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FCC MAIL SECTION

Federal Communications Commission

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

Amendment of the Commission's Rules)
to Relocate the Digital Electronic Message) ET Docket No. 97-99
Service From the 18 GHz Band to the)
24 GHz Band and to Allocate the)
24 GHz Band For Fixed Service)

ORDER

Adopted: March 14, 1997

Released: March 14, 1997

By the Commission:

I. INTRODUCTION

1. By this action, the Commission amends its Table of Frequency Allocations and Part 101 of its rules regarding Fixed Microwave Services to permit Fixed Service use of the 24.25-24.45 GHz and 25.05-25.25 GHz bands ("24 GHz band"). This action will facilitate relocation of the digital electronic message service ("DEMS") from the 18.82-18.92 GHz and 19.16-19.26 GHz bands ("18 GHz band") to the 24 GHz band. This action is being taken to advance, support and accommodate the national defense.¹ In order to accommodate this relocation, the Commission establishes rules to govern DEMS operations in the 24 GHz band.

II. BACKGROUND

2. In a July 1995 *Memorandum Opinion and Order* ("MO&O"), we amended our Table of Frequency Allocations by adding footnote US334 to permit use of the 17.8-20.2 GHz band for Government space-to-Earth fixed satellite transmissions and by modifying footnote G117 to limit Government use of this band to military systems.² This action was taken at the request of the National Telecommunications and Information Administration ("NTIA") because, according to NTIA, the

"reallocation is essential to fulfill requirements for Government space systems to perform satisfactorily [and] current Department of Defense (DoD) requirements cannot be accommodated in frequency bands

¹ See 47 U.S.C. § 151.

² See 10 FCC Rcd 9931 (1995).

currently allocated for Government use..."³

In the *MO&O*, we stated that this band is allocated on a worldwide basis for Fixed Satellite Service ("FSS") downlinks and domestically is predominantly exclusive non-Government spectrum. We further stated that the 17.8-19.7 GHz band is used by a variety of fixed services, including auxiliary broadcast, common carrier, private, cable television, digital termination systems, and, the main service addressed in this *Order*, DEMS.⁴

3. Subsequently, the Commission discussed various coordination alternatives with NTIA and put in place interim coordination procedures for services in this band. In Maryland, Virginia, the District of Columbia and Colorado ("Washington, D.C. and Denver areas"), fixed service licensees may not begin operation until their applications are approved.⁵ These interim measures have permitted licensing of non-Government facilities while preserving protection of the Government operations and providing an opportunity to evaluate longer term solutions that are acceptable to both the NTIA and the Commission.

4. Since adoption of footnote US334, the NTIA and the Commission have explored various methods of protecting the Government Earth stations while minimizing the impact on non-Government services. Because of the variety of non-Government terrestrial services in the 17.8-20.2 GHz band, it was determined that the optimum solution differs depending on the characteristics of the service. For instance, the highly directional nature of fixed point-to-point operations allows individual point-to-point links to be coordinated with Government operations at much closer distances than is possible with point-to-multipoint operations. In the case of DEMS, based on typical system parameters, NTIA determined that it would not be possible for DEMS to be provided within 40 km of the Government Earth stations.⁶ Considering the maximum system parameters permitted under our rules for DEMS, a potential for interference extends well beyond 40 km. Licenses for DEMS have already been granted in the vicinity of the Government facilities and operations under these licenses would not be compatible with Government operations.

5. Considering the extent of the area in which DEMS operations would be excluded, NTIA, on behalf of the Department of Defense, sent a letter dated January 7, 1997, stating that co-frequency, co-coverage operation of DEMS and the Government Earth stations is not possible and that steps should be taken to ensure protection of the Government Earth stations.

³ *Id.* at ¶ 3.

⁴ *Id.* at ¶ 2.

⁵ 11 FCC Rcd 13449, 13462 (1996) at ¶ 29. In all other parts of the U.S. licensees may begin conditional operations upon filing an application for a license to operate. See 47 C.F.R. § 101.5(d).

⁶ See Letter from Richard Parlow, Associate Administrator, Office of Spectrum Management, NTIA to Richard Smith, Chief, Office of Engineering and Technology, FCC, dated January 7, 1997.

Further, recognizing the Commission's desire to ensure the viability of DEMS and that this would require that spectrum for DEMS be available on a nationwide basis, NTIA proposed to make spectrum from the 24.25 - 24.65 GHz band available nationwide for DEMS. In addition, NTIA requested that accommodation of the Government Earth stations and relocation of DEMS be undertaken on an expedited basis because of the essential nature of these actions to military functions and sensitive national security interests of the United States.⁷ NTIA also stated that there are a limited number of Government radionavigation assignments in portions of the 24.25 - 24.65 GHz band and that coordination between NTIA and the Commission may be necessary to determine any sharing arrangements or transition plans for these stations.

6. On March 5, 1997, we received a second letter from NTIA making the 24.25 - 24.45 and 25.05 - 25.25 GHz bands available for non-Government uses ("Second NTIA Letter").⁸ The Second NTIA Letter reiterates the Government's determination that existing DEMS licensees must relocate to minimize potential interference to Government Earth stations in the 18 GHz band pursuant to footnote US334 and national security interests. To this end, NTIA has withdrawn the allocation for the Government radionavigation service in the 24.25 - 24.45 GHz and 25.05 - 25.25 GHz bands to permit relocation of DEMS from the 18 GHz band. In addition, NTIA requires that the Commission limit future FCC licensees from using the 17.8-20.2 GHz band for operations in the Washington, D.C. and Denver areas based on criteria discussed below.

7. In addition to Government satellite use, in July 1996, we set forth a plan for non-Government satellite downlink use of the 17.7 - 20.2 GHz band and for paired GSO and non-GSO ("NGSO") satellite uplinks, as well as Local Multipoint Distribution Service, in the 27.5 - 30 GHz band ("*28 GHz Order*").⁹ Specifically, of relevance to this decision, we designated the 18.8 - 19.3 GHz segment for NGSO/FSS uses. That designation raised the issue of coordination with terrestrial services.

8. As part of the 28 GHz proceeding, a great deal of effort, over several years, was put into determining whether ubiquitous satellite services could share spectrum with ubiquitous terrestrial services. In the *28 GHz Order* we concluded, based on the entire record before us, that co-frequency sharing between NGSO/FSS uplinks from ubiquitously deployed terminals (satellite services) and Local Multipoint Distribution Service ("LMDS") (a high

⁷ *Id.*

⁸ See Letter from Richard Parlow, Associate Administrator, Office of Spectrum Management, NTIA to Richard Smith, Chief, Office of Engineering and Technology, FCC, dated March 5, 1997.

⁹ See *First Report and Order and Fourth Notice of Proposed Rule Making to Amend Part 1, 2, 21, and 25 of the Commission's Rules to Redesignate the 27.5-29.5 GHz Frequency Band, to Establish Rules and Policies for Local Multipoint Distribution Service and for Fixed Satellite Services*, CC Docket No. 92-297, FCC 96-311, rel. July 22, 1996, at ¶ 77.

density point-to-multipoint terrestrial service) with its ubiquitously deployed subscriber terminals, was not feasible. We also concluded, however, that there was no indication in the record that sharing between NGSO/FSS downlinks and terrestrial services in the 18.8 - 19.3 GHz range would be infeasible, and indicated that we would rely on traditional coordination methods to address potential incompatibility between the satellite and terrestrial services in the absence of such evidence.¹⁰ However, subsequent developments, such as the availability of equipment to provide point-to-multipoint service in this band, have raised substantial questions concerning the feasibility of traditional coordination methods for DEMS and NGSO/FSS in the 18 GHz band.

9. After the release of the *28 GHz Order* on August 23, 1996, an NGSO/FSS applicant, Teledesic Corporation, seeking to use the 18 GHz band, filed a written request seeking an administrative freeze on acceptance and processing of applications for DEMS licenses in the 18 GHz band, due to concerns about frequency sharing with DEMS operations.¹¹ There were many DEMS applications at various stages at that time.¹² Recognizing the need to maintain the existing environment and study the spectrum sharing issue, the Wireless Telecommunications and International Bureaus granted Teledesic's request and ordered an administrative freeze on new applications, amendments to pending applications, renewals, modifications, or extensions for either terrestrial fixed services or NGSO/FSS earth stations in the 18 GHz band ("*18 GHz Freeze Order*"). The Bureaus also ordered that already-filed applications for new markets in the 18 GHz band be held in abeyance.¹³ In the interim, Teledesic and DEMS operators have been involved in private negotiations to resolve the issues that gave rise to the *18 GHz Freeze Order*.

10. Teledesic has a separate interest in relocating DEMS from the 18 GHz band due to interference with its Earth station downlinks in the 18 GHz band. Even if the DEMS licensees in the Washington, D.C. and Denver areas had ceased service due to interference with Government Earth stations, Teledesic determined that it was unable to share the 18 GHz band with point-to-multipoint operations in other geographic areas as well. In order to facilitate the relocation of DEMS, and eliminate sharing concerns with the DEMS licensees,

¹⁰ *Id.* at ¶ 79.

¹¹ *Freeze on the Filing of Applications for New Licenses, Amendments, and Modifications in the 18.8-19.3 GHz Frequency Band*, DA 96-1481 (rel. Aug. 30, 1996), ¶ 3.

¹² These included applications for additional nodal sites within already-licensed exclusive defined areas and for new exclusive geographic areas. *Id.*, ¶ 2.

¹³ *Id.*, ¶ 12.

Teledesic has now agreed to reimburse licensees which are required to modify existing equipment in order to operate in the 24 GHz band being offered by the Government.¹⁴

III. DISCUSSION

11. In order to give effect to NTIA's request, we implement changes to our rules, as described below, without notice and comment procedures. These rule changes provide for the relocation of DEMS interests from the 18 GHz band to the 24 GHz band. This is necessary because we are required to relocate DEMS in the Washington, D.C. and Denver, Colorado, regions in the interests of national security. Although this goal might be accomplished by moving the Washington, D.C. and Denver, Colorado operations only, doing so would effectively preclude these areas from getting DEMS service, since it is unlikely that 24 GHz equipment could be manufactured at economic prices solely for these two markets. We believe that the public interest is served by ensuring that services are deployed so that consumers are not disadvantaged by greater complexity in providing service to their geographic location. Accordingly, we seek to maintain the DEMS on a unified frequency band nationwide.¹⁵ Therefore, rather than license DEMS using a second band of frequencies solely for the Washington, D.C. and Denver areas, NTIA has offered to make Government spectrum available in the 24 GHz band to relocate the entire DEMS service for continued nationwide deployment.

12. Specifically, NTIA has made available 400 megahertz of spectrum in the 24.25 - 24.45 GHz and 25.05 - 25.25 GHz bands in order to accommodate DEMS and will delete its Radionavigation Service allocation in those bands. Based on a very narrow set of parameters that arise from the need to move DEMS as quickly and with as little impact as possible, we find that 400 megahertz of spectrum in the 24 GHz band will provide DEMS with service equivalent to that at 18 GHz. The 24 GHz band will accommodate existing licensees using four times the channel-width and sufficient transmit/receive frequency separation to permit DEMS systems to maintain equivalent information capacity to similarly engineered systems at 18 GHz. For a more detailed technical explanation, refer to Appendix B, attached hereto.

13. Therefore, in order to accommodate the Government's needs in the 18 GHz band, by this Order, we are allocating, for Fixed Service use, the 24.25-24.45 GHz and 25.05-25.25 GHz bands and are relocating DEMS to those bands from the 18 GHz band. In addition, NTIA has included, in the Second NTIA Letter, a request that we replace our current interim

¹⁴ See Letter dated February 27, 1997, from Russell Daggatt, President, Teledesic Corporation, and Laurence Harris, Counsel for Associated Communications, L.L.C., to Michele C. Farquhar, Chief, Wireless Telecommunications Bureau, and Donald H. Gips, Chief, International Bureau.

¹⁵ See *Amendment of Parts 2, 21, 74 and 94 of the Commission's Rules to Allocate Spectrum at 18 GHz*, 54 RR2d 1091, 1100 (1983) at ¶ 40 (describing the Commission's policy that DEMS should be treated uniformly in Alaska and the contiguous 48 states and that service allocation applies equally to all areas of Commission jurisdiction).

coordination procedures for non-DEMS fixed services in the 18 GHz band with permanent coordination requirements developed by the Government user.¹⁶ These permanent coordination procedures include exclusion zones around the Government Earth stations in which no new DEMS or low power non-Government operations will be permitted in the 18 GHz band. We will adopt rules consistent with the exclusion and coordination requirements requested by NTIA in a future order, except that by this Order we are modifying our rules with regard to low power operations at 18 GHz. Because these low power operations are licensed on an area basis, it is very difficult to ensure that individual transmitters are properly coordinated with the Government operations in the band. Accordingly, to help ensure the protection of the Government operations, we are prohibiting any new low power operations within 55 km when used outdoor and 20 km when used indoor of the coordinates 38° 48' N and 76° 52' W (Washington, D.C., area) and 39° 43' N and 104° 46' W (Denver, Colorado, area).¹⁷ Pending adoption of a future order consistent with NTIA's request, we will continue to protect Government operations in the 18 GHz band from other non-Government operations by using the interim procedures currently in place.¹⁸

14. To effectuate the transition of DEMS licensees from 18 GHz to 24 GHz, we are amending our rules to require incumbent DEMS licensees to cease operations using the 18 GHz band in the Denver and Washington areas immediately upon the effective date of our amended rules.¹⁹ In all other areas, incumbent DEMS licensees must cease operations not later than January 1, 2001. The amended rules reflect the current provisions of Part 101 governing existing DEMS licensing and operations with certain revisions necessary to effect the relocation of these licensees to 24 GHz, for example, frequency band and channel bandwidth. The purpose of these revisions is to ensure that, to the fullest extent practicable, incumbent DEMS operations are able to provide service using frequencies in the 24 GHz band in a manner equivalent to their operations in the 18 GHz band. To implement these changes, we are also exercising our authority under section 316 of the Communications Act to modify licenses.²⁰ All DEMS licenses for the 18 GHz band will be modified as described above as well as to authorize operations in the 24 GHz band. These modifications will be effected by

¹⁶ See Letter from Richard Parlow, Associate Administrator, Office of Spectrum Management, NTIA to Richard Smith, Chief, Office of Engineering and Technology, FCC, dated March 5, 1997, at ¶ iv. v.

¹⁷ See Appendix A, amended rule 47 C.F.R. § 101.147(r)(10).

¹⁸ *Supra* ¶ 3.

¹⁹ These areas are defined by a circle with a radius of 150 km from 38° 48' N and 76° 52' W (Washington, D.C., area) and a circle with a radius of 150 km from 39° 43' N and 104° 46' W (Denver, Colorado, area).

²⁰ Licensees will be afforded the 30 day protest period, pursuant to the statute. However, due to the consensual nature of this relocation, we do not anticipate any objections to the proposed license modifications.

separate action by the Wireless Telecommunications Bureau. None of these revisions is intended otherwise to alter, modify, expand, or change in any material way the authorizations provided to incumbent DEMS licensees under the terms of their current licenses.

15. The only current operations in the United States in the 24 GHz band are two radionavigation radar facilities operated by the FAA. These are located near Washington, D.C. and Newark, New Jersey. These facilities are scheduled to be decommissioned as of January 1, 1998 and January 1, 2000, respectively. Accordingly, DEMS operations at 24 GHz will be required to protect these facilities until the decommissioning dates. The FAA, NTIA, FCC, and affected licensees will coordinate to assure compatible operations in these areas. However, we do not anticipate the protection criteria as to unduly limit DEMS operations, especially in view of near term decommissioning.²¹ We also note that there are NASA operations in the adjacent band that must be considered.²² Also, operations in United States border areas will be subject to coordination with Canada and Mexico, as necessary.

16. In that this Order resolves conflicts surrounding the use of the 18 GHz band, we believe that we can now rescind our action in the *18 GHz Freeze Order* and substitute the following. We will grant the pending applications that have passed both the 30-day Public Notice period and the 60 day competing application cut-off period and for which there are no mutually exclusive competing applications. We will also grant the pending applications for nodal stations within markets for which a license exists. The licenses granted will permit operations at 18 GHz until the year 2001 and at 24 GHz for the term of the license. New facilities will be permitted only to the extent they are consistent with current authorizations, except that in the Denver and Washington areas, no new facilities, or modifications to existing facilities, will be permitted. No applications for new 18 GHz DEMS facilities will be accepted for filing. Future licensing in the 24 GHz band will be addressed in a subsequent rulemaking.

17. With regard to the applications that were pending at the time of the 18 GHz freeze but had not passed the 60-day cut-off period for competing applications because of the freeze on the filing of new applications, we believe that it is appropriate and equitable to dismiss them. These applications are not ripe for processing because we cannot predict whether competing applications would have been filed. Furthermore, in view of our decision to move DEMS operations to the 24 GHz band, it is unnecessary to retain these applications

²¹ See Letter from Richard Parlow, Associate Administrator, Office of Spectrum Management, NTIA to Richard Smith, Chief, Office of Engineering and Technology, FCC, dated March 5, 1997.

²² We have adopted limitations on out-of-band emissions which we believe are sufficient to afford any necessary protection. See also Letter from Richard Parlow, Associate Administrator, Office of Spectrum Management, NTIA, to Richard Smith, Chief, Office of Engineering and Technology, FCC, dated May 14, 1996 (NTIA making certain changes in the Table of Frequency Allocations concerning these services and suggesting that the FCC do the same). We intend to consider such changes to the Table of Frequency Allocations in a future proceeding.

in a pending status in that we are not in the process of establishing new rules for the continued operation of DEMS at 18 GHz.

IV. PROCEDURAL MATTERS

18. Based on the representations of NTIA that the relocation is essential to fulfill requirements for Government military space systems to perform satisfactorily,²³ we are amending the Table of Allocations in Part 2 of the rules to include the Fixed service in the 24.25-24.45 and 25.05-25.25 GHz bands and making other changes in our rules necessary to relocate DEMS systems to the 24 GHz band on a nationwide basis. The rules adopted in this order therefore involve the exercise of military functions of the United States in that they ensure the Government's current and future ability to operate military space systems in the 18 GHz frequency band. In addition, to the extent that any additional frequencies are being reallocated, these measures are necessary to ensure that DEMS service providers continue to be able to provide nationwide service. We believe that it would not be practical to have DEMS operating in two bands on a long term basis because of the complications involved with coordinating with the Government Earth stations, inconvenience to subscribers, and coordination with NGSO/FSS operations. Therefore, based on national security needs and because notice and public comment and procedures are otherwise, for good cause shown, unnecessary and contrary to the public interest, notice and comment procedures need not be followed prior to adoption of these rules. See 5 U.S.C. § 553 (a)(1), (b)(3)(B); Bendix Aviation Corp. v. F.C.C., 272 F.2d 533 (D.C. Cir. 1959), cert. denied sub nom. Aeronautical Radio, Inc. v. U.S., 361 U.S. 965 (1960).

V. ORDERING CLAUSES

19. Accordingly, IT IS ORDERED that Parts 1, 2, and 101 of the Commission's Rules ARE AMENDED as specified in Appendix A, effective 30 days after publication in the Federal Register. This action is authorized by Sections 4(i), 303(c), 303(f), and 303(r) of the Communications Act of 1934, as amended, 47 U.S.C. Section 154(i), 303(c), 303(f), and 303(r).

20. IT IS FURTHER ORDERED that all DEMS licenses for the 18 GHz band that include service in an area within 150 km of the coordinates 38° 48' N/76° 52' W (Washington, D.C area) and 39° 43' N/104° 46' W (Denver, CO area) will be modified so as to prohibit operations in those areas on those frequencies at midnight on the effective date of the rules adopted herein. Furthermore, all DEMS licenses for the 18 GHz band will be modified to expire on midnight of January 1, 2001 so as to prohibit operations on those frequencies beyond that date. All DEMS licenses will be modified to permit operations in the 24 GHz band for the remainder of their license term and consistent with the rules applicable

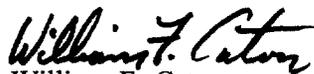
²³ See Letter from Richard Parlow, Associate Administrator, Office of Spectrum Management, NTIA, to Richard Smith, Chief, Office of Engineering and Technology, FCC, dated January 7, 1997.

in the 24 GHz band. Incumbent licensees will have 30 days from the date of release of this Order to protest the license modification consistent with Section 316 of the Communications Act of 1934, as amended. The Chief, Wireless Telecommunications Bureau, is instructed to notify the incumbent DEMS licensees of this Order on the release date pursuant to Section 1.87 of the Commission's Rules.

21. IT IS FURTHER ORDERED that licenses for low power systems in the 18 GHz band will be modified to prohibit any new low power operations within 55 km when used outdoor and 20 km when used indoor of the coordinates 38° 48' N and 76° 52' W (Washington, D.C., area) and 39° 43' N and 104° 46' W (Denver, Colorado, area). Incumbent licensees will have 30 days from the date of release of this Order to protest the license modification consistent with Section 316 of the Communications Act of 1934, as amended. The Chief, Wireless Telecommunications Bureau, is instructed to notify the incumbent low power licensees of this Order on the release date pursuant to section 1.87 of the Commission's Rules.

22. IT IS FURTHER ORDERED that, pending adoption of a future order consistent with NTIA's request for permanent coordination criteria concerning all non-Government operations in the 18 GHz band, we will continue to protect Government operations from non-Government operations not covered by this Order by using the interim procedures currently in place.

FEDERAL COMMUNICATIONS COMMISSION


William F. Caton
Acting Secretary

Appendix A: Final Rules

Parts 1, 2, and 101 of Title 47 of the Code of Federal Regulations are amended as follows:

PART 1 -- PRACTICE AND PROCEDURE

1. The authority citation for Part 1 continues to be the following:

AUTHORITY: 47 U.S.C. Secs. 151, 154, 303, and 309(j) unless otherwise noted.

2. Section 1.825(b) is deleted.

Part 2 of Title 47 of the Code of Federal Regulations is amended as follows:

**PART 2 -- FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS;
GENERAL RULES AND REGULATIONS**

1. The authority citation for Part 2 continues to read as follows:

AUTHORITY: Section 4, 302, 303, and 307 of the Communications Act of 1934, as amended, 47 U.S.C. Sections 154, 302, 303 and 307, unless otherwise noted.

2. Section 2.106, the Table of Frequency Allocations, is amended as follows:

- a. Remove the existing entries for 24.25 - 24.45 GHz and 24.75 - 25.25 GHz.
- b. Add row in numerical order for 24.25 - 24.45 GHz, 24.75 - 25.05, and 25.05 - 25.25 GHz.
- c. In the International Footnotes under heading I., add footnotes S5.534 and S5.535.
- d. In the International Footnotes under heading II., remove footnote 882G.
- e. Add new footnote US341.

The revisions and additions read as follows:

§ 2.106 Table of Frequency Allocations

* * * * *

International table			United States table		FCC use designators	
Region 1 -- allocation GHz	Region 2 -- allocation GHz	Region 3 -- allocation GHz	Government	Non-Government	Rule part(s)	Special-use frequencies
(1)	(2)	(3)	Allocation GHz (4)	Allocation GHz (5)	(6)	(7)
.
24.25 – 24.45 FIXED	24.25 – 24.45 RADIONAVIGATION	24.25 – 24.45 RADIONAVIGATION FIXED MOBILE	24.25 – 24.45 US341	24.25 – 24.45 RADIONAVIGATION FIXED US341	AVIATION (87) FIXED MICROWAVE (101)	
.
24.75 – 25.05 FIXED	24.75 – 25.05 FIXED-SATELLITE (Earth-to-space) S5.535	24.75 – 25.05 FIXED FIXED-SATELLITE (Earth-to-space) S5.535 MOBILE S5.534	24.75 – 25.05 RADIONAVIGATION	24.75 – 25.05 RADIONAVIGATION	AVIATION (87)	
25.05 – 25.25 FIXED	25.05 – 25.25 FIXED-SATELLITE (Earth-to-space) S5.535	25.05 – 25.25 FIXED FIXED-SATELLITE (Earth-to-space) S5.535 MOBILE S5.534	25.05 – 25.25	25.05 – 25.25 RADIONAVIGATION FIXED	AVIATION (87) FIXED MICROWAVE (101)	
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INTERNATIONAL FOOTNOTES

* * * * *

I. New "S" Numbering Scheme

* * * * *

S5.534 Additional allocation: in Japan, the band 24.65-25.25 GHz is also allocated to the radionavigation service on a primary basis until 2008.

S5.535 In the band 24.75-25.25 GHz, feeder links to stations of the broadcasting-satellite service shall have priority over other users in the fixed-satellite service (Earth-to-space). Such other users shall protect and shall not claim protection from existing and future operating feeder-link networks to such broadcasting satellite stations.

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UNITED STATES FOOTNOTES

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US341 Non-government operations in the 24.25-24.45 GHz band must provide protection to FAA radionavigation radar facilities near Washington, D.C., and Newark, New Jersey, until January 1, 1998 and January 1, 2000, respectively. Protection will be afforded in accordance with criteria developed by the F.C.C. and N.T.I.A.

PART 101 -- FIXED MICROWAVE SERVICES

1. The authority citation for Part 101 continues to be as follows:

AUTHORITY: 47 U.S.C. Secs. 154 and 303, unless otherwise noted.

Subpart B - Applications and Licenses

2. Section 101.13(c) is amended by modifying the first sentence to reference the 24 GHz band as follows:

*** in the 10.6, 18 GHz and 24 GHz bands ***

3. Section 101.49(a) is amended by deleting the phrase "in the Digital Electronic Message Service (DEMS)."

4. Section 101.59(b)(1) is amended by deleting the phrase "Digital Electronic Message Services."

5. Sections 101.59(c)(1)(i) and (c)(2)(i) are amended to read as follows, the current (c)(2)(ii) is deleted, and (c)(2)(iii) is redesignated as (c)(2)(ii):

(c)***

(1)***

(i) Any increase in equivalent isotropically radiated power is less than 3 dB over the previously authorized output power;

(2)***

(i) Any increase in antenna height is less than 3.0 meters (10 feet) above the previously authorized height;

Subpart C - Technical Standards

6. Section 101.101 is amended by adding a row to the table between the rows for the bands of frequencies frequency "21,200-23,600" and "27,500-29,500" as follows:

	Common Carrier (Part 101)	Private Radio (Part 101)	BC Aux.	Other	Notes
*** 24,250-25,250 ***	DEMS	DEMS			

7. Section 101.109(c) is amended by adding a row to the table between the rows for the bands of frequencies "21,200-23,600" and "27,500-29,500" as follows:

*** 24,250-25,250 ***	40 MHz
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8. Section 101.111(a)(4) is amended as follows:

(a)***

(4) For Digital Termination System channels used in the Digital Electronic Message Service (DEMS) operating in the 17,700-19,700 and 24,250-25,250 MHz bands:

9. Section 101.113(a) is amended by adding a row to the table between the rows for the bands of frequencies "21,200-23,600" and "27,500-29,500" as follows:

24,250-25,250 +55

10. Section 101.115(c) is amended by adding the rows to the table between the rows for the bands of frequencies "21,200-23,600" and "31,000-31,300" as follows:

24,250-25,250	A	2.2	38	25	29	33	36	42	55	55
(1)	B	2.2	38	20	24	28	32	35	36	36

11. Section 101.141(a) is amended to read as follows:

(a) Microwave transmitters employing digital modulation techniques and operating below 19.7 GHz and in the 24.25-25.25 GHz band must, with appropriate multiplex equipment, comply with the following additional requirements:

(1) ***

12. Section 101.147(a) is amended by adding an entry between the bands of frequencies "22,000-23,600" and "27,500-29,500" as follows:

24,250-25,250

13. Section 101.147(r) is amended as follows:

(r) 17,700 to 19,700 and 24,250 to 25,250 MHz: ***

(9) The following frequencies are available for point-to-multipoint DEMS Systems, except that channels 35-39 are available only to existing 18 GHz DEMS licensees as of the [adopted date of the order]. Systems operating on Channels 25-34 must cease operations as of January 1, 2001, except that those stations on these channels within 150 km of the coordinates 38° 48' N/ 76° 52' W (Washington, D.C., area) and 39° 43' N/104° 46' W (Denver, Colorado, area) must cease operations as of [effective date of these rules]:

	Nodal Station	User Station
Channel No.	Frequency band (MHz)	Frequency band (MHz)
***	***	***
35	24,250-24,290	25,050-25,090
36	24,290-24,330	25,090-25,130
37	24,330-24,370	25,130-25,170

38	24,370-24,410	25,170-25,210
39	24,410-24,450	25,210-25,250
***	***	***

(10) Special provision for low power systems in the 17,700-19,700 MHz band.

Notwithstanding other provisions in this rule part and except for specified areas around Washington, D.C., and Denver, Colorado, licensees of point-to-multipoint channel pairs 25-29 identified in paragraph (9) above may operate multiple low power transmitting devices within a defined service area. New operations are prohibited within 55 km when used outdoor and within 20 km when used indoor of the coordinates 38° 48' N/76° 52' W and 39° 43'N/104° 46' W.***

Subpart G - Digital Electronic Message Service

14. Section 101.501 is amended to read as follows:

In that DEMS operations will be transitioned to the 24 GHz band, applications for new facilities using the 18 GHz channels identified in Section 101.147(r)(9) are not acceptable for filing as of [effective date of these rules].

15. Section 101.505 is amended to read as follows:

"Frequencies, and the conditions on which they are available, for DEMS operations are contained in this Subpart as well as in Section 101.147(r)(9) of Subpart C."

16. Section 101.507 is amended to read as follows:

"The frequency stability in the 17,700-19,700 and 24,250-25,250 MHz bands must be ± 0.001% for each DEMS Nodal Station transmitter and ± 0.003% for each DEMS User Station transmitter."

17. Section 101.509(c) is amended as follows:

(c) The following interference studies, as appropriate, must be included in DEMS Nodal Station applications to the extent they are provided for in this Subpart:

Appendix B

DEMS Relocation Technical Description

We have reviewed the operations and proposed operations of incumbent 18 GHz DEMS licensees and evaluated the changes that would be necessary to provide equivalent operations at 24 GHz. Differences in propagation, rain attenuation, and available equipment at 18 GHz, compared to 24 GHz, will require the licensees to use different modulation and will affect the ability of operators to dynamically assign channels to users. Assuming use of similar equipment in all other respects including transmit power, systems at 24 GHz will require approximately four times the bandwidth as at 18 GHz to maintain equivalent capacity and coverage. Specifically, based on a typical cell with a radius of 5 km, there is an additional 11.8 dB of loss due to propagation and rain attenuation at 24 GHz compared to 18 GHz based on a reliability of 99.99%.

To provide for as rapid a transition as possible, as requested by NTIA, we have performed an analysis based on the use of the same or similar equipment to the extent possible. Based on this assumption, existing licensees will not be able to compensate for losses in the link budget merely by increasing transmitter power. Instead, changes in system operation will be required to achieve a reliable link comparable to that available at 18 GHz. Some benefit is realized by using the same antenna at the higher frequency. This provides 2.3 dB of additional gain at 24 GHz compared to 18 GHz. If licensees are to maintain the same cell coverage area, the remaining loss must be made up by changes in modulation and system operation. Current systems use 16-TCM (3/4) modulation, but have the capability to use QPSK (1/2). Using QPSK rather than 16-TCM to serve user stations at the edge of the cell recovers 7 dB of the loss. The information capacity, however, is reduced by 1/3. The additional path loss must be recouped by eliminating the dynamic bandwidth allocation planned by current licensees. Dynamic bandwidth allocation allows the DEMS systems to dynamically change the bandwidth available to a user based on actual demand at any given time. Fixing the amount of spectrum available to a user provides an additional 4 dB in the link budget over dynamic operations. Eliminating the efficiencies inherent in dynamically allocating spectrum, however, results in a significant reduction in system capacity. The exact reduction in capacity varies with parameters assumed for a typical system. Taken together, the changes in system operations necessary to compensate for greater losses at 24 GHz compared to 18 GHz result in a loss in system capacity in excess of four times the capacity at 18 GHz.

It is not necessary, however, to implement these changes in all areas of the cell. The changes are only necessary to maintain reliable coverage to the edge of a typical 5 km cell. We expect that, to the extent possible, licensees will maximize system capacity by maintaining the efficiencies planned for 18 GHz. Accordingly, we calculated the net effect on system capacity by considering the impact on information for any changes necessary to maintain a reliable link weighted by the area in which those changes would be necessary. Taking these factors into consideration, the information capacity at 24 GHz is approximately one-fourth that at 18 GHz, for a similar system with the same reliability and coverage. As a result, channels at 24 GHz will be four times those at 18 GHz.