

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

In the Matter of )  
 )  
**Teledesic LLC** ) File No. 195-SAT-ML-97  
 )  
for Minor Modification of License to )  
Construct, Launch and Operate a )  
Non-Geostationary Fixed Satellite )  
Service System )

**ORDER AND AUTHORIZATION**

Adopted: January 29, 1999

Released: January 29, 1999

By the Chief, International Bureau:

**Introduction**

1. With this Order, we grant Teledesic LLC's application for modification of its space station authorization. Teledesic holds a license to construct, launch, and operate a satellite system that will provide broadband fixed satellite service ("FSS") from satellites in non-geostationary satellite orbit ("NGSO"). By granting the proposed modification, Teledesic will be able to design a satellite system that best meets its business and customer requirements, while preserving the opportunity for existing and future systems to provide competitive choices to consumers.

**Background**

2. In March 1997, as part of the first Ka-band<sup>1</sup> processing round, Teledesic was authorized to construct, launch, and operate a NGSO system to provide domestic and international fixed-satellite service in a portion of the Ka-band.<sup>2</sup> Specifically, Teledesic was

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<sup>1</sup> 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. Teledesic was authorized to operate in a portion of these frequencies.

<sup>2</sup> *Teledesic Corporation*, Order and Authorization, 12 FCC Rcd. 3154 (Int'l Bur. 1997), ("*Teledesic*

authorized to operate its customer service links in the 28.6-29.1 GHz (uplink) and 18.8-19.3 GHz (downlink) bands on a primary basis and 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. The authorized system consists of a constellation of 840 satellites, with forty satellites in twenty-one orbital planes operating at an altitude between 695 and 700 kilometers and an inclination of 98.2°. <sup>3</sup> Teledesic was the only applicant proposing an NGSO FSS system in the first processing round. In adopting service rules to govern the new Ka-band satellite service, the Commission, however, stated it expected that other NGSO FSS systems would operate in the Ka-band and that Teledesic would bear some responsibility for inter-system sharing. <sup>4</sup> Six applicants filed applications proposing NGSO FSS satellites to be considered in the second Ka-band processing round. <sup>5</sup>

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*Authorization.*") Teledesic filed its initial application in March 1994 and subsequently filed two amendments prior to 1997.

<sup>3</sup> Inclination is the angle between the NGSO orbital plane and the equatorial plane. By convention, inclination is a number between 0 and 180 degrees, east to west.

<sup>4</sup> *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*, Third Report and Order, 12 FCC Rcd. 22,310 at ¶ 38 (1997), ("*Ka-Band Service Rules Report and Order.*")

<sup>5</sup> The following NGSO FSS and hybrid geostationary-satellite orbit ("GSO") NGSO FSS system applications were filed in the 18.8-19.3 GHz and 28.6-29.1 GHz bands for consideration in the second Ka-band processing round: @Contact LLC; Hughes Communications, Inc.; Lockheed Martin Corporation; Motorola Inc.; SkyBridge II LLC and TRW Inc. Motorola, however, subsequently amended its application to remove the frequencies that overlapped with Teledesic.

3. In July 1997, Teledesic selected the Boeing Company as its prime satellite contractor, and incorporated Boeing's plans into its system design. On September 26, 1997, Teledesic filed its modification application to reflect these changes.<sup>6</sup> Teledesic asserts that the proposed modifications represent technological advances since the system was initially designed.<sup>7</sup> Teledesic proposes to modify its system by: 1) decreasing the number of satellites from 840 to 288; 2) increasing the altitude to the 1375-1394 kilometer range; 3) decreasing the number of orbital planes to twelve and the number of satellites in each orbital plane to twenty-four; 3) decreasing the inclination of the orbital planes to 84°; 4) adding emission designators; and 5) adding optical inter-satellite links in addition to its radio frequency inter-satellite links. In addition, Teledesic also proposes to change its downlink modulation<sup>8</sup> and to revise its uplink and downlink power budgets.

4. Boeing filed comments in support of the application; Lockheed Martin Corporation and Motorola, Inc., both first-round GSO licensees in the Ka-band and two of the applicants for second round NGSO FSS Ka-band systems, filed comments and a petition to deny, respectively. Following the initial pleading cycle, the Bureau sought additional technical information from Teledesic, which Teledesic provided on March 23, 1998. On April 24, 1998, the Commission released a public notice announcing that this information had been filed and requested responses to this filing.<sup>9</sup> Cyberstar Licensee, LLC, a first-round GSO licensee, Lockheed, and Motorola filed comments. Teledesic filed Consolidated Reply Comments. Lockheed filed supplemental comments.<sup>10</sup> Motorola later withdrew its Petition to Deny and other related pleadings.<sup>11</sup> Both Cyberstar and Lockheed whose GSO systems are authorized to operate on a primary basis in frequency bands to be shared with Teledesic's secondary gigalink operations, raise concerns as to whether Teledesic's modified gigalink operations will cause

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<sup>6</sup> See Public Notice, Report No. SPB-107, October 17, 1997.

<sup>7</sup> Teledesic Modification Application at 3.

<sup>8</sup> The modulation technique determines a signal's spectral characteristics (i.e., power spectral density, bandwidth, etc.).

<sup>9</sup> Public Notice, Report No. SPB-124, April 24, 1998.

<sup>10</sup> Lockheed filed a Petition for Leave to File Supplemental Comments. Teledesic opposed this request. We will treat Lockheed's filing as an informal comment.

<sup>11</sup> See Letter from Philip L. Malet and James M. Talens, Counsel for Motorola, to Magalie Roman Salas, File No. 195-SAT-ML-97 (May 21, 1998). On July 15, 1998, Motorola entered into certain agreements with Teledesic, including a Combination Agreement, which among other things, has resulted in Motorola owning approximately a 26 percent interest in Teledesic. See Letter from Philip Malet and James Talens to Magalie Roman Salas, (August 13, 1998).

interference into their GSO systems. Lockheed also argues that Teledesic's proposed modification will require its customer terminals to operate at higher powers, and thus, constitutes a "major" modification that must be considered in the second Ka-band processing round.

### Discussion

5. In order to grant Teledesic's modification application, the Commission must find that the public interest, convenience, and necessity will be served by such a grant.<sup>12</sup> The Commission often receives requests from licensees to modify the technical design of their satellites while they are being constructed. In recognition of the several years required to construct a satellite, or constellation of satellites, the rapidly changing technology, and our goal of encouraging more efficient use of the radio spectrum, the Commission has tried to allow licensees to modify their satellite systems when possible. We have repeatedly recognized that:

Given the fairly lengthy time period required to construct a satellite, licensees often file requests to modify the technical design of their satellites as they are being built. If the proposed modification does not present any significant interference problems and is otherwise consistent with Commission policies, it is generally granted.<sup>13</sup>

Such decisions "allow[] the licensee to take advantage of the latest technology in providing service to the public."<sup>14</sup> In contrast, if the modification application were to present significant interference problems, we would treat the modification as a newly filed application and would consider the modification application in a subsequent satellite processing round.<sup>15</sup>

6. In its application, Teledesic claims that its requested modifications "do not change the amount or location of frequencies to be used, nor do they. . . increase interference to other authorized users or create a need for any additional protection from interference."<sup>16</sup>

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<sup>12</sup> See 47 U.S.C. § 309(a).

<sup>13</sup> See, e.g., *GTE Spacenet Corp.* 5 FCC Rcd. 4112, 4112 (Com. Car. Bur. 1990) (GTE was allowed to increase the power on one transponder from 20 watts to 27 watts); *American Satellite Company*, 5 FCC Rcd. 1186, 1186 (Com. Car. Bur. 1990) (American Satellite Company was permitted to increase the power level on two of its transponders from 16.5 watts to 30 watts); and *Hughes Communications Galaxy, Inc.*, 5 FCC Rcd. 1653 (Com. Car. Bur. 1990) (Hughes was permitted to increase power of two satellites from 10 watts to 16 watts.)

<sup>14</sup> *American Satellite Company*, 5 FCC Rcd. 1186, 1186 (1990).

<sup>15</sup> See, e.g., *Geostar Positioning Corporation*, 6 FCC Rcd. 2276 (Com. Car. Bur. 1991).

<sup>16</sup> Modification Application at 1, citing *Orbital Communications Corp.*, 9 FCC Rcd. 6476, 6481(1994), *recon*,

Teledesic asserts that the modifications will serve the public interest "by (1) facilitating sharing among multiple NGSO FSS systems; 2) improving the system's ability to coordinate around incompatible satellite and terrestrial uses where necessary; and (3) by bounding or reducing the cost of the Teledesic Network and increasing the commercially usable capacity of the system..."<sup>17</sup> In any event, Teledesic asserts that its proposed modification should be evaluated only by reference to its impact on Motorola's Celestri system application -- which was the only NGSO FSS application on file before Teledesic filed its modification application -- and not by reference to its impact on other proposed second round Ka-band systems.<sup>18</sup>

7. For the reasons discussed below, we find the proposed modifications to Teledesic's space segment do not, in themselves, create any significant interference problems to other systems or make sharing between Teledesic and other NGSO FSS systems significantly more difficult. In so finding, we disagree with Teledesic that we should evaluate its modification application only in reference to its impact on the NGSO FSS system on file before Teledesic filed its modification application, and not by reference to its impact on other proposed second round Ka-band systems. The Commission stated in the *Ka-band Service Rules Report and Order* that we expect all NGSO FSS systems "to bear some portion of the technical and operational constraints necessary to accommodate multiple non-homogeneous NGSO FSS systems."<sup>19</sup> Nowhere in that Order did we suggest that this burden would be limited only with respect to NGSO FSS systems licensed or applied for by a certain date. Consequently, we will evaluate Teledesic's proposed modifications with respect to all pending NGSO FSS applications, and with licensed systems operating in shared frequency bands.

#### Teledesic's Proposed Modifications

8. Below, we discuss the treatment of the proposed modifications followed by a discussion of each.

#### *Treatment of Modification*

9. Lockheed contends that Teledesic's modification application will increase the interference to other Ka-band systems and therefore is a "major" modification. Consequently, Lockheed asserts that in order to protect the rights of second-round Ka-band NGSO FSS

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10 FCC Rcd. 7801 (1995).

<sup>17</sup> Modification Application at 3.

<sup>18</sup> Teledesic Consolidated Reply Comments at 9.

<sup>19</sup> *Ka-band Service Rules Report and Order* at ¶ 38.

applicants under the *Ashbacker v. FCC* decision,<sup>20</sup> the Commission must analyze Teledesic's request as a "major" modification to be considered as part of the second Ka-band processing round. Lockheed maintains that the Commission considered a similar situation with respect to a modification filed by Geostar Positioning Corporation and decided to treat those modifications as newly-filed applications.<sup>21</sup>

10. In response, Teledesic contends that the changes in its application do not increase overall interference to any known satellite system. Teledesic also maintains that grant of the modifications are consistent with Commission precedent. Specifically, Teledesic relies on the Commission's decision in *Orbital Communications Corp.*, where the International Bureau permitted Orbcomm to amend its pending satellite system application to add satellites, change its altitude and increase its power.<sup>22</sup>

11. We disagree with Lockheed that the *Geostar* case compels a different result. Geostar was awarded a license for a satellite system in the radiodetermination satellite service ("RDSS"). Its system was chosen by the Commission as the "baseline" RDSS system because, among other reasons, it permitted multiple entry by other RDSS systems. The RDSS licensing rules mandated that all future applicants conform their design to Geostar's system architecture. Geostar proposed, among other things, to reduce the power of two of its three licensed satellites, to add two new satellites to its system, and to change an orbital location. The Commission found that this modification substantially reduced opportunities for future entry of other RDSS systems and was incompatible with the "baseline" system.<sup>23</sup> Thus, the Commission concluded that Geostar's proposal for a modification to its system was tantamount to an application for a new system and would need to be considered in the next RDSS processing round. In contrast, grant of Teledesic's modifications to its space segment, does not reduce entry opportunities for future NGSO FSS systems. Moreover, the Commission has not chosen a baseline system for NGSO FSS systems in the Ka-band. In fact, the Commission specifically decided not to select Teledesic's satellite constellation as a "baseline" for subsequent Ka-band NGSO FSS systems. Rather, it stated that to the extent future systems might be technically incompatible with the Teledesic design, Teledesic would be required to share some of the burden in coordinating with

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<sup>20</sup> *Ashbacker v. FCC*, 326 U.S. 327 (1945). Under *Ashbacker*, where grant of one application would preclude grant of another, the Commission may not grant one application without affording an opportunity for hearing to both applicants.

<sup>21</sup> *Geostar Positioning Corporation*, 6 FCC Rcd. 2276 (Com. Car. Bur. 1991).

<sup>22</sup> 9 FCC Rcd. 6476, 6481(1994), *recon*, 10 FCC Rcd. 7801 (1995).

<sup>23</sup> *Id* at 2278.

these NGSO FSS systems.<sup>24</sup>

12. We also disagree with Lockheed that Teledesic's application should be considered a "major" modification that cannot be considered until the second Ka-band processing round. Rather, as noted above, the Commission generally takes a flexible approach when considering modifications to space station licenses. Lockheed is correct in noting that in the context of *amendments* to satellite applications, Section 25.116 of the Commission's rules, 47 C.F.R. § 25.116, distinguishes between "minor" and "major" *amendments* to pending license *applications*.<sup>25</sup> Under Section 25.116, if a space station application amendment is characterized as "major," the entire application must be treated as newly filed and the applicant loses its status in any ongoing processing round. The Commission, however, has not promulgated a comparable rule distinguishing between minor or major *modifications* to *space station licenses*.<sup>26</sup> In any event, as discussed below, we are not allowing Teledesic to make any changes that will significantly increase interference potential to future systems. Further, because grant of the modification application will not preclude the grant of future NGSO FSS systems, we also do not agree with Lockheed that any "Ashbacker" hearing rights of second-round Ka-band applicants will be jeopardized if we act on the modification outside of the second-processing group. Consequently, we will not defer consideration of the Teledesic modification application to the second Ka-band processing round.

#### *Changes in Orbital Configuration*

13. First, we address Teledesic's proposed changes to its orbital configuration. By this, we mean the changes to the number of satellites, number of orbital planes, orbit altitude, and inclination. A system's orbital configuration can impact its ability to share with other systems and services by affecting the number of active satellites "visible" at a particular location. The magnitude of sharing difficulty increases with an increase in the number of active visible satellites in the modified system. Thus, a customer using another satellite system will have more difficulty operating with that system if the number of visible satellites in the modified system is

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<sup>24</sup> See *Ka-band Service Rules Report and Order* at ¶ 38.

<sup>25</sup> In pertinent part, § 25.116 defines as "major" those amendments that "increase the potential for interference, or change the proposed frequencies or orbital locations to be used." 47 C.F.R. § 25.116(b)(1).

<sup>26</sup> Although Sections 25.117 and 25.118, 47 C.F.R. §§ 25.117 and 25.118, discuss modifications to station licenses, neither section discusses when modifications to *space station licenses* are deemed "minor" or "major." These sections primarily address modifications to earth station licenses and their resulting regulatory treatment (that is, we place modification applications relating to "major" modifications on public notice for comment, while we allow earth station licensees to make "minor" modifications without prior Commission approval.)

increased. The Bureau's analysis indicates that Teledesic's proposed changes in orbital configuration will not affect the number of Teledesic satellites visible above a 40° elevation angle --Teledesic's proposed minimum elevation angle-- at any particular time period throughout the United States. Consequently, this change will not create any significant interference problems to other systems or make sharing with other NGSO FSS systems in the Ka-band significantly more difficult.

#### *Optical Inter-Satellite Links*

14. Teledesic also proposes to use optical inter-satellite links (ISLs) to interconnect its in-orbit satellites. Optical ISLs are inter-satellite links which transmit in the optical, not radio, frequency bands. Teledesic claims that the "extremely narrow beamwidth of optical links virtually eliminates any possibility of interference between the optical ISLs of Teledesic and ISLs of any nearby satellite networks."<sup>27</sup> Alternatively, if optical ISL technology proves infeasible for any reason, Teledesic proposes to use radio frequency ISLs as initially requested, for its ISL operations.<sup>28</sup> Because optical ISLs do not involve wire or radio frequency transmissions, the Commission does not have jurisdiction over the use of optical ISLs.<sup>29</sup> The addition of optical ISLs, therefore, does not impact the interference potential with respect to radio frequency ISLs. In fact, to the extent that the use of optical ISLs will alleviate congestion in the radio frequency bands used for commercial ISL operations, we encourage the use of such links. Therefore, we find these proposed changes, which were unopposed, will not create any significant interference problems to other systems or make sharing with other NGSO FSS systems in the Ka-band significantly more difficult.

#### *Emission Designators*

15. Teledesic proposes to use two 250 MHz carriers on the downlink rather than one 500 MHz carrier, as authorized. This proposed modification was not opposed. In fact, it may provide Teledesic with a capability to switch between transponders, giving it more flexibility when coordinating with other systems and services. This change will have no net affect on sharing because Teledesic will still be operating across the full 500 MHz. Therefore, the

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<sup>27</sup> Modification Application at 8.

<sup>28</sup> While we have not authorized Teledesic to operate on specific ISL frequencies, we have determined that Teledesic will operate within the 65-71 GHz band. Teledesic Authorization at ¶¶ 20-21. We expect to issue an order concerning Teledesic's ISLs shortly.

<sup>29</sup> See 47 U.S.C. § 152; the Commission's Table of Frequency Allocations only considers frequencies between 9 kHz and 400 GHz, see 47 C.F.R. § 2.102(a)- optical frequencies are above 400 GHz. The International Telecommunications Union also does not regulate optical inter-satellite links.



proposed change in emission designators will not create any significant interference problems to other systems or make sharing with other NGSO FSS systems in the Ka-band significantly more difficult.

### *Changes in Uplink and Downlink Power Budgets*

#### 1. Uplink

16. Teledesic's modified link budgets indicate that there is an increase in the uplink power density for both service links and giga-links.<sup>30</sup> Lockheed claims that this would require Teledesic to operate its earth stations at equivalent isotropically radiated power ("e.i.r.p.") and e.i.r.p. density levels significantly higher than initially proposed. As a consequence, Lockheed claims that Teledesic's new user terminals will cause much greater interference into the satellite receive antennas of second-round Ka-band NGSO FSS systems than they would have if the system were operated as originally authorized.<sup>31</sup> In response, Teledesic contends that the uplink e.i.r.p. spectral density of Teledesic earth station transmissions is not a direct measure of their interference-causing potential, as Lockheed asserts.<sup>32</sup> Teledesic further notes that "while e.i.r.p. is a measure of the maximum interference that may result during in-line situations, this is of questionable relevance because the in-line situations must be mitigated no matter what."<sup>33</sup>

17. The change in uplink e.i.r.p. density is the most significant change Teledesic proposes to its authorized system. Studies concerning sharing between NGSO FSS systems, performed thus far in international study groups, indicate that co-frequency and co-coverage sharing between NGSO FSS systems is not possible without some form of interference mitigation techniques, such as the use of satellite diversity.<sup>34</sup> While satellite avoidance techniques<sup>35</sup> may be used to mitigate the frequency of "in-line" situations, this will not mitigate

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<sup>30</sup> Although Teledesic did not specifically indicate changes in the frequencies for its "giga-link" or gateway, operations, it appears that Teledesic now proposes to operate some, if not all, of its uplink giga-link terminals in the 28.6-29.1 GHz bands. See Modification Application at B-1.

<sup>31</sup> Lockheed Comments at 2 and Supplemental Comments at 5.

<sup>32</sup> Teledesic Consolidated Reply Comments at 10.

<sup>33</sup> *Id.* at 11. "In-line" interference occurs when an NGSO satellite from one NGSO FSS system intersects the mainbeam of the interfering earth station.

<sup>34</sup> Satellite diversity is a technique where more than one satellite is visible to an earth station so that the earth station has the capability to select communication paths that will facilitate sharing.

<sup>35</sup> Satellite avoidance is a mitigation technique whereby in-line interference is avoided.

the potential for sidelobe interference from the Teledesic earth station into the satellite of another NGSO FSS system. This is because any increase in uplink power density will enlarge the area around the Teledesic satellite that another NGSO FSS system uplink would need to take into account in order to avoid receiving interference. These, in turn, could affect the system capacity of other NGSO FSS systems.

18. While there is no information on the record to quantify this impact, it appears that second-round NGSO FSS systems will be required to make additional reductions in system capacity if they are going to be able to operate compatibly with Teledesic's modified system. Consequently, while Teledesic's proposed increase in uplink power density will not preclude other NGSO systems from operating in these bands, it will make sharing with other NGSO FSS systems significantly more difficult absent a reduction in the capacity of the second-round system. For this reason, the proposed uplink power increase would in itself, significantly increase interference potential and, thus, we would be compelled to deny it or defer it to the second processing round. Nevertheless, the only application before us is an application to modify Teledesic's *space segment*. Teledesic has not yet filed an application for its earth station segment. Consequently, it is not appropriate, and in any case is premature, to consider here Teledesic's uplink user and gigalink terminal operations. Significantly, remedial technical mitigation, such as improvements in the earth station antenna pattern<sup>36</sup> can be used to mitigate the increased interference potential resulting from an increase in power. We emphasize that we will grant Teledesic authority for its service link earth stations only to the extent that the change presents no significant interference problems to second round NGSO systems.

19. Lockheed also asserts that the proposed increase in power may affect the ability of Teledesic's "gigalinks," to operate on a secondary non-interference basis in those frequency bands in the 27.6-28.4 GHz bands where GSO FSS systems operate on a primary basis. As discussed above, we do not have applications for Teledesic's gigalink terminals before us. Moreover, systems operating on a secondary basis may not cause harmful interference to or claim protection from stations operating on a primary or permitted basis.<sup>37</sup> While we recognize Lockheed's concerns, Teledesic does not propose any change to the secondary status of Teledesic's gigalinks.<sup>38</sup> Consequently, Teledesic's gigalink operations may not cause harmful interference to, or claim protection from, primary GSO operations.<sup>39</sup> Furthermore, under the

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<sup>36</sup> Because the Teledesic earth station side lobe and not its main lobe is at issue, the level of interference received at the NGSO satellite is highly dependent on the Teledesic earth station antenna performance (including sidelobe rolloff).

<sup>37</sup> See 47 C.F.R. § 2.104(d); 47 C.F.R. § 2.105(c)(3).

<sup>38</sup> See Teledesic Consolidated Reply Comments at 3.

<sup>39</sup> See 47 C.F.R. § 2.104(d); 47 C.F.R. § 2.105(c)(3); see also *Teledesic Authorization* at ¶ 19 and n.23.

terms of its authorization, Teledesic may not implement service in these secondary frequency bands without first demonstrating, to the Commission's satisfaction, that it can do so without causing harmful interference to primary satellite operations in these frequencies.<sup>40</sup>

## 2. *Downlink*

20. When analyzing the potential for increase in interference for satellite-to-Earth transmissions, we need to look at the effect on three different types of systems also operating in the frequency bands that Teledesic will use: terrestrial systems, GSO FSS systems and other NGSO FSS systems.

### a. terrestrial systems

21. The power-flux density (PFD) from Teledesic's system will affect the interference potential to terrestrial systems operating in shared bands. These PFD limits, however, remain virtually unchanged as a result of Teledesic's proposed modifications. With respect to the Teledesic's service link terminals, the PFD is slightly decreased. With respect to the gigalink terminals, the PFD is slightly increased.<sup>41</sup> In any event, in all cases, the modified PFD limits continue to meet the requirements of Section 25.208(c), 47 C.F.R. § 25.208(c), of the Commission's Rules. This limit ensures that there will not be any unacceptable interference to terrestrial receivers in this band. Further, the slight decrease in PFD in Teledesic's service bands, appears small enough such that the Teledesic earth station receivers will not be considered more susceptible to interference from terrestrial transmitters and other NGSO FSS satellites. Therefore, we conclude that the changes made in the downlink PFD limit do not present any significant interference problems with terrestrial systems.

### b. GSO FSS systems

22. CyberStar and Lockheed also express concerns over potential interference from Teledesic's gigalink terminals in the 17.8-18.6 GHz bands into licensed GSO FSS systems operating on a primary basis in these frequency bands. As stated above, Teledesic does not propose any change in the secondary status of Teledesic's gigalinks with respect to geostationary-satellite orbit systems in these frequency bands. Teledesic's use of these frequency bands for "gigalink" operations has priority on a secondary non-interference basis with respect to GSO FSS systems. Furthermore, Teledesic may not implement this secondary authorization without first

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<sup>40</sup> *Teledesic Authorization* at ¶ 39.

<sup>41</sup> However, the revised link budgets indicate that the PFD will decrease several dB under conditions of heavy rain fade and low elevation angles.

demonstrating to the Commission's satisfaction that it can do so without causing harmful interference to primary satellite operations in these frequencies.<sup>42</sup> Therefore, grant of this portion of the modification will not affect any GSO FSS system because Teledesic still must operate on a secondary priority non-interference basis to these GSO FSS systems.

c. NGSO FSS systems

23. Teledesic is authorized to operate its satellite-to-gigalink terminal transmissions in the 17.8-18.6 GHz band on a secondary priority non-interference basis. Although Teledesic did not specifically indicate changes in the frequencies for its "gigalink" operations, it appears that Teledesic now proposes to operate some if not all of its downlink gigalink terminals in the 18.8-19.3 GHz bands, which is designated for primary NGSO downlinks.<sup>43</sup> Teledesic's modified link budgets indicate an increase in the downlink gigalink PFD level in the modified Teledesic system. This proposed change will likely affect, to some degree, sharing with other NGSO FSS systems proposing to operate downlinks in the 18.8-19.3 GHz bands. It may also increase the potential for interference into other NGSO FSS systems that propose to operate on a secondary non-interference basis to GSO FSS systems in the 17.8-18.6 GHz band. At this point we cannot quantify the effect of this increase in power on future systems because we do not know how many NGSO FSS systems will ultimately be licensed and the system configurations of future licensees.

Nevertheless, our analysis indicates that the increased downlink power will not create any significant interference problems with second-round NGSO systems or make NGSO sharing significantly more difficult. Moreover, none of the second-round Ka-band applicants have objected to this change in Teledesic's application. Consequently, we will grant Teledesic authority to increase the power of its downlink gigalink terminals in the 18.8-19.3 GHz and 17.8-18.6 GHz bands. Nevertheless, consistent with the *Ka-Band Service Rules Report and Order*, we expect Teledesic to share the burden of coordination with other NGSO FSS systems and to coordinate in good faith.

### Conclusion

24. We conclude that the public interest is served by granting Teledesic authority to modify its space station system. This will allow Teledesic to proceed with system implementation in a manner that will not significantly affect other existing and proposed systems. Further, we conclude our action today is consistent with Commission policy to encourage technical innovation and spectrum efficiency.

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<sup>42</sup> *Id* at 22310 para. 39.

<sup>43</sup> *See* Modification Application at B-1.

**Ordering Clauses**

25. Accordingly, IT IS ORDERED that Application File No. 195-SAT-ML-97 for modification of Teledesic LLC's space station authorization IS GRANTED, to the extent indicated herein, in accordance with the technical specifications set forth in the application and consistent with the Commission's rules.

26. IT IS FURTHER ORDERED that Teledesic LLC is subject to the terms and conditions in its 1997 *Order and Authorization* as modified in this Order.

27. IT IS FURTHER ORDERED that the temporary assignment of any orbital planes, or of any particular frequencies, to Teledesic LLC is subject to change by summary order of the Commission on thirty days notice and does not confer any permanent right to use the orbit and spectrum. Neither this authorization nor any right granted by this authorization, shall be transferred, assigned or disposed of in any manner, voluntarily or involuntarily, or by transfer of control of any corporation holding this authorization, to any person except upon application to the Commission and upon a finding by the Commission that the public interest, convenience, and necessity will be served thereby.

28. IT IS FURTHER ORDERED that Teledesic LLC will prepare any necessary submissions to the International Telecommunication Union (ITU) and to affected administrations for the completion of the appropriate advance publication, coordination, and notification obligations for these space stations and its modifications in accordance with the ITU Radio Regulations. 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, 47 C.F.R. § 25.111(b).

29. 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. Failure to respond within that period will constitute formal acceptance of the authorization.

30. IT IS FURTHER ORDERED that this Order is issued pursuant to Section 0.261 of the Commission's Rules, 47 C.F.R. § 0.261. 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)).

31. IT IS FURTHER ORDERED that this Order is effective upon the date of its release.

FEDERAL COMMUNICATIONS COMMISSION

Regina M. Keeney  
Chief, International Bureau