

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

In the matter of

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|--|---|----------------------|
|  | ) |                      |
| Rulemaking to Amend Parts 1, 2, 21, and 25     | ) | CC Docket No. 92-297 |
| 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                                       | ) |                      |

**MEMORANDUM OPINION AND ORDER**

**Adopted: May 16, 2001**

**Released: May 25, 2001**

By the Commission

**Introduction**

1. This order disposes of petitions for clarification or reconsideration of the *First Report and Order* in this proceeding, in which the Commission adopted a band-segmentation plan for the Ka Band.<sup>1</sup> In response to requests from petitioners and other parties, we are amending Section 25.258 of the Commission's rules to eliminate one requirement and clarify provisions concerning inter-system coordination in the 29.25-29.5 GHz band.

**Background**

2. In the *First Report and Order* the Commission designated two adjacent frequency bands, 29.1-29.25 GHz and 29.25-29.5 GHz, for feeder uplinks for Mobile Satellite Service systems using non-geostationary-orbit satellites (*i.e.*, "NGSO/MSS" systems). The Commission also designated these bands for use by other services. Specifically, the 29.1-29.25 GHz band was designated for hub-to-subscriber transmission by Local Multipoint Distribution Service ("LMDS") systems<sup>2</sup> and the 29.25-29.5 GHz band for uplinks for Fixed Satellite Service systems using geostationary satellites (*i.e.*, "GSO/FSS" systems). The Commission adopted different rules for licensing and coordination of NGSO/MSS feeder uplinks in these two bands, tailored in light of the different sharing environments. Provisions pertaining specifically

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<sup>1</sup> *First Report and Order and Fourth Notice of Proposed Rulemaking*, 11 FCC Rcd 19,005 (1996). Consistently with usage in previous orders in this proceeding, we use the term "Ka Band" to denote the spectrum at 17.7-20.2 GHz, which is allocated for satellite-to-earth (*i.e.*, downlink) transmission and that at 27.5-30.0 GHz, which is allocated for earth-to-satellite (*i.e.*, uplink) transmission.

<sup>2</sup> LMDS is a high-capacity, broadband terrestrial wireless service with cellular architecture, linking subscribers' fixed terminals via hub transceivers in each cell. LMDS systems could be used for facilities-based competition with local exchange telephone carriers and cable-television providers or for a variety of interactive services, including broadband video on demand.

to authorization and inter-system coordination in the 29.25-29.5 GHz band are set forth in Section 25.258 of the Commission's rules, which states as follows:

- (a) Operators of NGSO MSS feeder link earth stations and GSO FSS earth stations in the band 29.25 to 29.5 GHz where both services have a co-primary allocation shall cooperate fully in order to coordinate their systems. During the coordination process both service operators shall exchange the necessary technical parameters required for coordination.
- (b) Licensed GSO FSS systems shall, to the maximum extent possible, operate with frequency/polarization selections, in the vicinity of operational or planned NGSO MSS feeder link earth station complexes, that will minimize instances of unacceptable interference to the GSO FSS space stations.
- (c) NGSO MSS satellites operating in this frequency band shall compensate for nodal regression due to the oblate shape of the Earth, and thus maintain constant successive sub-satellite ground tracks on the surface of the Earth.
- (d) NGSO MSS systems applying to use the 29.25 - 29.5 GHz band, for feeder link earth station uplink, will have to demonstrate that their system can share with the authorized U.S. GSO/FSS systems operating in this band.<sup>3</sup>

### Discussion

#### Deletion of Repeating-Groundtracks Requirement

3. In a "Petition for Partial Reconsideration" of the *First Report and Order*, Motorola Satellite Communications, Inc. asks for deletion of Subsection 25.258(c), the provision that limits eligibility for NGSO/MSS feeder uplink assignments in the 29.25-29.5 GHz band to systems with "constant successive sub-satellite ground tracks" – *i.e.*, NGSO/MSS systems whose satellites retrace the same path over the earth's surface. At the time of filing, Motorola, which held the space-station license for the "Iridium" Big LEO system, was one of two NGSO/MSS licensees that had applied for Ka-Band feeder-uplink assignments.<sup>4</sup>

4. Motorola argues that the repeating-ground-track requirement should be eliminated because it severely constrains NGSO/MSS system design, is unnecessary for coordination with GSO/FSS systems, and was adopted without prior notice required by law. According to Motorola's calculations, NGSO satellites must be placed at one of certain specific orbit altitudes in order to meet the requirement, and all

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<sup>3</sup> 47 C.F.R. § 25.258. Further provisions relevant to coordination between GSO and NGSO uplinks in the 29.25-29.5 GHz band are set forth in 47 C.F.R. § 25.203(h) and (k).

<sup>4</sup> The Iridium earth-station licenses were granted to corporations affiliated with Motorola Satellite Communications, Inc. For the sake of simplicity, in this order we refer indiscriminately to Motorola Satellite Communications, Inc. and/or its parent and sister corporations as "Motorola."

but seven of those altitudes are useless for communications satellites because they lie within the Van Allen radiation belt. Motorola points out that the Report of the Conference Preparatory Meeting for the 1995 World Radiocommunication Conference (“CPM-95”) concluded that if the number of satellites involved is large it would be difficult to derive any coordination advantage from placing NGSO satellites in repeating-ground-track orbits and that use of such a design would multiply the frequency of interference events involving earth stations positioned in non-protected areas.<sup>5</sup> Motorola contends that interference mitigation predicated on repeating ground tracks is not a feasible means of coordinating more than one NGSO/MSS system for operation in the 29.25-29.5 GHz band and hence that the requirement makes that spectrum unusable for more than one NGSO/MSS system.

5. Motorola also seeks clarification regarding a statement in the *First Report and Order* that “Motorola will be limited to operating [Iridium] feeder [up]links within ... [the 29.1-29.25 GHz] band, since Motorola indicates [Iridium] will be unable to share with GSO/FSS systems in the adjoining [29.25-29.5 GHz] band.”<sup>6</sup> Motorola fears that this statement might be construed to mean that Iridium will never be allowed to operate in the 29.25-29.5 GHz band under any circumstances. While conceding that it may not be possible to coordinate use of the 29.25-29.5 GHz band for Iridium feeder links with currently-proposed GSO/FSS uplinks from earth stations in the United States, Motorola asserts that such coordination is possible with respect to uplink operation in other countries. Motorola surmises, moreover, that techniques might be developed in the future that would enable Iridium to share the 29.25-29.5 GHz uplink band with GSO/FSS systems for domestic operation, as well. Therefore, Motorola asks the Commission to resolve any doubt in this regard by declaring that the Iridium licensee could obtain authority for feeder-link operation in 29.25-29.5 GHz if it were to demonstrate that such operation could be conducted compatibly with GSO/FSS operation in that band.

6. AT&T Corporation, Lockheed Martin Corporation, GE American Communications, Inc. (“GE”), and Hughes Communications Galaxy, Inc. (“Hughes”), all of which had previously filed license applications for GSO/FSS systems, filed comments in opposition to Motorola’s petition. Hughes argues that the repeating-ground-track requirement should be retained because adjusting orbital parameters so that NGSO/MSS satellites trace constant ground tracks is an important technique for facilitating coordination with GSO/FSS systems. Hughes and Lockheed Martin assert that the Commission predicated its adoption of the pertinent rules on a compromise proposal endorsed by all the interested parties, including Motorola, and that one of the main principles they agreed upon was that the 29.25-29.5 GHz uplink band should be reserved for GSO/FSS systems to share only with NGSO/FSS systems that can be coordinated with co-frequency GSO/FSS operation. Hughes, Lockheed Martin, and AT&T contend that it has been amply shown by documents of record, including a study submitted by Motorola, that Iridium feeder uplinks cannot be coordinated with co-frequency GSO/FSS uplinks.

7. We conclude that the repeating-ground-track requirement should be eliminated. While operation with repeating ground tracks could facilitate coordination under some circumstances, none of the parties has established that an NGSO/MSS system *must* operate with repeating ground tracks for coordination with GSO/FSS systems to be feasible. On the contrary, Lockheed Martin indicates that the crucial factors are the designed orbital altitude of the NGSO/MSS satellites and the number and location of

<sup>5</sup> *ITU-R/CPM-95, Conference Preparatory Meeting, Report to WRC-95* ¶3.1.7.

<sup>6</sup> *First Report and Order* at ¶63.

an NGSO/MSS system's planned feeder-link earth stations.<sup>7</sup> Furthermore, TRW asserts that it successfully coordinated its proposed NGSO/MSS system with the GSO/FSS applicants regarding sharing in the 29.25-29.5 GHz band without relying on repeating ground tracks.<sup>8</sup> As we have no grounds for finding that operation with repeating ground tracks is indispensable for coordinated sharing of the 29.25-29.5 GHz uplink band, we will not require NGSO/MSS applicants to propose operation with repeating ground tracks in order to be eligible for an uplink assignment in that band. However, any applicant for an NGSO/MSS uplink assignment in the 29.25-29.5 GHz band will have to comply with the provisions pertaining to coordination in Subsections 25.203(h) and 25.203(k).<sup>9</sup> Such an applicant must also demonstrate that coordination with authorized GSO/FSS operation in that band is feasible, as required by the final paragraph of Section 25.258.

8. To address Motorola's request for clarification concerning the possibility of future Iridium operation in the 29.25-29.5 GHz band: if the Iridium licensee were to apply for authority to operate in that band we would assess associated coordination showings submitted pursuant to the pertinent requirements of Sections 25.203 and 25.258 on their merits.

#### Other Requests for Amendment of Section 25.258

9. *Geographic separation.* Lockheed Martin proposes that Subsection 25.258(b) be amended by inserting the text indicated here by underlining:

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<sup>7</sup> *Consolidated Comments of Lockheed Martin Corporation* at p.10 (filed Oct. 21, 1996.)

<sup>8</sup> TRW included these comments on point in a pleading filed in response to Motorola's petition for reconsideration:

[T]he prospect for successful sharing between NGSO/MSS feeder link networks of the design of Odyssey and GSO/FSS networks in the band 29.25-29.5 GHz is not dependent on TRW's maintenance of constant successive ground tracks for Odyssey. The frequency with which Odyssey satellites will cross through the geostationary [satellite orbital] arc is unaffected by the use of this feature. Coherent orbits simply have the effect of regularizing the intersections; they have no impact whatsoever on the ability of GSO/FSS operators to employ modest coordination measures (already agreed to and incorporated into the Commission's *First Report and Order* and associated new rules) to permit full operation of both types of system even in cases where there are orbit intersections at occupied GSO/FSS positions.

Our staff's evaluation of evidence of record pertaining to the coordination principles that TRW and the GSO/FSS applicants agreed upon bears out TRW's assertion that the coordination did not depend on maintenance of repeating ground tracks.

<sup>9</sup> Subsection 25.203(h) requires any applicant for an earth-station license authorizing operation in a frequency band allocated on a co-primary basis for NGSO and GSO uplinks to select a site, or sites, where mainlobe-to-mainlobe coupling will not occur with respect to satellites of other systems and to pre-coordinate the proposed site and spectrum use with existing earth-station licensees and applicants. Subsection 25.203(k) requires an applicant for an earth-station license in a band designated for sharing by GSO and NGSO systems to show that the proposed operation will not cause unacceptable interference to any satellite system licensed for operation in the same band or else certify that the proposed operation would comport with established coordination agreements with the licensees of the affected satellite systems.

(b) Licensed GSO FSS systems shall, to the maximum extent possible, operate with frequency/polarization selections, in the vicinity of operational or planned NGSO MSS feeder link earth station complexes, or alternatively GSO FSS and NGSO MSS systems shall operate with geometric separation to provide uplink beam isolation, that will minimize instances of unacceptable interference ....

Lockheed Martin contends that the rule should be amended in this way because geographic separation of earth stations might be a more feasible means of uplink coordination for some GSO/FSS systems than frequency and/or polarity selection. In particular, Lockheed Martin asserts that the uplink transmission of its proposed Astrolink GSO/FSS system could be coordinated with some types of NGSO/MSS feeder-link operation by this means alone. Lockheed Martin would prefer to coordinate by geographic separation, rather than by frequency or polarity selection, because that would allow Astrolink gateway stations to make use of the entire 29.25-29.5 GHz band in both polarities.

10. TRW and Hughes filed comments on this amendment proposal. TRW agrees that coordination through geographic separation should be a permissible alternative but objects to the wording of Lockheed Martin's proposed amendment because it implies that an affected NGSO/MSS licensee would bear equal responsibility for achieving geographic separation with respect to the earth stations of a GSO/FSS licensee preferring this coordination technique. TRW maintains that the burden of coordinating through geographic separation should be borne primarily by GSO/FSS licensees. The reason for allocating the responsibility in that way, according to TRW, is that siting options for Ka-Band NGSO/MSS feeder-link earth stations are already severely constrained by rule provisions adopted to enable NGSO/MSS systems to share 29.1-29.25 GHz uplink spectrum with each other and with LMDS systems.<sup>10</sup> Hughes opposes the amendment request. Hughes argues that there is no need to amend Section 25.258 to indicate that GSO/FSS and NGSO/MSS operation in the 29.25-29.5 GHz band may be coordinated through geographical separation, because the rule already permits that. Hughes also argues that the proposed amendment should be rejected because it would "codify" a coordination method that would not work for GSO/FSS systems linking with numerous widely-distributed earth stations.

11. We deny this request because the proposed amendment is, as Hughes contends, unnecessary. As presently written, Subsection 25.258(b) merely requires GSO/FSS earth stations *in the vicinity of* NGSO/MSS feeder link earth stations to be coordinated through frequency or polarity selection. GSO/FSS licensees need not coordinate the uplink frequencies or polarity of earth stations that are sufficiently separated by distance from NGSO/MSS feederlink stations that they can operate in the same channels with the same polarity without interfering with NGSO/MSS uplink reception. Thus, Subsection 25.258(b) does not preclude reliance on geographical separation for avoidance of interference.

12. "*Licensed*". Lockheed Martin contends that the word "Licensed" should be stricken from Subsection 25.258(b) because its use in that context might foster an impression that NGSO/MSS licensees need not coordinate sharing in the 29.25-29.5 GHz band with regard to GSO/FSS systems proposed in pending applications. We do not agree that there is any need for such an amendment. Lockheed Martin's concern is misplaced, as Subsection (b) merely prescribes a requirement for GSO/FSS licensees. In any event, merely deleting "Licensed" from Subsection (b) would not change the meaning of that provision.

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<sup>10</sup> See 47 C.F.R. §25.257.

13. *Unopposed amendment requests.* Hughes, TRW, and Lockheed Martin propose several minor changes to current Subsections (b) and (d) of Section 25.258 for purposes of clarification. In particular, they propose that (b) be amended to make it clear that interference is to be minimized with respect to both GSO FSS and NGSO MSS systems and that current Subsection (d) be amended to make it clear that the showing regarding sharing must be made with respect to previously-licensed systems that are not yet operational. These requests are unopposed. We agree that the proposed changes would usefully clarify those provisions and are amending the rule accordingly.

#### Limits on LMDS Operation

14. Texas Instruments (“TI”) seeks clarification regarding limitations on use of the 29.1-29.25 GHz frequency bands for LMDS. The Commission prohibited use of this band for LMDS subscriber-to-hub links, but indicated that the limitation might be reconsidered in the future based on evidence that sharing is feasible. TI seeks clarification regarding the process that would be used to reach a determination in this regard and the FCC’s role in that process. We see no reason to prescribe a specific process for making such a determination at this time. Any such determination would be made based on current technical information, market conditions, and other factors that may be relevant to the public interest. TI’s other request, concerning clarification of requirements that might be applicable to fixed service leasing of LMDS spectrum, is being addressed separately.<sup>11</sup>

#### **Final Regulatory Flexibility Certification**

15. The Regulatory Flexibility Act of 1980, as amended (“RFA”)<sup>12</sup> requires that a regulatory flexibility analysis be prepared for rulemaking proceedings, unless the agency certifies that “the rule will not have a significant economic impact on a substantial number of small entities.”<sup>13</sup> The RFA generally defines “small entity” as having the same meaning as the terms “small business,” “small organization,” and “small governmental jurisdiction.”<sup>14</sup> In addition, the term “small business” has the same meaning as the term “small business concern” under the Small Business Act.<sup>15</sup> A small business concern is one which: (1)

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<sup>11</sup> See *Promoting Efficient Use of Spectrum Through Elimination of Barriers to the Development of Secondary Markets*, Notice of Proposed Rulemaking, WT Docket No. 00-230 (rel. Nov. 27, 2000), 2000 W.L. 1736657.

<sup>12</sup> The RFA, 5 U.S.C. § 601 *et seq.*, has been amended by the Contract With America Advancement Act of 1996, Pub. L. No. 104-121, 110 Stat. 847 (1996) (“CWAAA”). Title II of the CWAAA is the Small Business Regulatory Enforcement Fairness Act of 1996 (“SBREFA”).

<sup>13</sup> 5 U.S.C. § 605(b).

<sup>14</sup> 5 U.S.C. § 605(6).

<sup>15</sup> 5 U.S.C. § 601(3) (incorporating by reference the definition of “small business concern” in the Small Business Act, 15 U.S.C. § 632). Pursuant to 5 U.S.C. § 601(3), the statutory definition of a small business applies “unless an agency, after consulting with the Office of Advocacy of the Small Business Administration and after

is independently owned and operated; (2) is not dominant in its field of operation; and (3) satisfies any additional criteria established by the Small Business Administration (“SBA”).<sup>16</sup>

16. First, in this Memorandum Opinion and Order we eliminate a rule provision that barred use of the 29.25-29.5 GHz frequency band for transmission from earth stations to non-geostationary-orbit (i.e., “NGSO”) satellites that do not trace constant paths over the ground in successive orbits. Any applicant for a license for NGSO uplink transmission in that band is required by other provisions in the Commission’s rules to demonstrate that the proposed operation (1) would not interfere with authorized operation in that band by previously-licensed systems or (2) would be conducted in accordance with coordination agreements with the licensees of such systems. With these protective measures in place, we believe that the elimination of the restriction on use of the 29.25-29.5 GHz frequency band will not have a significant economic impact on any small entities. Second, this Memorandum Opinion and Order adopts minor revisions to other rule provisions to make it clear that: (1) the frequencies and polarity of transmission to GSO satellites in the 29.25-29.5 GHz band from fixed earth stations in the vicinity of NGSO feeder-link stations must be chosen to minimize interference with reception of uplink transmission to NGSO, as well as GSO, satellites and (2) applicants for authority to use the 29.25-29.5 GHz band for feeder uplinks must show that sharing is possible with other systems that have been previously-authorized to use that band, not just systems that are currently operational. These changes merely clarify the Commission’s pertinent intentions, rather than altering its policies and therefore impose no additional burden on any small entities. We therefore certify that the adoption of this Memorandum Opinion and Order will not have a significant economic impact on a substantial number of small entities. The Commission will send a copy of the Memorandum Opinion and Order, including a copy of this final certification, in a report to Congress pursuant to the Small Business Regulatory Enforcement Fairness Act of 1996.<sup>17</sup> In addition, the Memorandum Opinion and Order and this final certification will be sent to the Chief Counsel for Advocacy of the SBA and will be published in the Federal Register.

#### Ordering Clauses

17. Accordingly, IT IS ORDERED that the “Petition for Partial Reconsideration” filed by Motorola Satellite Communications, Inc. on September 27, 1996 IS GRANTED.

18. IT IS FURTHER ORDERED that the “Petition of TRW Inc. for Clarification and/or Partial Reconsideration of the First Report and Order” filed on September 24, 1996 IS GRANTED to the extent indicated herein and IS OTHERWISE DENIED and that the “Petition for Reconsideration of Texas Instruments, Inc.” filed on August 28, 1996 IS DENIED to the extent indicated herein.

19. IT IS FURTHER ORDERED that Section 25.258 of the Commission’s rules IS AMENDED as indicated in the appendix to this order, effective 30 days after publication in the Federal

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opportunity for public comment, establishes one or more definitions of such term which are appropriate to the activities of the agency and publishes such definition(s) in the Federal Register.”

<sup>16</sup> Small Business Act, 15 U.S.C. § 632.

<sup>17</sup> 5 U.S.C. § 801(a)(1)(A).

Register. This action is taken pursuant to 47 U.S.C. §§ 154(i) and 303(r).

20. IT IS FURTHER ORDERED that the Commission's Consumer Information Bureau, Reference Information Center, SHALL SEND a copy of this Memorandum Opinion and Order, including the Regulatory Flexibility Certification, to the Chief Counsel for Advocacy of the Small Business Administration.

FEDERAL COMMUNICATIONS COMMISSION

Magalie Roman Salas  
Secretary



**APPENDIX**

For the reasons discussed above, the Federal Communications Commission amends 47 C.F.R. Part 25 as follows:

**Part 25 – Satellite Communications**

1. The authority citation for part 25 continues to read as follows:

Authority: 47 U.S.C. 701-744. Interprets or applies Sections 4, 301, 302, 303; 307, 309 and 332 of the Communications Act, as amended, 47 U.S.C. Sections 154, 301, 302, 303, 307, 309 and 332, unless otherwise noted.

2. Section 25.258 is revised to read as follows:

**§25.258 Sharing between NGSO MSS Feeder link Stations and GSO FSS services in the 29.25-29.5 GHz Bands**

(a) Operators of NGSO MSS feeder link earth stations and GSO FSS earth stations in the band 29.25 to 29.5 GHz where both services have a co-primary allocation shall cooperate fully in order to coordinate their systems. During the coordination process both service operators shall exchange the necessary technical parameters required for coordination.

(b) Licensed GSO FSS systems shall, to the maximum extent possible, operate with frequency/polarization selections, in the vicinity of operational or planned NGSO MSS feeder link earth station complexes, that will minimize instances of unacceptable interference with GSO FSS or NGSO MSS uplink reception.

(c) Applicants for authority to use the 29.25 - 29.5 GHz band for NGSO MSS feeder uplinks will have to demonstrate that their systems can share with GSO FSS and NGSO MSS systems that have been authorized for operation in that band.