

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

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FEDERAL COMMUNICATIONS COMMISSION  
OFFICE OF THE SECRETARY

In the Matter of )  
)  
Amendment of Parts 2 and 25 of the )  
Commission's Rules to Designate Extended )  
C-Band Spectrum for TT&C Functions of GSO )  
FSS Systems Operating in Bands Above )  
Ku-band )

RM No. \_\_\_\_\_

**PETITION FOR RULEMAKING**

Comm, Inc., EchoStar Satellite Corporation ("EchoStar"), GE American Communications, Inc. ("GE Americom"), Hughes Communications Galaxy, Inc. ("Hughes"), KaStar Satellite Communications Corp. ("KaStar"), Lockheed Martin Corporation ("Lockheed Martin"), Orion Network Systems, Inc. ("Orion"), PanAmSat Licensee Corp. ("PanAmSat"), and VisionStar, Inc., pursuant to Section 1.401 of the Commission's rules, hereby petition the Commission to designate 10 MHz of spectrum in both the 3600-3700 MHz band (space-to-Earth) and the 6425-6525 MHz band (Earth-to-space) for tracking, telemetry, and control ("TT&C") operations for geostationary satellite orbit ("GSO") space stations in the fixed-satellite service ("FSS") which operate at bands above Ku-band.

**Introduction**

On May 9, 1997, the Commission granted licenses to 13 companies, including all of the Petitioners, for 73 satellites to provide GSO FSS services in the Ka-band (or "30/20 GHz" bands). These systems represent billions of dollars of investment and will provide a wide range of broadband satellite communications services as a critical element of the Global Information Infrastructure ("GII").

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Like all spacecraft, these Ka-band satellites require proven and reliable TT&C capabilities for orbital insertion, station-keeping and on-orbit maneuvers, and other spacecraft housekeeping functions. Dependable TT&C is crucial to maintain normal spacecraft operations and to recover from anomalous spacecraft events in emergency situations. Petitioners believe that the Commission should authorize GSO FSS systems operating service links in higher frequencies such as the 30/20 GHz bands to perform these critical spacecraft operations in bands which can utilize proven TT&C technology and equipment.<sup>1/</sup> Specifically, Petitioners respectfully request that the Commission designate 10 MHz of extended C-band spectrum in the 3600-3700 MHz band (space-to-Earth) and 6425-6525 MHz band (Earth-to-space) for TT&C operations for GSO FSS systems operating in higher frequency bands (*i.e.*, above Ku-band).<sup>2/</sup>

#### **Discussion**

On May 9, 1997, the Commission licensed 13 companies, including all of the Petitioners, to launch and operate 73 GSO FSS satellites in the 30/20 GHz band. The Ka-band licensees generally proposed to perform on-orbit TT&C operations in the Ka-band and transfer orbit or secondary TT&C in the C-band or Ku-band.<sup>3/</sup> Although the Commission did not address the

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<sup>1/</sup> Existing GSO FSS systems operating in the C-band and Ku-band have demonstrated the feasibility of performing TT&C operations within their service bands. Accordingly, this petition for rulemaking is limited to the TT&C operations of GSO FSS systems operating in bands above Ku-band, such as the Ka-band.

<sup>2/</sup> The Commission may also wish to consider a similar designation in extended Ku-band frequencies to permit satellite operators to take advantage of existing global Ku-band facilities. However, this petition only requests an extended C-band designation.

<sup>3/</sup> Many Ka-band licensees proposed on-orbit TT&C operations in their service bands based on an extremely narrow interpretation of Section 25.202(g) of the Commission's rules. However, as discussed below, this provision very likely permits GSO FSS TT&C operations in any frequency band allocated to FSS.

issue of on-orbit TT&C, it uniformly rejected proposals to use C-band or Ku-band frequencies for transfer orbit TT&C because such spectrum is not allocated to the Space Operations Service nor are these bands included in the systems' service bands.<sup>4/</sup>

Section 25.202(g) of the Commission's rules provides that "[t]elemetry, tracking and telecommand functions for U.S. domestic satellites shall be conducted at either or both edges of the *allocated* band(s)."<sup>5/</sup> Although the Commission apparently interpreted this provision to require TT&C to be performed in a system's service bands or in bands allocated to space operations, the ITU has interpreted this type of regulation more broadly to permit TT&C operations in any band allocated to the *same service* as the service links (*e.g.*, a Ka-band FSS system may use C-band FSS frequencies for TT&C).<sup>6/</sup> In addition, the Commission has previously authorized TT&C

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<sup>4/</sup> See Ka-band authorizations of Comm, Inc. (File Nos. 163 through 166-SAT-P/LA-95, 201-SAT-MISC-95, rel. May 9, 1997), EchoStar Satellite Corp. (File Nos. 167 and 168-SAT-P/LA-95, 54-SAT-AMEND-96, rel. May 9, 1997), GE American Communications, Inc. (File Nos. 169 through 173-SAT-P/LA-95, 54-SAT-AMEND-97, rel. May 9, 1997), Hughes Communications Galaxy, Inc. (File Nos. 3/4-DSS-P/LA-94, CSS-94-021 through CSS-94-025, 174 through 181-SAT-P/LA-95, 36-SAT-AMEND-96, rel. May 9, 1997), KaStar Satellite Communications Corp. (File Nos. 128-SAT-P/LA-95, 203-SAT-P/LA-95, rel. May 9, 1997), Loral Space & Communications Ltd. (File Nos. 109-SAT-P/LA-95, 110-SAT-P-95, 187-SAT-AMEND-95, 188/189-SAT-P/LA-95, 102/103-SAT-AMEND-96, rel. May 9, 1997), Morning Star Satellite Company, L.L.C. (File Nos. 190 through 193-SAT-P/LA-95, rel. May 9, 1997), NetSat 28 Company, L.L.C. (File No. 184-SAT-P/LA-95, rel. May 9, 1997), Lockheed Martin Corp. (File Nos. 182 through 186-SAT-P/LA-95, rel. May 9, 1997), and VisionStar, Inc. (File No. 200-SAT-P/LA-95, rel. May 9, 1997).

<sup>5/</sup> 47 CFR § 25.202(g) (1996) (emphasis added).

<sup>6/</sup> The ITU Rule of Procedure on Radio Regulation 25 provides:

... space operation functions will be considered in conformity with the Table of Frequency Allocations (favorable Finding) in the case where the assigned frequency (and the assigned frequency band) lies in a frequency band allocated to the:

operations in frequencies outside of the system's service links and space operations spectrum in certain circumstances.<sup>7/</sup> Accordingly, Petitioners believe that designation of extended C-band FSS spectrum for TT&C operations of GSO FSS satellites operating in higher frequencies such as the Ka-band is consistent with Section 25.202(g). However, if the Commission concludes that Section 25.202(g) does not permit the use of TT&C frequencies outside of a system's service band or bands allocated to space operations, then Petitioners urge the Commission to amend Section 25.202(g) in the context of this rulemaking.

The designation of appropriate spectrum for TT&C operations is critical to facilitate the deployment of GSO FSS systems in the Ka-band and in higher frequencies. Although it may be technically feasible to perform TT&C operations in the 30/20 GHz bands and in higher frequencies, such a requirement would place substantial operational constraints on these next-generation satellite systems. For example, the use of Ka-band or higher frequencies for TT&C would require the use of non-standard equipment, specially-designed high-power Ka-band amplifiers, and significantly larger ground antennas to achieve the required reliability. Use of such equipment will result in substantial technical and operational difficulties, which indicates that frequencies above Ku-band are not technically or economically suitable for TT&C operations of GSO FSS satellites operating in significantly higher frequency bands.

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- Space Operation Service, or
  - *the main service in which the space station is operating (e.g., FSS, BSS, MSS).*

ITU Rules of Procedure (1994) Part A1 at 1 (emphasis added).

<sup>7/</sup> See, e.g., *DirectSat Corp.*, Order, File No. 53-SAT-ML-95, DA 96-1514 (rel. Sept. 9, 1996).

Since the TT&C spectrum requirements of GSO FSS systems are extremely modest (usually below 1 MHz per system) and sharing among GSO FSS systems should be easily achieved, the amount of spectrum requested in the instant petition is very small. Petitioners estimate that the designation of 10 MHz of spectrum in each direction for TT&C operations will be sufficient to meet the needs of the GSO FSS systems operating in the Ka-band and higher frequencies for the foreseeable future. The proposed 10 MHz would be used for transfer orbit TT&C, standard on-orbit TT&C functions, and emergency-mode TT&C.

Petitioners believe that the most promising C-band spectrum for TT&C operations of GSO FSS systems is the extended C-band frequencies at 3600-3700 MHz (space-to-Earth) and 6425-6525 MHz (Earth-to-space). These bands are particularly attractive because they are adjacent to traditional C-band FSS frequencies, which will permit the use of extremely reliable and widely available equipment to satisfy the TT&C requirements of Ka-band systems and higher frequency GSO FSS satellites.

The 3600-3700 MHz band (space-to-Earth) is already allocated on a primary basis to FSS for non-government use and aeronautical radionavigation and radiolocation for government use.<sup>8/</sup> Although use of the 3600-3700 MHz band would require compliance with Footnote US245, which could be construed to limit FSS use of the band to international inter-continental systems, Petitioners urge the Commission to clarify or waive Footnote US245 with respect to the TT&C

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<sup>8/</sup> See 47 CFR § 2.106 (1996). Of course, GSO FSS systems seeking to perform TT&C operations in this band would be required to coordinate with affected government and non-government users.

operations of GSO FSS systems in the 3600-3700 MHz band.<sup>9/</sup> The intent of Footnote US245 is to limit the number of FSS earth stations in the 3600-3700 MHz band by restricting the use of that spectrum to *service links* of international intercontinental systems. Accordingly, the use of 10 MHz of spectrum within this band by a small number of TT&C facilities is consistent with the intent of Footnote US245. Such a clarification or, if the Commission deems it necessary, a waiver of Footnote US245 would permit domestic and sub-regional GSO FSS satellite systems operating in bands above Ku-band to obtain the benefit of the Commission's designation of extended C-band spectrum for TT&C operations.<sup>10/</sup>

The 6425-6525 MHz band (Earth-to-space) is also allocated on a primary basis to non-government FSS use, as well as to non-government mobile services. Services which may utilize this band include broadcast auxiliary services, cable television relay, domestic public fixed radio services, and private operational-fixed microwave. Use of the 6425-6525 MHz band does not appear to be extensive and coordination with these services should be possible. In addition, the Commission should be able to develop rules governing these services and GSO FSS TT&C operations in the small amount of spectrum requested in order to reduce the number of coordinations required. Thus, the 6425-6525 MHz band is promising spectrum in which to designate 10 MHz of uplink spectrum for the proposed GSO FSS TT&C operations.

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<sup>9/</sup> Footnote US245 also requires a case-by-case electromagnetic compatibility ("EMC") analysis, which would be performed on a system-by-system basis.

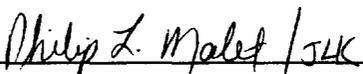
<sup>10/</sup> Indeed, the Commission has previously authorized the modification of a satellite operator's license to permit operation on a non-conforming basis with Footnote US245. See *DirectSat Corp.*, *supra* note 7. Of course, satellite operators proposing to implement international inter-continental GSO FSS systems in bands above Ku-band would satisfy Footnote US245.

## Conclusion

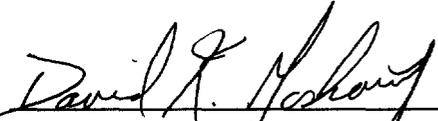
Petitioners respectfully request that the Commission institute a rulemaking proceeding to designate 10 MHz of spectrum in each of the 3600-3700 MHz band (space-to-Earth) and 6425-6525 MHz band (Earth-to-space) for TT&C operations of GSO FSS systems operating in bands above Ku-band. Further, in light of the impact of TT&C frequencies on the construction milestones of newly-licensed Ka-band satellite systems, Petitioners request that the Commission consider this rulemaking on an expedited basis.

Respectfully submitted,

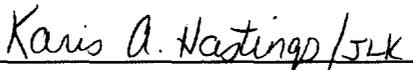
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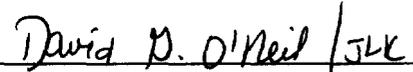
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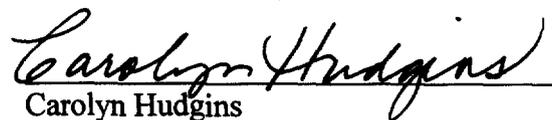
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