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

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In the Matter)
of the Application of)
)
Motorola Satellite Systems, Inc.)
)
For Authority to Construct,)
Launch and Operate a Non-Geostationary)
Orbit Satellite System in the Fixed-Satellite)
Service.)

File Nos. 157-SAT-P/LA-96(72)
29-SAT-AMEND-97

To: Chief, International Bureau

RESPONSE

FIXED POINT-TO-POINT COMMUNICATIONS
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September 29, 1997

TABLE OF CONTENTS

SUMMARY	i
AVAILABILITY OF HDFS IN THE MILLIMETER WAVE BANDS MUST BE SUPPORTED	5
MOTOROLA SATELLITE LACKS THE LEGAL QUALIFICATIONS TO BE GRANTED A LICENSE FOR THE M-STAR SYSTEM	8
THE RECORD PROVES THAT MOTOROLA SATELLITE IS NOT TECHNICALLY QUALIFIED TO BE LICENSED FOR THE M-STAR SYSTEM	12
A. Motorola Satellite’s Reliance on Part 25 Criteria is Invalid	14
B. Motorola Satellite’s Reliance Upon ATPC and FS Power Increase Limitations is Invalid	18
C. Motorola Satellite’s Efforts At Achieving Band Sharing Are Self- Serving and Unproductive	20
CONCLUSION	21

SUMMARY

Motorola Satellite Systems, Inc. ("Motorola Satellite") has filed the captioned application, as amended (the "Application"), for Commission authority to construct, launch and operate its non-geostationary orbit ("NGSO") Fixed-Satellite Service ("FSS") "M-Star System." The M-Star System would provide broadband services in the 36-51.4 GHz band, with downlinks in the 37.5-40.5 GHz band and uplinks in the 47.2-50.2 GHz band.

The Fixed Point-to-Point Communications Section, Network Equipment Division of the Telecommunications Industry Association (the "Section"), petitioned to deny the Application with respect to Motorola Satellite's proposed operation in the 37-40.5 GHz band. Several other parties filed similar petitions.

Pursuant to Section 309 of the Communications Act of 1934, as amended, if substantial and material questions exist regarding an applicant's qualifications to be a licensee, the Commission must grant a petition to deny the application. As demonstrated herein, the record of this proceeding overwhelmingly supports denying the Application. Motorola Satellite has failed to demonstrate its legal and technical qualifications to be a Commission licensee:

- Motorola Satellite does not have the legal qualifications to operate the proposed M-Star System. A significant portion of the downlink band (*i.e.*, 37.5-38.5 GHz) is not allocated in the U.S. for FSS, but is allocated for fixed point-to-point microwave radio service ("FS") use.
- Motorola Satellite does not possess the technical qualifications to operate its proposed M-Star System in the 37-40.5 GHz band. The M-Star System downlinks would cause harmful interference to FS operations and FS operations would cause harmful interference to FSS earth stations. This interference would degrade FS reliability objectives significantly; would have a devastating impact on established, highly successful 38.6-40.0 GHz band FSS operations; and would foreclose expansion of potential FS operations throughout the 37-40.5 GHz band.

In its Consolidated Opposition and Reply ("Reply"), Motorola Satellite attempts to minimize the importance of these fundamental, disqualifying flaws in its Application. It claims that the lack of a domestic allocation for its proposal is irrelevant because the operation could be conformed to any eventual spectrum designation. Motorola Satellite also glosses over the most critical problem with its proposal -- the proven inability of NGSO/FSS and FS users to share spectrum.

Motorola Satellite's attempted rehabilitation of its Application, in the Reply, fails completely:

- Contrary to Motorola Satellite's claim, the Commission does not grant satellite licenses conditioned upon a future possible spectrum allocation or designation. Indeed, in the recent Ka-band allocation, which involved sharing between FS and FSS users, the Commission purposely deferred licensing and granting orbital slots until after the protracted, contentious proceeding had been finalized. Furthermore, Motorola Satellite fails to demonstrate that it even could conform the M-Star System to any spectrum designations or operating rules that the Commission might adopt.
- Numerous industry studies have condemned FS/FSS sharing in the millimeter wave bands. None has proven that it is feasible. The Commission acknowledges that sharing is highly impractical. Even Motorola Satellite has acknowledged that band segmentation, not band sharing, is appropriate in these bands. Furthermore, its proposed solutions to the FSS/FS sharing problem are invalid.

Motorola Satellite unjustifiably perpetuates the FSS industry's assault on FS spectrum. Its proposal would disrupt a vital industry, which provides a wide variety of competitive telecommunications services and which provides critical network support for emerging wireless services. Plans for expansion of these valuable services unnecessarily will be held hostage until the material questions concerning the M-Star System are addressed, let alone resolved.

Motorola Satellite does not provide any reason why this uncertainty must continue. Loss of FS spectrum to FSS users, which constantly have failed to demonstrate any need for the spectrum and which constantly have failed to implement necessary measures for protecting themselves from interference, must be stopped. Thus, since Motorola Satellite does not possess the requisite qualifications, the Commission is statutorily required to deny the captioned application in part so that the M-Star System would not be able to operate on bands designated for FS use.

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RESPONSE

In the above-captioned application, as amended (the "Application"), Motorola Satellite Systems, Inc. ("Motorola Satellite")¹ seeks Commission authority to construct, launch and operate its non-geostationary orbit ("NGSO") Fixed-Satellite Service ("FSS") "M-Star System" to provide broadband services in the 36-51.4 GHz band. Motorola Satellite would operate FSS service downlinks in the 37.5-40.5 GHz band and uplinks in the 47.2-50.2 GHz band.

Before the Commission can grant the Application, Motorola Satellite must demonstrate its legal and technical qualifications to be a licensee.² Pursuant to Section 309(d) of the Communications Act of 1934, as amended (the "Act"),³ and to Section 25.154 of the

¹Public Notice, Rep. No. SPB-95 (DA 97-1723, released Aug. 13, 1997); Public Notice, Rep. No. SPB-89 (DA 97-1551, released July 22, 1997) ("M-Star Public Notice").

²47 U.S.C. §308 (1997); 47 C.F.R. §25.156 (1997). See also Teledesic Corporation, 12 FCC Rcd 3154, 3158 (Chief, Int. Bureau 1997) ("Teledesic"); MCI Telecommunications Corporation, 11 FCC Rcd 16275, 16280 (Chief, Int. Bureau 1996).

³47 U.S.C. §309(d) (1997).

Commission's Rules,⁴ the Fixed Point-to-Point Communications Section, Network Equipment Division, of the Telecommunications Industry Association (the "Section"),⁵ and several other parties, petitioned the Commission to deny the Application.⁶

In these petitions to deny, the parties clearly demonstrated that Motorola Satellite is not legally or technically qualified to be a Commission licensee for its proposed NGSO/FSS system.⁷ Specifically, they proved that: (i) Motorola Satellite does not have the legal qualifications to operate the proposed M-Star System because a significant portion of the downlink band (i.e., 37.5-38.5 GHz) is allocated exclusively for FS use, and not for FSS use, domestically; and

⁴47 C.F.R. §25.154 (1997).

⁵The Telecommunications Industry Association ("TIA") is the principal industry association representing all telecommunications equipment manufacturers, including manufacturers of terrestrial fixed point-to-point microwave radio service ("FS") equipment. Section members serve, among others, companies, including telephone carriers, utilities, railroads, state and local governments, and cellular carriers, licensed by the Commission to use private and common carrier bands for provision of important and essential telecommunications services. Sometimes, a product-oriented division or a section of such a division will file in a proceeding representing the views of only the members of that division or section. In this instance, the filing is specifically from the Fixed Point-to-Point Communications Section, Network Equipment Division, of the TIA.

⁶The deadline for filing this Response was extended until September 30, 1997. See August 29, 1997, letter from the Chief, Satellite and Radiocommunication Division, International Branch, to Marc A. Paul, counsel for Motorola Satellite. Other petitions to deny or dismiss were filed by WinStar Communications, Inc. ("WinStar"); Advanced Radio Telecom Corp. ("ART"); GE American Communications, Inc. ("GE Americom"); and Sky Station International, Inc. ("Sky Station"). Comments on the Application were filed by TRW Inc. ("TRW") and Hughes Communications, Inc. ("HCI"). On September 25, 1997, Motorola Satellite filed another amendment to its Application. Counsel for the Section only received a copy of this amendment today. Thus, the Section reserves the right to address the September 25 amendment, if necessary, in a supplemental pleading.

⁷Pursuant to Section 25.156 of the Commission's Rules, the Commission can grant the Application only if it "finds that [Motorola Satellite] is legally, technically and otherwise qualified, that the proposed facilities and operations comply with all applicable rules, regulations and policies, and that grant of the application will serve the public interest, convenience and necessity." 47 C.F.R. §25.156 (1997). However, if the Application does not substantially comply with such rules and regulations, it should be dismissed as defective. 47 C.F.R. §25.112 (1997).

(ii) Motorola Satellite does not possess the technical qualifications to operate its M-Star System in the entire 37-40.5 GHz band because FSS and FS users are unable to operate in the same band without causing harmful interference to each other, especially to the sophisticated high density FS ("HDFS")⁸ operations in the 38.6-40.0 GHz band ("38 GHz Band").

In its Consolidated Opposition and Reply to these pleadings ("Reply"), Motorola Satellite obfuscates the numerous fundamental problems with its Application and attempts, without success, to refute the claims made in the petitions to deny. Motorola Satellite argues that, since the Commission routinely permits amendment of satellite applications to conform with rule changes, the lack of spectrum designated domestically for FSS use does not disqualify it legally. Motorola Satellite also asserts that it is technically qualified because NGSO/FSS and FS users can co-habitate in the 37-40.5 GHz band if inter-service coordination is conducted under Part 25 (satellite service) criteria and/or if FS users reduce their power and employ Automatic Transmit Power Control ("ATPC").

⁸HDFS is a form of fixed point-to-point microwave service that is technically inherent to the propagation characteristics of high frequency operation. It is differentiated from more conventional fixed terrestrial service in lower bands by short "hop lengths," large scale deployment, utilization of wide bandwidth, and use of many different network topologies and path geometries, including elevation angles up to about 45°. See §7.5.3.2 of the "CPM Report on technical, operational and regulatory/procedural matters to be considered by the 1997 World Radio Communication Conference," ITU-R, May 1997 ("CPM Report"):

In the frequency bands above about [17] GHz the Fixed Service is typically deployed in tight meshes needed to provide local access (commonly called "last mile") in areas of high subscriber density (urban and suburban, business and industrial). This type of FS deployment has been named "high density fixed service" (HDFS). It is characterized by spacings between adjacent HDFS stations typically ranging from tens of meters to a few kilometers, which obviously leaves no "holes" of large enough size for siting satellite earth stations without causing intolerable interservice interference.

As detailed below, however, these arguments are unavailing and the record compels denial of the Application, at least with respect to Motorola Satellite's proposed operation in the 37-40.5 GHz band:⁹

LEGAL QUALIFICATIONS

- Motorola Satellite does not have the legal right to provide its service -- No spectrum exists domestically for M-Star System downlink operations. The 37.5-38.5 GHz band is not designated for such use and the 38.6-40.0 GHz band is unavailable due to sharing constraints. No proof exists in the record that the 37-40.5 GHz band ever will be available for NGSO/FSS use domestically. Nor does any proof exist that, depending on how the 37-40.5 GHz band ultimately is designated and depending on what operating rules are adopted, that Motorola Satellite's proposed system is so facile that it can accommodate any changes. Thus, Motorola Satellite clearly has no legal basis to have its Application granted.

TECHNICAL QUALIFICATIONS

- FS/FSS sharing will not work -- Motorola Satellite, in the Reply, admits that its NGSO/FSS could not share with HDFS in the millimeter wave bands. No evidence exists to the contrary. Co-primary FS users will be unable to share spectrum with FSS users without experiencing harmful interference. In addition, such users likely will degrade FSS facilities because of their relatively high receiver sensitivity to FS interference. Industry efforts to develop sharing criteria have been unsuccessful. There is no indication that a solution can be attained.
- Sharing will impede FS expansion significantly -- Existing and potential FS users must be allowed to continue expanding systems in the same general area as FSS earth stations. Historically (e.g., in the 4 GHz band), when an earth station is located in a particular area, its high interference reduction requirements freeze the band from further development of FS in the same geographical area. FS intra-service station distances for the bands proposed in the Application are substantially smaller than FS/FSS inter-service separation distances. The integrity of FS operating areas therefore will be severely and adversely affected by the large "holes" or "exclusion zones" required to protect FSS earth station receivers. Due to these system

⁹While the Section does not directly address Motorola Satellite's proposed operation in the shared bands above 40 GHz, the same concerns expressed herein apply to that proposal.

characteristics, without appropriate safeguards, FS facilities would be forced to be located outside such huge "exclusion zones." If FS users are required to navigate around these large "exclusion zones," not only would their high degree of reliability be compromised severely, but their potential areas for expanding, especially in urban areas, would be reduced significantly and associated services would become unavailable where demand is greatest.

- Motorola Satellite does not prove sharing ever will be feasible -- Motorola Satellite's proposed approach to accomplishing sharing is not technically proven or justified. ATPC equipment for millimeter wave band FS operations does not exist. Industry standards recommend against using ATPC or reducing power for FS users in these bands. Reliability of FS operations would suffer. In fact, FS systems would be far more susceptible to harmful interference from FSS operations if ATPC were to be deployed.
- FSS users must assume responsibility for protecting FS users -- Motorola Satellite's proposals for sharing typify the FSS industry's myopic treatment of FS users. Motorola Satellite proposes numerous limitations on FS operations, but it fails to suggest any self-help measures. Such a one-sided approach must be stopped. It is absolutely incumbent upon the Commission to force FSS user concessions as well. At a minimum, FSS users must be required to implement measures for protecting themselves from FS interference. They must prove actual need for the spectrum and they must employ minimum spectral efficiency standards. It is no longer appropriate or equitable for FS users to have the entire burden of protecting FSS users.

AVAILABILITY OF HDFS IN THE MILLIMETER WAVE BANDS MUST BE SUPPORTED

The 37-40 GHz Band currently has numerous HDFS users in the United States and in other countries, especially in urban areas, which are exactly the same areas "requiring" 37-40 GHz band FSS earth terminals:

- These frequencies support the other telecommunications services that private and common carrier FS users provide, such as emergency, public health and safety services; and they support services for local exchange carriers, cellular licensees, utilities, railroads, petroleum companies, and financial institutions.

- Short-haul FS frequencies in the 36-51.4 GHz band are used for private LAN-to-LAN interconnection, surveillance, and other related applications. These needs are demonstrated by the number of businesses and governmental entities already employing the frequencies for such services. More importantly, these services are essential building blocks for wireless network platforms. Such applications include local access, inter-cell links for mobile and wireless local loop networks, fiber connectivity, local TV distribution, broadband GII access, intelligent transport, SDH access, RLANs and ATM compatible transport.¹⁰

Demand for HDFS in the millimeter wave bands is increasing on an exponential basis to support wireless and other emerging technologies.¹¹ These bands are populated by existing authorized operations that represent a highly successful new industry, which is providing essential local services in competition with entrenched service providers.

Unfortunately, available spectrum to support these services is decreasing because of an ever-increasing requirement for sharing to accommodate FSS and other services. In particular, use of all HDFS frequencies in the 36-51.4 GHz band is being jeopardized by a proliferation of proposed satellite-based systems that uniformly are incompatible with the current and future terrestrial usage of this band. Permitting such service degradation would totally contravene well-established Commission policy of safeguarding incumbents from harmful interference:

Protection from interference is a fundamental Commission function that must be considered when introducing new technologies into spectrum allocations currently in use.¹²

Because high-density deployment results from inherent technical factors, FS, in the millimeter wave bands, characteristically are high density. Any lesser use of these bands would

¹⁰See CPM Report at §7.5.2.3 and Table 7.2.

¹¹ART Petition at 4-5; WinStar Petition at 2-3.

¹²Advanced Television Systems and Their Impact Upon the Existing Broadcast Service, 11 FCC Rcd 6235, 6254 (1996).

be technically and economically inefficient. The technical characteristics of these bands dictate the multiple link, short-hop configuration of the HDFS network architecture. No alternative exists for HDFS if NGSO/FSS users are permitted to continue usurping the millimeter wave bands. Thus, HDFS development will be retarded if FS/FSS co-frequency sharing is implemented.

Neither Motorola Satellite, nor any of the other FSS "pretenders" attempting to invade this band, have proffered a compelling reason for disrupting existing, viable 38 GHz Band operations or tangible future HDFS uses. Indeed, contrary to Motorola Satellite's claim,¹³ the FSS industry has failed completely to prove that it needs the spectrum requested in the 37-40 GHz band or that it is committed to constructing the proposed systems.¹⁴

In its Reply, Motorola Satellite criticizes FS users by admonishing the Commission to "expect more of its licensees, otherwise the first-come, first-served attitude exhibited by the FS

¹³Motorola Satellite Reply at 5.

¹⁴Motorola Satellite's failure to demonstrate need for its M-Star System also is documented by other FSS users and by FS users. See GE Americom Petition at 2; WinStar Petition at 4-5. The simple fact that 14 different satellite companies are all proposing to offer competing FSS in 1.25 GHz of spectrum in the Ka-band (which is less than half of what Motorola Satellite seeks in the 36-51.4 GHz band), raises serious questions concerning requests for even additional spectrum. If so many carriers could provide FSS in the relatively limited amount of spectrum available at 18/28 GHz, there is no discernable reason why additional spectrum is needed in the 36-51.4 GHz band. It is exactly this approach by FSS users that necessitates better spectrum management. The Section has serious doubts concerning the apparent need that Motorola Satellite and other FSS operators have to bulldoze and paralyze the millimeter wave bands. Numerous press reports indicate that, contrary to this rush for licensing, FSS operators have been slow in committing to build their recently authorized Ka-band satellites. "[I]f these [Ka-band FSS] organizations do not have a proper explanation of how the satellites will be funded - why bother with them?" Telcom Highlights International, Nov. 15, 1995, p.18. See also Communications Daily, Aug. 28, 1997, p.3 ("[FSS] operators slow to commit to building Ka-band satellites").

petitioners here will foreclose the band from any use by other services with co-primary rights."¹⁵ In view of the FSS industry's unrelenting threat to established FS users, Motorola Satellite and its peers instead would be well-served to heed their own advice. This threat to FS users in the millimeter wave bands clearly is not speculative. Despite their spectrum warehousing in the Ka-band, numerous FSS users now are seeking authority in the bands above 36 GHz.¹⁶

MOTOROLA SATELLITE LACKS THE LEGAL QUALIFICATIONS TO BE GRANTED A LICENSE FOR THE M-STAR SYSTEM

In its Petition to Deny, the Section urged the Commission to reject the Application because the 37.5-38.5 GHz, 40.5-41.5 GHz and 48.2-50.2 GHz bands proposed for the M-Star System had not been designated domestically for FSS and, due to the lack of consensus regarding the 36-51.4 GHz band,¹⁷ because there was no reason to believe that such a designation ever would be made.

Indeed, as detailed below, based upon the record of the Band Segmentation NPRM, there is no certainty that the proposed designation would, in fact, ever be adopted. Thus, it clearly is premature for Motorola Satellite to seek authority for operating FSS downlinks, in the 37.5-38.5 GHz band, as part of its M-Star System.

* * * * *

¹⁵Motorola Satellite Reply at 19.

¹⁶See TR Daily, Sept. 26, 1997, which reports that six (6) new applications have been filed for a total of nine (9) FSS applicants in the millimeter wave bands.

¹⁷Allocation and Designation of Spectrum for Fixed-Satellite Services in the 37.5-38.5 GHz, 40.5-41.5 GHz, and 48.2-50.2 GHz Frequency Bands; Allocation of Spectrum to Upgrade Fixed and Mobile Allocations in the 40.5-42.5 GHz Frequency Band, Allocation of Spectrum in the 46.9-47.0 GHz Frequency Band for Wireless Services; and Allocation of Spectrum in the 37.0-38.0 GHz and 40.0-40.5 GHz for Government Operations, Notice of Proposed Rulemaking, IB Docket No. 97-95, RM-8811 (FCC 97-85, released March 24, 1997) ("Band Segmentation NPRM") at ¶ 12.

Accommodating disparate FS and FSS needs in the 36-51.4 GHz band has not been, and based upon the record of the Band Segmentation NPRM, clearly will not be, an easy task. The FSS interests, including Motorola Satellite, without justification, claim that the Commission has not proposed allocating adequate spectrum to meet their needs. The FS interests demonstrate that the amount and location of the spectrum requested by the FSS interests [are] unjustified. Complicating resolution of this process is the fact that, as part of the Band Segmentation NPRM, TIA and several FSS providers submitted proposed band plans that differ from the Commission's proposed band plan and, not surprisingly, differ from each other's plans.

* * * * *

Under those unsettled circumstances, a grant of the Application, as proposed, is inimical to the public interest. Thus, the Commission has no choice but to deny the Application in part so that the M-Star System would not share bands with FS users.¹⁸

GE Americom (a FSS licensee), ART and WinStar also petitioned the Commission to deny the Application because it conflicts with existing and proposed band plans.¹⁹

Motorola Satellite argues that this lack of a designated frequency band for its proposed service is a minor inconvenience and is not disqualifying. It claims that the Application should not be denied because the "Commission routinely accepts and processes satellite applications that are not in conformance with its rules or are the subject of pending rulemaking proposals."²⁰ Motorola Satellite also states that "[a]ny licensees [sic] granted would be subject to existing Part 25 satellite rules, as well as any specific technical and operational rules that the Commission might later adopt for satellite use in the bands."²¹

¹⁸Section Petition at 4-5 (footnotes omitted).

¹⁹GE Americom Petition at 2; ART Petition at 2; WinStar Petition at 4-5.

²⁰Motorola Satellite Reply at 7 (footnote omitted).

²¹Motorola Satellite Reply at 14.

As discussed below, Motorola Satellite's claims are totally without merit and the decisions it cites to support these claims are inapplicable. Until Motorola Satellite proves that it is technically and legally qualified, the Application is defective and must be dismissed.²²

To support its argument that denial of the Application is premature because the proposed M-Star System always could be amended, Motorola Satellite relies extensively upon the Commission's Ka-band decision.²³ Such reliance is misplaced because this decision instead supports the Section's showing that the Application should be dismissed. In the First Ka-Band Order, unlike Motorola Satellite's proposal in the Application, no frequency assignment authorizations ever were issued for FSS in the Ka-band on a co-primary basis (except for feeder link spectrum). Rather, Ka-band slot assignments and final system authorizations were issued only after FSS/FS segmentation had been finalized. The only open issue when these licenses

²²It is, of course, true that the Commission often allows parties to file satellite applications before specific licensing and operation rules have been developed, and allows such parties to amend their applications once rules are adopted. Motorola Satellite neglects to mention, however, that the Commission's rules also authorize the agency to dismiss defective applications. See 47 C.F.R. §25.112 and M-Star Public Notice at 4. Motorola Satellite's position seems to be that "the sky's the limit" in terms of what satellite applicants may file, since they always can amend their applications later. This is obviously a self-serving formula for abusing the Commission's scarce resources. To preserve the meaning of Section 25.112, the Commission should summarily reject Motorola Satellite's argument. See also Amendment of Section 2.106 of the Commission's Rules to Allocate 1610-1626.5 MHz and the 2483.5-2500 MHz Bands for Use by the Mobile-Satellite Service, Including Non-geostationary Satellites, Notice of Proposed Rulemaking and Tentative Decision, 7 FCC Rcd 6414, 6416 n.15 (1992) ("MSS Decision") (Commission dismissed a satellite applicant's proposal because it would result in interference to incumbent aeronautical telemetering users).

²³Motorola Satellite Reply at 15. In the Ka-band decision, the Commission designated the 28 GHz band for various FS and FSS uses. 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 and Suite 12 Group Petition for Pioneer's Preference, Third Notice of Proposed Rulemaking and Supplemental Tentative Decision, 11 FCC Rcd 53 (1995) ("First Ka-Band Order").

were granted was intra-service NGSO/GSO sharing, not the more problematic FSS/FS inter-service sharing, which is the case with the millimeter wave bands.

The Commission does not grant licenses conditioned on future spectrum allocation or designation proceedings, such as the Band Segmentation NPRM. All it will do is process an application and permit the applicant, not the licensee, to conform the proposal to future spectrum or rule changes.²⁴

Motorola Satellite's promise to conform the Application to ultimately adopted spectrum designations and operating rules is built on a "house of cards." It even acknowledges the uncertainty by stating that "it is yet unclear whether and how the Commission will segment the bands ultimately designated in the U.S. between the FSS and FS."²⁵ Given the uncertainty over when and how the Band Segmentation NPRM will be resolved, there is absolutely no legal

²⁴Motorola Satellite cites numerous other cases for the proposition that it can be granted a conditional license. However, Motorola Satellite's statements are incorrect and its reliance on these decisions is misleading. See MSS Decision, 7 FCC Rcd at 6414 (the Commission did not grant any licenses and there is no mention of "pending applications" as Motorola Satellite suggests; rather, there were Petitions for Rulemaking requesting allocations of spectrum and Requests for Pioneer Preference); Assignment of Orbital Locations to Space Stations in the Ka-Band, Order, 11 FCC Rcd 13737 (1996) (the Commission expressly said that it was assigning orbital locations for the international portion of the systems "until the domestic rules are adopted, and orbital locations in the domestic arc are assigned"); Application of Comm. Inc. for Authority to Construct, Launch, and Operate a Ka-Band Satellite System in the Fixed-Satellite Service, Order and Authorization, DA 97-968 (rel. May 9, 1997) (Motorola Satellite fails to mention that the spectrum already had been allocated for this service and only operational and service rules had yet to be put into place); Teledesic, 12 FCC Rcd at 3157-58 (Teledesic's license was granted subject to compliance with future technical and service rules to be issued in the near future, but the spectrum already had been allocated for this service); Amendment of the Commission's Rules to Establish Rules and Policies Pertaining to a Mobile Satellite Service in the 1610-1626.5/2483.5-2500 MHz Frequency Bands, Report and Order, 9 FCC Rcd 5936, 5942-43, 61 (1994) (stating that Big LEO MSS applicants filing by the cut-off date were permitted to amend their applications to bring them into conformance with requirements and policies adopted at a later date, but the spectrum for MSS already had been allocated both domestically and internationally and only service rules were yet to be established).

²⁵Motorola Satellite Reply at 6 (emphasis added).

foundation for grant of the Application. Nor has Motorola Satellite provided any indication that, once the band plan is adopted, the Application actually could be conformed. Absent such a showing, the Commission has no choice but to reject the Application.²⁶

**THE RECORD PROVES THAT MOTOROLA SATELLITE IS NOT
TECHNICALLY QUALIFIED TO BE LICENSED FOR THE M-STAR SYSTEM**

An applicant, such as Motorola Satellite, must prove that it is technically qualified to be licensed as the operator of a FSS system.²⁷ To demonstrate its technical qualifications, the applicant must prove, *inter alia*, that its proposed operation complies with the requirements prescribed in Subpart C, Part 25, of the Commission's Rules.²⁸ In addition, since the Motorola Satellite proposal involves co-primary FS/FSS operations, it must comply with the coordination requirements for such inter-service operations prescribed in applicable Commission decisions.²⁹

In its Petition to Deny, the Section identifies why the Application is technically flawed:

- Motorola Satellite's reliance on the power flux density ("pfd") limits in Section 25.208(c) of the Commission's Rules and in ITU RR S21.16 (Article S21) technically would be unworkable and would increase significantly the potential for harmful interference to FS operations, and thus is invalid.

²⁶Alternatively, the Commission could require that Motorola Satellite amend its application so that it would not operate in FS bands. If this change were to be made, the technical and legal qualification issues raised herein would be moot.

²⁷47 U.S.C. §308(b) (1997); 47 C.F.R. §25.156 (1997).

²⁸47 C.F.R. §§25.201 *et seq.* (1997).

²⁹Rulemaking 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, First Report and Order and Fourth Notice of Proposed Rulemaking, 11 FCC Rcd 19005, 19037-38 (1996) ("Second Ka-Band Order").

- Motorola Satellite's proposed requirement, that FS users employ ATPC and Part 25 coordination criteria to protect its earth stations from FS operations, is invalid.³⁰

The record of this proceeding completely supports the Section's showing that FS and FSS users cannot share the millimeter wave bands proposed in the Application and that Motorola Satellite consequently is technically disqualified to be a Commission licensee of the M-Star System.³¹ To document this fatal flaw, all the Commission needs to do is review Motorola Satellite's own words. While Motorola Satellite still clings to its oft-repeated claim that "co-frequency sharing is possible,"³² it nonetheless declares that:

designation of High Density Fixed Service (HDFS) frequencies may seriously impact, if not preclude entirely, FSS use of bands ultimately designated for HDFS use.³³

In other words, Motorola Satellite admits that it cannot share with most FS bands above 17 GHz.

As explained in the CPM Report:

The types of radio-relay services that may be provided in FS frequency bands is determined largely by maximum usable hop lengths . . . As hop lengths become shorter and shorter and frequency reuse (i.e., potential deployment density) becomes correspondingly higher moving through the bands above 17 GHz, higher and higher density FS services become more technically practical.³⁴

³⁰Section Petition at 7-14.

³¹See GE Americom Petition at 3; HCI Comments at 3; WinStar Petition at 6-10; ART Petition at 10-11.

³²Motorola Satellite Reply at 17.

³³Motorola Satellite Reply at 11.

³⁴CPM Report at §7.5.2.

Independently of its application (Point-to-Point and/or Point-to-Multipoint) and because of simple, immutable principles of physics, any FS band above 17 GHz, and in particular above 30 GHz, is a HDFS band. It is interesting to note that, worldwide, the most popular of these unsharable HDFS bands today is the 38 GHz Band,³⁵ the same one where Motorola Satellite "believe[s] that co-frequency sharing is possible."³⁶

A. Motorola Satellite's Reliance on Part 25 Criteria is Invalid.

Motorola Satellite relies upon Part 25 criteria to demonstrate that harmful interference to FS facilities would not occur. The Section attacked this approach:

Motorola Satellite naively claims that FS operations would not be degraded by its FSS downlinks because the proposed use of the 37.5-40.5 GHz band "would conform to the power flux density limits of the International Radio Regulations applicable" thereto and to similar limits in Section 25.208(c) of the Commission's Rules. In fact, Section 25.208 does not contain any power flux density ("pfd") requirements specifically for the 37-40 GHz band, and serious questions exist whether the values prescribed therein for the lower frequency bands would be applicable to the higher elevation operations in the 37-40 GHz band.

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³⁵CPM Report at §7.5.2.3; ("[t]he vast majority of current worldwide HDFS deployment are in the 38 GHz [b]and . . .").

³⁶In its Reply, Motorola Satellite tells the Commission to "carefully scrutinize its underlay proposal" because this concept is proof "that there is some means for both FS and FSS to operate in these bands on a co-primary basis." Motorola Satellite Reply at 19 and 20. Just a few months ago, however, Motorola Satellite and GE Americom declared that sharing with FS underlay systems only would be acceptable to FSS operators if the proposed FS underlay systems would have a secondary status. Comments on Band Segmentation NPRM by Motorola at 17 and by GE Americom at 7. Unlike these FSS operators, the Section, at the time, had tried to remain open to the new concept. The Section had maintained that, while it could not have helped with existing and planned FS systems, the FS underlay concept might have been exploited in the future by yet to be developed FS in-building technologies and applications. Comments on Band Segmentation NPRM by the Section at 17-18.

The only other interference protection given FS users is prescribed in Section 25.251 of the Commission's Rules. Unfortunately, these limits were established decades ago when FS users only employed analog radios. All 37-40 GHz band radios are now digital. Consequently, the anachronistic Part 25 limits underestimate applicable protection requirements by up to 20 dB. Thus, contrary to Motorola Satellite's assertion, no definitive Part 25 limits exist regarding the pfd necessary to protect FS users.³⁷

Furthermore, Motorola Satellite incorrectly ignores its obligation to use Part 101 protection criteria:

GSO/FSS, NGSO/MSS feeder links and NGSO/FSS systems are all fixed satellite services. Under current rules, such services share band[s] with fixed services on a coequal basis. Current rules require coordination of these services pursuant to the requirements in Section 25.130(b) of the rules, and under the procedures outlined in Section 101.103 of the Rules.³⁸

Other petitioners agree with the Section. In its Petition to Deny, ART states:

Motorola also dismisses the possibility of M-Star satellite interference into FS facilities by stating that M-Star will meet the PFD limits of Section 25.208(c) of the Rules and ITU Radio Regulation S21.16 (Article 21). Yet Section 25.208(c) does not contain PFD requirements for 37-40 GHz band systems. Moreover, the Application utterly fails to consider Part 101 coordination or interference protection criteria.³⁹

Given the high-density deployments characteristic of the millimeter wave bands, this inability to properly coordinate between FS and NGSO/FSS systems would have serious, negative repercussions both for the evolving HDFS industry and for the FSS industry:

It has been suggested that the FS-into-FSS-ground-station interference could be cured by the geographic separation and frequency coordination of the FS and FSS ground sites. Frequency coordination, however, would be

³⁷Section Petition at 9 (footnotes omitted).

³⁸Second Ka-Band Order, 11 FCC Rcd at 19037-38 (footnotes omitted).

³⁹ART Petition at 12 (citations and footnote omitted).

extremely difficult, expensive and time-consuming, in light of the high-density deployments being increasingly experienced in FS. Under such a scenario, the ability for rapid, cost effective deployment would suffer a catastrophic blow, eviscerating the essence of the FCC's geographic licensing plan for the 38 GHz FS industry.

* * * * *

[T]he key to the success of the broadband FS industry at 38 GHz is the ability to rapidly and economically deploy its service on demand. Self-coordination by 38 GHz FS licensees is the greatest single factor making this possible. Indeed, self-coordination is the essence of the FCC's geographic licensing plan for 38 GHz FS. The advent of spectrum sharing with high-density satellite deployments would undermine the FCC's licensing plan and remove the benefits gained from self-coordination.⁴⁰

Similarly, WinStar, in its Petition to Deny, demonstrates why Motorola Satellite's claimed ability to coordinate with co-primary FS users merely is a "red herring" and should be ignored completely:

Coordination, however, is not practicable given Motorola's statement that coordination "may not be possible" in those areas "where both terrestrial [services] and M-Star stations are expected to have a high density of use." Given that both services are designed to be ubiquitous (i.e., high density uses) -- coordination will not be possible.⁴¹

Specifically, WinStar identifies why coordination will not work:

[T]he results demonstrate that sharing between FS systems and the M-Star network on a co-frequency, co-primary basis without the need to coordinate, is not viable because of the high level of interference expected to be encountered. Coordination distances will normally be in the range of tens of kilometers, although the local topography will have some impact. Since the FS networks in the 38.6-40.0 GHz band are already well established and providing service to a large number of customers, and higher capacity advanced systems are under development, it is recommended that M-Star not be authorized to use this portion of the

⁴⁰ART Petition at 12-13.

⁴¹WinStar Petition at 9.

frequency band. Having to coordinate at such close distances will cause considerable dislocation to both services. Segmenting the frequency band provides the optimum opportunity for both the FS systems and the satellite based networks to maximize their potential for meeting customer requirements.⁴²

Even Motorola Satellite concedes that its Application is based upon inappropriate pfd limits and coordination values:

Motorola [Satellite] agrees with [the Section] that these pfd limits and coordination values are not suitable to operations in the millimeter wave bands. The Commission has indicated that it will establish rules for technical operation in these bands at a later date. At that time, Motorola [Satellite] will amend its application or modify its license to reflect these new standards.⁴³

Motorola Satellite's commitment, to conform its M-Star System to whatever new standards are adopted, is an empty promise. It is unlikely that pfd limits facilitating FS/FSS sharing in the millimeter wave bands can be defined because any changes needed to protect FS users would negatively impact FSS operation. Increasing pfd limits to a sufficient level so that FS operations would be protected should render FSS users unable to provide the level of service necessary to meet the availability requirements of the customers they seek to serve. For this reason, it is highly unlikely that adjusting pfd limits is a viable approach to FS/FSS sharing. Even if pfd limits and service objectives are sufficiently developed, Motorola Satellite makes no showing that its proposed M-Star System design is flexible enough to accommodate such changes. These hurdles make it highly unlikely that Motorola Satellite could make good on its "commitment" to

⁴²WinStar Petition, Appendix A at 1.

⁴³Motorola Satellite Reply at 18 (footnotes omitted).

conform the M-Star System if and when the Commission finalizes the millimeter band plan and adopts corollary operating rules.

B. Motorola Satellite's Reliance Upon ATPC and FS Power Increase Limitations Is Invalid.

Motorola Satellite recommends that, if coordination procedures are unsuccessful, a 1 kilometer separation requirement should be established and FS users should employ ATPC and reduced power output.⁴⁴ Although these proposed "solutions" to the sharing problem universally have been rejected, Motorola Satellite inexplicably persists in beating its head on a "virtual stone wall in repeated efforts" to foist a clearly unworkable solution on the Commission and the public.⁴⁵

Reliance upon ATPC is totally misplaced. As ART details in its Petition to Deny:

Equipment manufacturers confirm that power-controlled equipment does not now exist, and thus the installed FS base equipment does not employ power control. To the degree dynamic controls could be made available, they would be expensive and difficult to install and operate, again undermining the key competitive strength of the 38 GHz FS industry. The application of [ATPC] would require a drastic redesign of the fixed service in the 38 GHz band - even the existing deployed systems. Such a solution, at least as has been advanced by Motorola [Satellite], would require a new FS EIRP density limit approximately 44 dB below current operating levels, and would rely heavily on the use of FS ATPC at levels of between about 40-50 dB.

* * * * *

Moreover, TIA/EIA Telecommunications System Bulletin TSB10-F (TIA Bulletin 10) specifically states that further study of the use of ATPC above 12 GHz is warranted and that, regardless of this need for study, serious problems with the use of ATPC in these bands exist. Additionally, the

⁴⁴Application at 71.

⁴⁵Motorola Satellite Reply at 19.

National Spectrum Managers Association has recommended against the use of ATPC in bands above 30 GHz.

* * * * *

All of these modifications would add failure points to FS systems that would reduce rather than increase mean-time between failures. It should be made clear that the equipment in use today has proven to be highly reliable in the field. In practice, the predominant system availability limiting factor is rain attenuation, which can be readily dealt with by careful attention to path length in the deployment process. The use of ATPC would do nothing to improve the reliability of FS implementations, but could, in fact, degrade them in several key performance and availability respects.

* * * * *

Furthermore, ATPC will not preclude interference from FS stations into FSS earth station receivers, nor will it play any substantial role in avoiding intraservice FS interference. In fact, the ATPC proposed by Motorola [Satellite] would likely increase intraservice and interservice interference as a result of uncorrelated rain fading events (*i.e.*, instances where the intended receiver is under rain conditions and victim receivers are not) into victim (unintended) FS receivers and victim FSS earth stations on the order of 50 dB above desired receive levels....⁴⁶

Use of ATPC also would make FS receivers more susceptible to harmful interference from FSS space station transmitters. This harmful interference would occur under virtually all operating conditions, as compared to the more limited potential for interference if ATPC is not deployed.

Not surprisingly, Motorola Satellite, in its Reply, does not address these basic problems with its sharing approach. This silence speaks loud and clear -- Motorola Satellite can not respond because there is uncontroverted evidence that its approach does not, and will not, work.

⁴⁶ART Petition at 15-16. Accord WinStar Petition at Appendix A; Section Petition at 12-14. See also AHMW Report at 3.1.1; Band Segmentation NPRM at ¶ 8.

C. Motorola Satellite's Efforts At Achieving Band Sharing Are Self-Serving and Unproductive.

In its Reply, Motorola Satellite complains that its efforts at working out sharing solutions with the FS industry repeatedly have been blocked. Prompted by its "frustration," Motorola Satellite takes the FS industry to task:

Efficient spectrum management principles mandate that all licensees work closely to ensure that maximum use is made of any particular frequency band. It is not enough for a co-primary licensee to assert a de facto claim to exclusive use of a band without making a good faith effort to resolve interference concerns.

* * * * *

The FS industry must be willing to compromise on sharing where bands are allocated on a co-primary basis. Motorola still believes that sharing is possible on either a coordinated or uncoordinated basis.⁴⁷

It is time that this sad refrain be silenced. First, Motorola Satellite is highly disingenuous when it claims sharing between NGSO/FSS and HDFS in the millimeter wave bands is appropriate. In fact, Motorola Satellite has advocated segmentation for these bands in the context of WRC-97 preparations,⁴⁸ and has stated, in the Reply, that such sharing is highly unlikely.⁴⁹ Second, Motorola Satellite's criticism of the FS industry is totally misplaced. Motorola Satellite consistently has refused to acknowledge the legitimate and comprehensive analyses presented by

⁴⁷Motorola Satellite Reply at 19 (footnote omitted).

⁴⁸AHMW Report at 3.0 and 4.0.

⁴⁹Motorola Satellite Reply at 11.

the FS industry that fairly evaluate its proposed sharing "solutions" and unambiguously prove their impracticality.⁵⁰

CONCLUSION

A prima facie question exists whether Motorola Satellite has the technical or legal qualifications to be the licensee of the M-Star System. Consequently, under Section 309 of the Act and Section 25.156 of its Rules, the Commission must deny the Application with respect to Motorola Satellite's proposed operations in bands designated for FS systems.

Motorola Satellite is not technically qualified because no proof exists in the record, or in any other proceeding, that FS users and Motorola Satellite's NGSO/FSS could share the band. It is not legally qualified because no proof exists that the 37-40 GHz band proposed for its downlink service ever will be designated domestically.

Protection of their constantly eroding spectrum is of paramount importance to FS users. And it should be for the Commission as well. Essential public services and new technologies will be lost if FSS users are permitted to continue their unabated assault on FS spectrum. Denial of the Application will send a strong signal that FS users must be protected and that FSS users must

⁵⁰For example, the Section repeatedly has attempted to meet and negotiate a resolution of the sharing and related problems in the millimeter wave bands with FSS interests. Not unexpectedly, the FSS interests categorically have rejected all these overtures.

clearly demonstrate that their proposed operations are necessary and will provide adequate safeguards for co-primary users.

Respectfully submitted,

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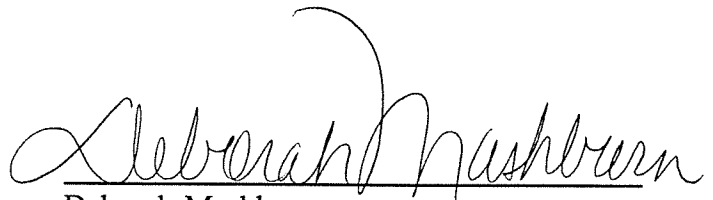
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