

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

In the Matter of)
Astrolink International LLC) File Nos. SAT-MOD-19971222-0020
Application to Modify) SAT-AMD-19991118-0011
the Astrolink System Authorization) SAT-AMD-20000801-00116

ORDER AND AUTHORIZATION

Adopted: November 29, 2000 Released: November 29, 2000

By the Chief, International Bureau:

I. INTRODUCTION

1. By this Order, we grant, in part, the amended request of Astrolink International LLC ("Astrolink") to modify the frequencies its satellite system is authorized to use for tracking, telemetry, and control ("TT&C") functions. This action will foster rapid deployment of Astrolink's broadband satellite system.

II. BACKGROUND

2. The Astrolink system consists of nine satellites located at five geostationary satellite orbital locations. The locations are 97° W.L., 21.5° W.L., 2° E.L., 130° E.L., and 175.25° E.L. The satellites will provide a fixed satellite service ("FSS")

1 Lockheed Martin Corporation ("Lockheed") filed the original application. On November 18, 1999, Lockheed amended its application to reflect a change in ownership of the licensee. See File No. SAT-AMD-19991118-00111. The Commission had previously authorized that change in ownership. See Astrolink International LLC, DA 99-2049 (Int'l. Bur., rel. Oct. 1, 1999).

2 See Lockheed Martin Corporation, 12 FCC Rcd 23014 (Int'l. Bur. 1997).

3 Astrolink's authorization currently specifies the 38° E.L. orbital position instead of the 2° E.L. location. As discussed below, we are modifying the authorization to conform it to the Ka-Band Orbital Assignment Plan. See Assignment of Orbital Locations to Space Stations in the Ka-Band, 12 FCC Rcd 22004 (Int'l. Bur. 1997).

using frequencies in the Ka-Band.⁴ This system can provide services that include broadband Internet access, distance learning, telemedicine, and other high data rate applications.

3. The Astrolink system will be launched in two phases. In the first phase, Astrolink plans to deploy a single satellite in each of the 97° W.L., 21.5° W.L., 2° E.L., 130° E.L. orbital locations.⁵ These satellites will not have inter-satellite links.⁶ The first of these four satellites is scheduled for launch in 2003, followed by the launch of the next three satellites at six-month intervals.⁷ In the second phase, Astrolink would launch a single satellite into the 175.25° E.L. location, and a second satellite into each of the four other authorized locations. Satellites in the second phase may have inter-satellite links, if consistent with Astrolink's business objectives.⁸

4. On August 1, 2000, Astrolink amended its applications, based on preliminary discussions with satellite operators at locations near Astrolink's assigned orbital locations. The amendment modified the frequencies requested in order to address potential coordination concerns. With the amendment, Astrolink now requests two telemetry signals, each with a bandwidth of 600 kHz, and one command frequency, with a 1.5 MHz bandwidth, at each of four orbital locations. Astrolink specifically requests, for the 97° W.L. location, a command frequency centered at 6465 MHz, and telemetry frequencies centered at 3697 and 3699 MHz; for the 21.5° W.L. location a command frequency centered at 6465 MHz, and telemetry frequencies centered at 3699 and 3701 MHz; and, for both the 2° E.L. and 130° E.L. locations, a command frequency centered at 6425.75 MHz, and telemetry frequencies centered at 3697 and 3699 MHz. The frequencies will be used for launch, transfer orbit, and on-orbit operations. The Astrolink system is "in an advanced stage of system implementation, having obtained approximately \$1.33 billion in equity financing from major investors and begun construction of its initial satellite constellation."⁹

⁴ The term "Ka-Band" generally refers to uplink frequencies in the 27.5-30.0 GHz band and downlink frequencies in the 17.7-20.2 GHz band. The Commission has adopted band plans for use of the Ka-Band frequencies. *See* Amendment of Commission Rules for the 27.5-30 GHz Band, First Report and Order, CC Docket No. 92-297, 11 FCC Rcd 17005(1996); Redesignation of the 17.7-19.7 GHz Frequency Band, Report and Order, IB Docket No. 98-172, 15 FCC Rcd 13430 (2000).

⁵ Letter from Richard L. Gobbi to Thomas S. Tycz, dated January 19, 2000. An inter-satellite link is a radiocommunication link between two artificial satellites.

⁶ *Id.*

⁷ Annual Report of Astrolink pursuant to Section 25.145(g) of the FCC Rules, June 30, 2000. *See also* Ex Parte Presentation of Astrolink in IB Docket No. 98-172, dated December 30, 1999.

⁸ Letter from Richard L. Gobbi to Thomas S. Tycz, dated January 19, 2000.

⁹ Ex parte presentation of Astrolink in IB Docket No. 98-172, dated December 30, 1999.

III. DISCUSSION

5. We will grant Astrolink's request for TT&C authorizations for the first four satellites to be deployed in its system. We defer action on Astrolink's TT&C modification in all other respects. This action will facilitate prompt implementation of the first phase of the Astrolink system.

6. *Conformance with Relevant Regulations.* TT&C functions are a space operation service. The bands in which Astrolink proposes to operate TT&C are allocated to the fixed satellite service ("FSS"), not the space operations service. However, the relevant regulations state that "[t]hese functions will normally be provided within the service in which the space station is operating."¹⁰ The Astrolink system provides a fixed satellite service.¹¹ Therefore, Astrolink's proposed TT&C frequencies, because they are in bands allocated to the FSS, are consistent with international allocations and the United States Table of Frequency Allocations.¹²

7. Section 25.202 of the Commission's rules lists the frequencies generally available in the United States for fixed satellite services. The extended C-Band frequencies¹³ that Astrolink is seeking to use are not among the frequencies listed in Section 25.202.¹⁴ However, Section 25.202(b) of the rules provides that "[o]ther frequencies . . . may be assigned on a case-by-case basis to space systems . . . in conformance with § 2.106," the Table of Frequency Allocations. In the 3650-3700 MHz band, the allocation is subject to Footnote US245. Footnote US245 provides that "the fixed-satellite service is limited to international inter-continental systems and subject to case-by-case electromagnetic compatibility analysis." The Astrolink system will provide both domestic and international service. However, because the intent of this footnote is to insure coordination with government stations, and we have separately adopted a new footnote US348 to the Table of Allocations to address this concern in the 3650-3700 MHz band,¹⁵ we will construe the requirements of US245 as applying for earth stations located within 80 kilometers of the sites specified in US348.

¹⁰ See ITU Radio Regulation S1.23. See also 47 C.F.R. § 2.1 (defining "space operations").

¹¹ See ITU Radio Regulation S1.21.

¹² See also Amendment of the Commission's Rules with Regard to the 3650-3700 MHz Government Transfer Band, FCC 00-363, ¶¶ 33, 132 (released October 24, 2000) (Part 2 of the Commission's Rules permits TT&C operations in the 3650-3700 MHz band for satellite systems that include operations in the fixed satellite service).

¹³ The term "C-Band" or "standard C-Band" is commonly used to refer to the 3700-4200 MHz (downlink) and 5925-6425 MHz (uplink) frequency bands. The term "extended C-Band" refers to frequencies allocated to the fixed satellite service and adjacent to the standard C-Band, such as 3625-3700 MHz (downlink), and 5850-5925 and 6425-6525 (uplink).

¹⁴ See 47 C.F.R. § 25.202.

¹⁵ See also Amendment of the Commission's Rules with Regard to the 3650-3700 MHz Government Transfer Band, FCC 00-363 (released October 24, 2000).

8. Section 25.202(g) of our rules provides that TT&C functions for U.S. satellites shall be conducted at either or both edges of the “allocated band(s).”¹⁶ This provision, followed in the standard C- and Ku-bands,¹⁷ effectively limits FSS operators to operating TT&C links in the frequency bands in which they operate FSS. Thus, a GSO/FSS operator will generally coordinate its TT&C operations with the same set of satellites, at adjacent orbital locations, with which it coordinates its FSS operations. In this respect, the rule serves the purpose of simplifying the coordination process for FSS systems, by limiting the number of potentially affected operators. It also provides an incentive for an operator to maximize the efficiency of a system’s TT&C operations, and minimize the constraints placed on other satellite operations, since the greatest effect of any inefficiency in TT&C operations is likely to impact the operations of the operator’s own satellite. Astrolink’s request implicates both these concerns, since its proposed TT&C frequencies are outside the bands in which it will provide FSS.

9. We recognize that for various technical and operational reasons Astrolink designed its system to use the frequencies it has selected. Astrolink has conducted preliminary discussions with satellite operators at adjacent orbital locations, and has adjusted its TT&C frequency plan to address potential coordination difficulties. Furthermore, we will include a condition in this authorization requiring completion of international frequency coordination for any particular satellite’s TT&C frequencies prior to launch. With regard to the efficiency of the system’s TT&C operations, we note that Astrolink is proposing to use three TT&C earth station sites worldwide, and that its TT&C technical parameters appear to be consistent with industry-wide practice for TT&C in the standard C- and Ku-bands. This proposal does not, therefore, present substantial concerns with efficiency or international coordination.

10. In a separate proceeding, the *3650-3700 MHz FNPRM*,¹⁸ the Commission has sought comment on whether Section 25.202 of the Commission’s Rules should be amended to permit use of the 3650-3700 MHz band for systems with service links outside the extended C-Band. Because Astrolink’s application for TT&C frequencies has been pending for almost three years, during which time Astrolink has proceeded with diligence in addressing Commission concerns, and because it is now in a relatively advanced stage of planning and construction,¹⁹ we will act now on its request, rather than defer action pending resolution of the *3650-3700 MHz FNPRM*.

¹⁶ 47 C.F.R. § 25.202(g).

¹⁷ The “standard” Ku-Band referred to here is at 11.7-12.2 GHz (downlink) and 14.0-14.5 GHz (uplink).

¹⁸ Amendment of the Commission’s Rules with Regard to the 3650-3700 MHz Government Transfer Band, FCC 00-363 (released October 24, 2000).

¹⁹ See Ex Parte Filings of Astrolink, dated November 3 and 7, 2000.

11. *Earth Station Licensing for TT&C Operations.* Astrolink anticipates that it will seek authority for one TT&C earth station in the United States, to be used in conjunction with the satellite at the 97° W.L. orbital location. Astrolink indicates it plans to use a location near Colorado Springs, Colorado. This Order and Authorization only addresses Astrolink's request for a space station authorization. Authorization of a TT&C earth station in the United States will require submission of an application. Any such application will be evaluated in light of the *3650-3700 MHz Report and Order*.²⁰

12. *Miscellaneous Matters.* Consistent with our separate order, in which we modified the orbital locations available for the Astrolink system by substituting the 2° E.L. location for the 38° E.L. orbital position, we are modifying Astrolink's license to conform to the available locations.²¹ This action is taken without prejudice to any further decision we may make regarding the Ka-Band orbital assignment plan.

IV. ORDERING CLAUSES

13. Accordingly, IT IS ORDERED that the license granted by Order and Authorization, 12 FCC Rcd 23014 (Int'l. Bur. 1997) IS MODIFIED to specify operations of two of the authorized satellites at the 2° E.L. orbital position, rather than the 38° E.L. orbital location.

15. IT IS FURTHER ORDERED that the Application of Lockheed Martin Corporation, File No. SAT-MOD-19971222-0020, as amended by File No. SAT-AMD-19991118-00111, and File No. SAT-AMD-20000801-00116, IS GRANTED to the extent indicated herein, and Astrolink International, LLC, IS AUTHORIZED to operate four satellites during launch, transfer orbit, and on-orbit operations at each of the 97° W.L., 21.5° W.L., 2° E.L., and 130° E.L. orbital locations, at the frequencies and consistent with the parameters indicated in its application, as amended.

16. IT IS FURTHER ORDERED that this authorization is subject to the following conditions:

- a) Astrolink shall coordinate the operations authorized by this order, including operations during transfer orbit, with the operation of in-orbit satellites of the U.S. and other affected Administrations.
- b) Astrolink shall complete international coordination for on-orbit TT&C operations of each satellite prior to launch of that satellite.

²⁰ Amendment of the Commission's Rules with Regard to the 3650-3700 MHz Government Transfer Band, FCC 00-363 (released October 24, 2000). For example, any such application will be coordinated through the Frequency Assignment Subcommittee of the Interdepartmental Radio Advisory Committee in the event it is located within 80 kilometers of the three sites specified in Footnote US348 to the Table of Frequency Allocations, i.e., St. Inigoes, MD, Pascagoula, MS, and Pensacola, FL. Footnote US348 was adopted in the *3650-3700 MHz Report and Order*.

²¹ *Assignment of Orbital Locations to Space Stations in the Ka-Band*, 12 FCC Rcd 22004 (Int'l. Bur. 1997).

17. IT IS FURTHER ORDERED that Astrolink shall prepare the necessary information, as may be required, for submission to the ITU to initiate and complete the advance publication, international coordination, and notification process regarding the TT&C operations of this space station in accordance with the ITU Radio Regulations. We also note that no protection from interference caused by radio stations authorized by other administrations is guaranteed unless coordination procedures are timely completed or, with respect to individual administrations, by successfully completing coordination agreements. Any radio station authorization for which coordination has not been completed may be subject to additional terms and conditions as required to effect coordination of the frequency assignments of other administrations. *See* 47 C.F.R. § 25.111(b).

18. IT IS FURTHER ORDERED that this Order is effective upon release.

Federal Communications Commission

Donald Abelson
Chief, International Bureau