel for Teledesic LLC to Thomas Tycz, Chief, Satellite and Radiocommunication Division (January 19, 2000).

III. DISCUSSION

A. *Inter-Satellite Service*

7. Given the sharing studies done by the licensees and the actions taken at WRC-97, we can now assign specific ISL spectrum to Teledesic's NGSO Ka-band 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 WRC-97 allocated Teledesic's requested band at 65-71 GHz for ISLs for both NGSO and GSO systems operating in the FSS. Recognizing that this band was allocated on a co-primary basis for various Government services, NTIA suggested that implementing the WRC-97 allocations domestically would better accommodate existing Government and proposed non-Government satellite systems. Therefore, the Commission conducted a rulemaking proceeding to implement the WRC-97 Final Acts with respect to the 50.2-71.0 GHz frequency bands, specifically designating the 65.0-71.0 GHz band segment for non-Government ISL use.¹⁷

8. Teledesic proposes to conduct ISL operations in the 66-67 GHz and 69-70 GHz bands based on its constellation deployment scenario. Teledesic's Ka-band satellite constellation will consist of 288 satellites with twenty-four active satellites in twelve orbital planes. Each satellite will require six independent ISL transmit channels and six independent ISL received channels, a total of twelve ISL channels to be capable to communicate with its two closest neighboring satellites within the same orbital plane (i.e., the satellite preceding it and the one following it), as well as up to two satellites within each of the adjacent orbital planes, a total of six satellites. Each ISL will require 1000 MHz bandwidth of ISL spectrum to support a data rate of 1.2 Gbps using QPSK modulation. Teledesic asserts that each satellite in the constellation will be capable of using the same 2 x 1 GHz bands on dual circular polarizations to accommodate the six transmit and the six received ISL channels, and that each satellite will be capable of reusing the same frequency assignments at different orbital locations. Teledesic further asserts that with the use of these ISL facilities it will be possible to interconnect any two points on the Earth's surface without the use of terrestrial links. This technique will avoid the need for multiple uplinks and downlinks.

9. Based on Teledesic's representations, we find that its ISL request is reasonable. We will therefore authorize Teledesic to conduct ISL operations in the 66-67 GHz and 69-70 GHz bands pursuant to its request, subject to coordination among the licensees pursuant to the *GSO FSS Sharing Report* and the *Teledesic Sharing Report*, and subject to coordination with government users operating in this band on a co-primary basis.

B. *Milestones*

10. As discussed above, when we granted Teledesic 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 Teledesic to begin

¹⁷ See 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, at ¶ 45 (rel. December 22, 2000).

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.¹⁸

11. In authorizing ISL frequencies, we are now in a position to impose system implementation milestones as a condition of Teledesic's modified license. 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 NGSO FSS licensees to "[1] begin construction of its first two satellites within one year of the unconditional grant of its authorization, and [2] complete construction of those first two satellites within four years of that grant. [3] Construction of the remaining authorized operating satellites in the constellation must begin within three years of the initial authorization, and [4] the entire authorized system must be operational within six years."¹⁹ We incorporate these milestones in Teledesic's license. Failure to meet any of these construction milestones will render those satellite authorizations null and void.

12. The date by which the Teledesic licensed system must be "brought into use" to protect the date priority of the ITU filings for its frequencies is September 26, 2004.²⁰ We recognize that, in this case, the ITU "bringing into use" date is two years earlier than the date by which our rules require Teledesic to bring its system into operation. To protect the date priority of the U.S. ITU filings for its system frequencies, we require Teledesic to launch its first satellite, which "brings into use" all of the frequency assignments it plans to operate in its system, by the September 26, 2004 ITU "bringing into use" date. This will protect the United States' and thus, Teledesic's ability to coordinate and gain international recognition for its system. Moreover, we do not anticipate that meeting this milestone will present undue difficulties. First, Teledesic has had almost four years since we granted its license in March 1997 in which to finalize its system design for everything but its ISLs. Second, the launch milestone imposed still provides Teledesic with over three years from now to incorporate ISLs into its system and to launch its satellites. Further, in light of the actions taken at WRC-97 regarding ISLs, and the licensees' 1998 studies demonstrating that they can share ISL spectrum, we expect that Teledesic will have already made significant progress in incorporating its requested ISLs into its system.

IV. CONCLUSION

13. Accordingly, upon review, we modify Teledesic's Ka-band system license to include ISL frequencies and implementation milestones. This action allows Teledesic to provide a variety of advanced broadband communication services to businesses and consumers around the world.

¹⁸ *Teledesic's Authorization Order* at 3163-64, ¶ 21.

¹⁹ 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).

²⁰ This date is nine years after the date the ITU published the Advanced Publication Information for the concerned frequency assignments. *See* ITU Radio Regulations S.11.44, as modified by Final Acts of the 2000 World Radiocommunication Conference, Istanbul (2000).

V. ORDERING CLAUSES

14. Accordingly, IT IS ORDERED that the license granted to Teledesic LLC by Order and Authorization, 12 FCC Rcd. 3154 (Int'l Bur. 1997) and modified by Order and Authorization, 14 FCC Rcd 2261 (Int'l Bur. 1999), IS MODIFIED to assign the 66-67 GHz and 69-70 GHz bands for inter-satellite link operations, in accordance with *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).

15. IT IS FURTHER ORDERED that Teledesic LLC must coordinate its inter-satellite link operations in accordance with the report submitted to the Commission entitled: "Interference Between Teledesic and GSO Inter-Satellite Links" (dated October 9, 1998), with the other Ka-band licensees that are included in the referenced report.

16. IT IS FURTHER ORDERED that Teledesic LLC shall coordinate its inter-satellite link operations in the 65.0-71.0 GHz band through NTIA's Interdepartment Radio Advisory Committee's Frequency Assignment Subcommittee.

17. IT IS FURTHER ORDERED that Teledesic LLC. must comply with all technical and coordination requirements prescribed for NGSO FSS downlink operations in the *Redesignation of the 17.7-19.7 GHz Frequency Band, Blanket Licensing of Satellite Earth Stations in the 17.7-20.2 GHz and 27.5-30.0 GHz Frequency Bands, and the Allocation of Additional Spectrum in the 17.3-17.8 GHz and 24.75-25.25 GHz Frequency Bands for Broadcast Satellite-Service Use*, IB Docket No. 98-172, Report and Order, 15 FCC Rcd 13430 (2000) ("*18 GHz Report and Order*"), *petition for review pending, Teledesic LLC v. FCC*, D.C. Cir. No. 00-1466 (filed November 6, 2000).

18. IT IS FURTHER ORDERED that, Teledesic LLC's authorization shall become NULL and VOID with no further action on the Commission's part in the event its space stations are not constructed, launched, and placed into operation in accordance with the technical parameters and terms and conditions of the authorization by the following dates.

	<u>Commence Construction</u>	<u>Complete Construction</u>
First Two Satellites	January 2002	January 2004
Remaining Satellites	January 2004	
	<u>Launch and Operate</u>	
First Satellite	September 26, 2004	
Remaining Satellites	January 2007	

19. IT IS FURTHER ORDERED that Teledesic LLC is subject to all terms and conditions in its original Order and Authorization, 12 FCC Rcd 3154 (Int'l Bur. 1997), and its modification Order and Authorization, 14 FCC Rcd 2261 (Int'l Bur. 1999).

20. IT IS FURTHER ORDERED that the license term for the space station constellation is ten years and will begin to run on the date Teledesic LLC certifies to the Commission that the first satellite in the system has been successfully placed into orbit and the operations fully conform to the terms and conditions of this authorization.

21. IT IS FURTHER ORDERED that Teledesic LLC 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.

22. 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