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

In the Matter of	)	
	)	
Redesignation of the 17.7-19.7 GHz Frequency	)	
Band, Blanket Licensing of Satellite	)	IB Docket No. 98-172
Earth Stations in the 17.7-20.2 GHz and	)	RM-9005
27.5-30.0 GHz Frequency Bands,	)	RM-9118
and the Allocation of Additional Spectrum	)	
in the 17.3-17.8 GHz and 24.75-25.25 GHz	)	
Frequency Bands for Broadcast	)	
Satellite-Service Use	)	

NOTICE OF PROPOSED RULEMAKING

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By the Commission:

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I. INTRODUCTION

1. In this proceeding, we propose to redesignate the 17.7-19.7 GHz band among the various allocated services in order to make more efficient and better use of this portion of the spectrum. Pursuant to the Commission's *28 GHz First Report and Order*,[1] much of this spectrum is currently allocated for shared use between terrestrial fixed service and Ka-band Fixed Satellite Service ("FSS").[2] With non-government FSS licensees planning to deploy potentially millions of small antenna earth stations, we are concerned, however, about the feasibility of sharing between terrestrial fixed service and ubiquitously deployed FSS earth stations. In this Notice of Proposed Rulemaking ("NPRM"), we address several possible means for existing and future licensees to share this band. We have tentatively concluded, in light of the current state of technological development, that the public interest is best served by separating terrestrial fixed service operations from the operations of non-government ubiquitously deployed FSS earth stations into dedicated sub-bands.[3]

2. Specifically, we propose to provide primary designations[4] for: (1) terrestrial fixed services use in the 17.7-18.3 GHz band; (2) Geostationary Orbit Fixed Satellite Service ("GSO/FSS") use in the 18.3-18.55 GHz band; and, (3) Non-Geostationary Orbit Fixed Satellite Service ("NGSO/FSS") use in the 18.8-19.3 GHz band.[5] We propose to retain the co-primary designations for: (1) terrestrial fixed service use and GSO/FSS use in the 18.55-18.8 GHz band; and, (2) terrestrial fixed service use and Mobile Satellite Service

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[1] *See* 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, *First Report and Order and Fourth Notice of Proposed Rulemaking*, CC Docket No. 92-297, 11 FCC Rcd 19005 (1996) (*28 GHz First Report and Order*).

[2] The term "Ka-band" refers to the space-to-Earth (downlink) frequencies at 17.7-20.2 GHz and the corresponding Earth-to-space (uplink) frequencies at 27.5-30.0 GHz. The downlink portion of the band is referred to as the 18 GHz band, and the uplink portion of the Ka-band is referred to as the 28 GHz band.

[3] The United States Government is authorized to use the Ka-band for military satellite systems. This NPRM does not propose to change the relationship between Government and non-Government operations. *See* Amendment of Part 2 of the Commission's Rules to Allocate Spectrum for the Fixed-Satellite Service in the 17.8-20.2 GHz Band for Government Use, *Memorandum Opinion and Order,* 10 FCC Rcd 19 (1995).

[4] A service designated as primary is the only service given priority status to operate in a frequency band. A service designated as co-primary must share operations with other services designated as co-primary in the frequency band on a co-equal basis. A service designated as secondary is allowed to use the band as long as its operations do not cause interference to any primary designated operations. If a secondary service operation causes interference to a primary service, the secondary service provider must cease operation. *See generally* 47 C.F.R. § 2.105(c).

[5] Although we propose changes to only the 17.7-19.3 GHz portion of the band, the 19.3-19.7 GHz portion of the band is affected by the proposal because there is an existing terrestrial fixed service channeling plan that spans the entire 17.7-19.7 GHz band. Because the terrestrial fixed service channeling plan includes paired channels for two-way communications, any changes in the 17.7-19.3 GHz frequency segment will affect the terrestrial fixed service channeling plan in the 19.3-19.7 GHz frequency segment.

Feeder Link ("MSS/FL") use in the 19.3-19.7 GHz band. In bands where the terrestrial fixed service would lose its current co-primary status (18.3-18.55 GHz and 18.8-19.3 GHz), we propose to grandfather existing terrestrial fixed service operations. We request comment on this proposed band plan, as well as on possible modifications to the proposal that would allow continued sharing in additional portions of the 17.7-19.7 GHz band. We also seek comment on whether there is any means by which terrestrial fixed service and FSS could feasibly continue to share the entire band.

3. In addition, we propose a blanket licensing procedure that would allow Ka-band FSS satellite earth stations to operate under a single system license in bands that are designated for their primary use.[6] Thus, we propose to allow blanket licensing of GSO/FSS satellite earth stations in the existing GSO/FSS bands, 19.7-20.2 GHz, 28.35-28.6 GHz, and 29.5-30 GHz and, in conjunction with our proposed band, the 18.3-18.55 GHz band. In addition, we propose to allow blanket licensing of NGSO/FSS earth stations in the 18.8-19.3 GHz and 28.6-29.1 GHz bands. We believe that blanket licensing will provide a fast and efficient means for licensing the large numbers of small antenna FSS earth stations expected to be deployed.

4. Finally, we propose to allocate additional spectrum for the Broadcast Satellite Service ("BSS") and we propose to conform this allocation to the International Telecommunication Union ("ITU")[7] Region 2 BSS allocation. Specifically, we propose to allocate the 17.3-17.8 GHz band to BSS;[8] to allocate the 24.75-25.25 GHz band to Fixed Satellite Service ("FSS") for BSS feeder link use;[9] and to implement these allocations effective April 1, 2007. These proposed allocations will provide additional spectrum for direct-to-home video services. This increased amount of spectrum should allow BSS operators to offer an increased variety of programming and services which would enhance competition in the multichannel video programming market. We address the BSS allocation in this proceeding because part of the spectrum allocated (17.7-17.8 GHz) is also involved in our band redesignation plan.

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[6] GSO/FSS and NGSO/FSS operators propose to blanket license small antenna satellite earth stations that are transmit/receive end user terminals. Therefore, in our discussions of blanket licensing, we consider both the uplink and downlink portions of the Ka-band.

[7] The ITU, headquartered in Geneva, Switzerland, is an agency of the United Nations that deals with, and sets standards for, international communications issues.

[8] ITU Radio Regulations Footnote S5.517 states: "In Region 2, the allocation to the broadcasting-satellite service in the band 17.3-17.8 GHz shall come into effect on 1 April 2007. After that date, use of the fixed-satellite service (space-to-Earth) service in the band 17.7-17.8 GHz shall not claim protection from and shall not cause harmful interference to operating systems in the broadcasting-satellite service."

[9] ITU Radio Regulations Footnote S5.535 states: "In the band 24.75-25.25 GHz, feeder links to stations of the broadcasting-satellite service shall have priority over other uses in the fixed-satellite service (Earth-to-space). Such other uses shall protect and shall not claim protection from existing and future operating feeder-link networks to such broadcasting satellite stations."

5. We note that United States Government systems are authorized to operate in the 17.8-20.2 GHz band in accordance with footnote US334 in the United States Table of Frequency Allocations.[10] This NPRM concerns only non-Government operations; coordination between Government and non-Government operations will continue to remain in effect.

II. BACKGROUND

6. Development of the current band plan for both the 18 GHz and 28 GHz bands began in 1992 when three petitions for rulemaking were filed proposing changes in the rules concerning terrestrial fixed services in the 28 GHz band.[11] In January 1993, the Commission released the *28 GHz First Notice of Proposed Rulemaking*, proposing to designate spectrum for Local Multipoint Distribution Service ("LMDS") use.[12] This NPRM proposed a solution that accommodated the needs described by petitioners and requested comments on what effects the proposal would have on the proposed satellite use of the band. In February 1994, the Commission tentatively concluded that it was in the public interest to allow terrestrial fixed and satellite providers to co-exist in the 28 GHz band and established the LMDS/FSS 28 GHz Band Plan Negotiated Rulemaking Committee ("NRMC").[13] In July 1995, the Commission released the *28 GHz Third Notice of Proposed Rulemaking* that proposed to allow LMDS, GSO/FSS, NGSO/FSS, and MSS/FL access to the 28 GHz band and requested comment on satellite uplink-downlink pairing.[14] Based on the work of the NRMC and

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[10] *See* 47 C.F.R. § 2.106. Footnote US334 states: "In the band 17.80-20.20 GHz, Government space stations and associated earth stations in the fixed satellite (space-to-Earth) service may be authorized on a primary basis. For a Government geostationary satellite network to operate on a primary basis, the space station shall be located outside the arc measured from East to West, 70°W to 120°W. Coordination between Government fixed-satellite systems and non-Government systems operating in accordance with the United States Table of Frequency Allocations is required."

[11] Harris Corp-Farinon Division requested that the Commission channelize the 28 GHz band for point-to-point use, CellularVision requested that the rules be changed to allow point-to-multipoint services in the 28 GHz band, and Video/Phone Systems, Inc. proposed a broadband-on-demand video telecommunications service. *See* 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 19.5-30.0 GHz Frequency Band, to Establish Rules and Policies for Local Multipoint Distribution Service and for Fixed Satellite Services, *Third Notice of Proposed Rulemaking and Supplemental Tentative Decision*, CC Docket 92-297, 11 FCC Rcd 53 (1995).

[12] *See* Rulemaking to Amend Parts 1, 2, 21, and 25 of the Commission's Rules to Redesignate the 27.5-29.5 GHz Frequency Band and to Establish Rules and Policies for Local Multipoint Distribution Service and for Fixed Satellite Services, *First Notice of Proposed Rulemaking*, CC Docket No. 92-297, 8 FCC Rcd 557 (1993).

[13] *See* Rulemaking to Amend Parts 1, 2, 21, and 25 of the Commission's Rules to Redesignate the 27.5-29.5 GHz Frequency Band and to Establish Rules and Policies for Local Multipoint Distribution Service and for Fixed Satellite Services, *Second Notice of Proposed Rulemaking*, CC Docket No. 92-297, 9 FCC Rcd 1394 (1994).

[14] *See* Rulemaking to Amend Parts 1, 2, 21, and 25 of the Commission's Rules to Redesignate the 27.5-29.5 GHz Frequency Band, to Reallocate the 29.5-30.0 GHz Frequency Band, to Establish Rules and Policies for Local Multipoint Distribution Service and for Fixed Satellite Services, *Third Notice of Proposed Rulemaking*, CC Docket No. 92-297, 11 FCC Rcd 53 (1995).

additional comment from industry, the Commission issued the *28 GHz First Report and Order* adopting a band plan in July 1996.[15] In issuing the *28 GHz First Report and Order*, the Commission intended to satisfy the requirements of numerous competing terrestrial fixed service and satellite interests. The NRMC focused on evaluating spectrum sharing between terrestrial fixed services and fixed satellite services in the satellite uplink band at 28 GHz. Accordingly, while the decision in the *28 GHz First Report and Order* cited the potential for some difficulties with sharing between terrestrial fixed and satellite services in the 18 GHz band, the record at that time did not warrant separation of these services in the downlink band as well. Rather, the Commission in the *28 GHz First Report and Order* stated that the 17.7-19.7 GHz band would be shared on a co-equal basis between terrestrial fixed and satellite services and that coordination would be required under procedures outlined in Sections 25.130 and 101.103 of our Rules.[16] The Commission, however, indicated that if the affected parties wished to propose slightly modified coordination procedures to facilitate the implementation of these services, we would consider such a proposal in the future.[17]

7. The band plan adopted in the *28 GHz First Report and Order* is as follows:[18]

Uplink Band

LMDS fss 850 MHz	GSO/ FSS ngso/ fss 250 MHz	NGSO/FSS gso/fss 500 MHz	MSS /FL and LM DS 150 MHz	MSS/ FL and GSO/ FSS 250 MHz	GSO/FSS ngso/fss 500 MHz

27.5 28.35 28.6 29.1 29.25 29.5 30.0 GHz

[15] *Supra* note 1.

[16] *See* 47 C.F.R. §§ 25.130, 101.103. The *28 GHz First Report and Order* also designated the 19.7-20.2 GHz band for primary use by GSO/FSS (the segment was allocated for FSS and MSS use).

[17] *28 GHz First Report and Order*, 11 FCC Rcd at 19038.

[18] *See* 11 FCC Rcd 19005. Services designated for primary domestic licensing priority are specified in capital letters and services designated for secondary domestic licensing priority are specified in lower case letters. *See supra* note 4. In addition, *see* 47 C.F.R. § 2.106 for the specific frequency allocations in the 17.7-20.2 GHz band.

Downlink Band

GSO/FSS and FS[19]	NGSO/FSS and FS	MSS/FL and FS	GSO/FSS
ngso/fss	gso/fss	gso/fss	ngso/fss
1100 MHz	500 MHz	400 MHz	500 MHz

17.7 18.8 19.3 19.7 20.2 GHz

As shown above, the current downlink band plan is as follows: the 17.7-18.8 GHz band is designated for co-primary use by terrestrial fixed service and GSO/FSS; the 18.8-19.3 GHz band is designated for co-primary use by terrestrial fixed service and NGSO/FSS; the 19.3-19.7 GHz band is designated for co-primary use by terrestrial fixed service and MSS/FL; and the 19.7-20.2 GHz band is designated for primary use by GSO/FSS.

8. Terrestrial fixed services currently operating in the 17.7-19.7 GHz band include Cable Television Relay Service ("CARS"), auxiliary broadcasting, local television transmission, fixed point-to-point, and low power point-to-multipoint.[20] These services meet a variety of important communications needs, including remote monitoring of gas and petroleum pipelines, public safety links, video distribution links, and point-to-point data links. There are tens of thousands of terrestrial fixed links currently licensed in the 17.7-19.7 GHz band. Terrestrial fixed service use of this band is expected to increase as a result of migration of users from the congested lower terrestrial fixed service bands to this band, and from the need for new systems to support the introduction of new services such as digital television broadcasting, Personal Communications Services, and other digital communications systems.

9. Satellite services licensed to operate in the Ka-band include GSO/FSS, NGSO/FSS, and MSS/FL.[21] The Commission has granted thirteen GSO/FSS licenses and one NGSO/FSS license. The currently-licensed GSO/FSS and NGSO/FSS systems in this band have the potential to provide global Internet access, two-way digital communications, videoconferencing, interactive multimedia, telemedicine and residential voice and data communications services. Within the next five to ten years, we anticipate that these services will be provided to millions of United States businesses and consumers using small antenna Ka-band satellite earth stations.

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[19] Terrestrial Fixed Service

[20] The spectrum used for Digital Electronic Message Service ("DEMS") was recently changed. *See* Amendment of the Commission's Rules to Relocate the Digital Electronic Message Service From the 18 GHz Band to the 24 GHz Band and to Allocate the 24 GHz Band For Fixed Service, *Order*, 12 FCC Rcd 4990 (1997), *aff'd*, *Memorandum Opinion and Order*, FCC 98-155, ___FCC Rcd ___ (rel. July 17, 1998).

[21] *Supra* note 3.

10. In addition to the existing licensees, on December 22, 1997, the Commission closed the filing window for second round Ka-band FSS systems. The Commission received applications for 17 additional FSS systems during the second round Ka-band filing window. These applications included proposals for GSO/FSS, NGSO/FSS, and hybrid GSO and NGSO satellite systems.[22] We note that some applicants requested use of spectrum that is inconsistent in several aspects with the current band plan. Any licenses granted to second round Ka-band applicants will be conditioned upon conformance with the final band plan adopted in this proceeding and any service rules that are adopted in the licensing proceeding.

11. On December 23, 1996, Lockheed Martin Corporation, AT&T Corp., Hughes Communications, Inc., Loral Space & Communications Ltd., and GE American Communications, Inc. ("Petitioners") filed a joint Petition for Rulemaking proposing blanket licensing for GSO/FSS earth stations operating in certain portions of the Ka-band. On January 16, 1997, the Commission placed the petition on Public Notice and assigned it rulemaking number RM-9005.[23] Teledesic Corporation, licensee of a NGSO/FSS system in the Ka-band, filed comments supporting the petition and proposed that the rulemaking proceeding be expanded to include blanket licensing for all types of satellite earth stations in the Ka-band, including NGSO/FSS earth stations. On September 5, 1997, the Commission issued a Public Notice requesting comments on issues raised by the petition and to refresh the record.[24] In response to this Public Notice, twenty-two formal comments were filed.[25]

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[22] These second round applications will be addressed in a future licensing proceeding.

[23] *See Public Notice*, Report No. 2173 (rel. Jan. 16, 1997).

[24] *See "Commission Requests Comment to Refresh Record on Proposals for Blanket Licensing of Satellite Earth Stations Operating in the 17.7-20.2 GHz and 27.5-30.0 GHz Frequency Bands and Sharing Between Fixed Terrestrial and Satellite Services in the 17.7-19.7 GHz Frequency Bands", Public Notice*, IN Report No. 97-27 (rel. Sept. 5, 1997).

[25] The commenters are listed in Appendix A.

12. In 1997, the Commission issued licenses to 13 GSO/FSS applicants[26] and one NGSO/FSS applicant[27] to launch and operate Ka-band FSS systems. On October 9, 1997, the Commission adopted licensing qualification requirements and service rules for Ka-band FSS systems.[28] These service rules impose a strict timetable for the implementation of Ka-band GSO and NGSO FSS systems.[29] Although these systems are not yet in operation, we expect the deployment of commercial Ka-band FSS systems in the near future.

13. On June 5, 1997, DIRECTV Enterprises, Inc., ("DIRECTV") filed a Petition for Rulemaking proposing to reallocate the 24.75-25.25 GHz band to FSS for BSS feeder link use and the 17.3-17.8 GHz band to BSS for its downlinks. In addition, DIRECTV requested that the Commission adopt a 4.5° orbital spacing policy in licensing BSS space stations to operate in the 17.3-17.8 GHz and 24.75-25.25 GHz bands. On July 1, 1997, the Commission placed this petition on public notice and assigned it rulemaking number RM-9118.[30] In response to DIRECTV's petition, seven comments and three reply comments were filed.[31] We address the DIRECTV petition in this rulemaking due to the potential impact of the proposed band plan on a BSS downlink allocation at 17.7-17.8

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[26] On May 9, 1997, the Commission assigned orbital locations to the thirteen GSO/FSS applicants. *See* Assignment of Orbital Locations to Space Stations in the Ka-band, *Order*, FCC Rcd 13737 (1997). On the same day, the Commission also granted licenses for the thirteen GSO/FSS applicants. *See* Authorizations of: Comm, Inc. (DA 97-968); GE American Communications, Inc. (DA 97-970); EchoStar Satellite Corporation (DA 97-969); Hughes Communications Galaxy, Inc. (DA 97-971); KaStar Satellite Communications Corp. (DA 97-972); Lockheed Martin Corporation (DA 97-973); Loral Space & Communications Ltd. (DA 97-974); Morning Star Satellite Company, L.L.C. (DA 97-975); NetSat 28 Company, L.L.C. (DA 97-976); Orion Atlantic, L.P. (DA 97-979); PanAmSat Licensee Corp. (DA 97-978); and VisionStar, Inc. (DA 97-980); Orion Network Systems, Inc. (DA 97-977) (International Bureau May 9, 1997).

[27] The Teledesic license was granted on March 14, 1997. *See* Application of Teledesic Corporation for Authority to Construct, Launch, and Operate a Low Earth Orbit Satellite System in the Domestic and International Fixed Satellite Service, *Order*, 12 FCC Rcd 3154 (1997).

[28] *See* 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 19.5-30.0 GHz Frequency Band, to Establish Rules and Policies for Local Multipoint Distribution Service and for Fixed Satellite Services, *Third Report and Order*, 12 FCC Rcd 22310 (1997).

[29] Each GSO/FSS licensee is required to begin construction of its first satellite within one year of grant, to begin construction of the remainder within two years of grant, to launch at least one satellite into each of its assigned orbit locations within five years of grant, and to launch the remainder of its satellites by the date required by the ITU to assure international recognition and protection of these satellites. Each NGSO/FSS licensee is required to begin construction of its first two satellites within one year of the unconditional grant of its authorization, and complete the construction of those first two satellites within four years of grant. Construction of the remaining authorized operating satellites in the constellation must begin within three years of the initial authorization, and the entire authorized system must be operational within six years. *See* 47 C.F.R. § 25.145(f).

[30] *See Public Notice*, Report No. 2208 (rel. July 1, 1997).

[31] The commenters are listed in Appendix A.

GHz.

III. DISCUSSION

A. The Joint FSS Petition

14. Petitioners propose blanket licensing for GSO/FSS earth stations operating in those portions of the Ka-band that are not currently shared with the terrestrial fixed service (*i.e.*, the 19.7-20.2 GHz, 28.35-28.6 GHz, and 29.25-30.0 GHz bands).[32] In support of the blanket licensing proposal, Petitioners state that there will be millions of GSO/FSS earth stations and that individual licensing of these earth stations would result in delay, increased consumer costs, and administrative burdens on the Commission.[33]

15. Teledesic argues that similar considerations apply to NGSO/FSS earth stations and that blanket licensing has previously been used in shared bands by issuing blanket licenses but requiring the licensees to conduct coordination.[34] Accordingly, Teledesic requests that the proceeding be expanded to include blanket licensing procedures for all FSS earth stations operating in the Ka-band, including NGSO/FSS earth stations. Comments submitted by other Ka-band satellite interests also generally stress the need for blanket licensing.[35]

16. Terrestrial fixed service commenters argue that blanket licensing should not be allowed in frequency bands that are shared with the terrestrial fixed service. The Fixed Point-to-Point Communication Section of the Telecommunications Industry Association ("TIA-FPTP") contends that sharing of frequencies requires licensees in each service to coordinate their frequency usage.[36] TIA-FPTP states that such coordination is impossible if one of the services is blanket licensed and specific station locations are not identified. TIA-FPTP contends that if a satellite earth station must be protected and its location is unknown, then the entire blanket license area and an additional buffer zone outside of that area must be avoided. This protected area could be over 100 miles wide depending upon the characteristics of the satellite earth stations and the terrestrial system involved. TIA-FPTP argues that the inability to coordinate with blanket licensed earth stations at unspecified locations would have a substantial negative impact on terrestrial fixed users, and blanket licensing would in effect close off entire portions of the 18 GHz band to many existing and

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[32] Petitioners also request that a second proceeding be initiated to address sharing between GSO/FSS and terrestrial fixed service in the currently shared 17.7-18.8 GHz band. Because we are proposing a band plan that separates ubiquitous satellite service operations from terrestrial fixed service operations, we believe a second proceeding dealing with inter-service sharing issues, as recommended by Petitioners, is not necessary.

[33] Petition at 3.

[34] Teledesic initial comments at 3-5.

[35] Motorola comments at 4; PanAmSat comments at 1; TIA-Sat comments at 3.

[36] TIA-FPTP comments at 3.

potential terrestrial fixed services.[37]

17. Some terrestrial fixed service commenters argue that frequency sharing with FSS is not feasible even if blanket licensing is not adopted. TIA-FPTP states that the integrity of terrestrial fixed service operating areas will be severely and adversely affected by the large "holes" or "exclusion zones" required to protect FSS earth station receivers.[38] GTE asserts that terrestrial fixed service and FSS are not compatible services and should not be required to share the same frequency block.[39] Harris states that sharing would only be viable if the number of FSS earth stations is limited or if FSS earth stations are deployed away from urban areas.[40]

B. General Considerations

18. In the *28 GHz First Report and Order*, the Commission recognized that there might be difficulties involved with sharing the 17.7-19.7 GHz band; however, there was no record to support redesignating the band to separate terrestrial fixed service and FSS at that time. In the present proceeding, we received petitions and comments describing: (1) the ubiquitous nature of the proposed satellite systems; (2) the need for blanket licensing of such systems; (3) the difficulty of blanket licensing in shared bands; and (4) the difficulty of sharing between ubiquitous satellite systems and terrestrial fixed services even without blanket licensing. Given the record in this proceeding, we now realize that there is a clear need to revisit sharing of the 17.7-19.7 GHz band.

19. We agree with satellite interests that given the large numbers of small FSS earth stations expected to be deployed, blanket licensing will probably be necessary to ensure the fast and efficient implementation of these new Ka-band services.[41] However, it appears that blanket licensing would make it impractical for terrestrial fixed service providers to coordinate new operations to avoid interference in shared frequency bands where blanket licensing is allowed. Furthermore, even without blanket licensing, the presence of large numbers of ubiquitously deployed small antenna earth stations could have a serious adverse effect on the ability of the terrestrial fixed service to start a new operation or expand existing operations in a shared band. After considering these factors, we tentatively conclude that the public interest is best served by redesignating the 17.7-19.7 GHz band to separate terrestrial fixed services from most satellite earth station operations.

20. Separating terrestrial fixed service operations from most GSO/FSS and

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[37] *Id.* at 15.

[38] *Id.* at 3.

[39] GTE comments at 6.

[40] Harris comments at 3.

[41] *See infra.* Section III.D.

NGSO/FSS operations will benefit the terrestrial fixed service in several ways. First, such separation would eliminate the need for new terrestrial fixed service operations to coordinate with satellite earth station operations. In addition, terrestrial fixed service operators looking to expand their operations would no longer run the risk of being precluded from large geographic areas by the introduction of a new satellite earth station or from a portion of the band by the presence of millions of satellite earth stations. Furthermore, without satellite earth stations in an area, a denser population of terrestrial fixed service operations would be possible.

21. Separating terrestrial fixed service operations from most GSO/FSS and NGSO/FSS operations will also benefit satellite operators. First, satellite operators would not be required to individually coordinate large numbers of satellite earth stations with terrestrial fixed service operations. We agree with Petitioners that individual coordination of satellite earth stations would be costly, time consuming, and would delay service to the end user. In addition, satellite operators would not need special siting and shielding installations to avoid receiving interference from the operation of a terrestrial fixed service station. Finally, our band proposal would allow the adoption of efficient blanket licensing procedures for GSO/FSS and NGSO/FSS satellite earth stations in the bands earmarked for primary satellite use.

22. Although we propose to separate terrestrial fixed service from ubiquitous satellite operations, we do not think that such separation is necessary for all Ka-band satellite operations. In this regard, we note that Lockeed has indicated it is planning to use 500 MHz in the 17.7-18.8 GHz band for the operation of "Astrolink™" gateway earth stations.[42] These earth stations are expected to use relatively large diameter antennas and are not expected to be ubiquitously deployed. Sharing between the terrestrial fixed service and such non-ubiquitous satellite operations is feasible because the number of satellite earth stations is not large, because we are not proposing blanket licensing in these bands, and because their locations will be known. Therefore, current coordination criteria and sharing principles between satellite earth station and terrestrial fixed service operations can be used. Thus, we propose continued sharing in certain band segments. We anticipate that satellite operators will deploy large antenna diameter earth stations for specialized uses such as gateway terminals in these shared band segments.

23. Further, while we tentatively conclude that redesignating the 17.7-19.7 GHz band to separate terrestrial fixed service from ubiquitous satellite operations is the most practical solution, we also request comment on the feasibility of alternative proposals that would involve continued sharing in part or all of the 17.7-19.7 GHz band. We note that Petitioners and several commenters urge the creation of a joint working group to address inter-service sharing and coordination issues,[43] and that such a working group has been

[42] Lockeed comments at 6.

[43] Petition at 8; Motorola comments at 5; PanAmSat comments at 2; ABC comments at 3; GTE comments at 8; UTC comments at 4; NSMA comments at 3.

formed.[44] We support this industry effort and encourage the working group to file comments in this proceeding and to recommend alternative band sharing or separation approaches. We are aware from previous experience that developing a consensus in such a working group can be a lengthy process. Given the need to resolve satellite licensing issues on a timely basis and to protect the operations of existing terrestrial fixed service licensees, we believe the public interest will be served by offering proposals and requesting comments on the issues addressed in this NPRM.

C. Band Redesignation Proposals

24. In developing specific band redesignation proposals for this NPRM, we sought to identify the spectrum requirements of all services authorized to operate in the band and to strike a balance between the requirements of these different services and the public interest. While we recognize the difficulties involved in this process, we tentatively conclude that the band plans proposed below strike the appropriate balance, and will ensure both continued development of terrestrial fixed service and FSS in this band and efficient use of the spectrum. We request comment on whether we have fully identified the requirements of the various services, and whether we have identified band plans that best meet the public interest.

1. Spectrum Requirements

25. GSO/FSS. Satellite systems have typically been allocated equal blocks of uplink and downlink spectrum. In the United States, GSO/FSS systems are currently designated 1000 MHz of spectrum for use in the uplink portion of the Ka-band (28.35-28.6 GHz, 29.25-29.5 GHz, and 29.5-30.0 GHz) and 1.6 GHz of spectrum for use in the downlink portion of the Ka-band (17.7-18.8 GHz and 19.7-20.2 GHz). Of this 1.6 GHz of downlink spectrum, 500 MHz (19.7-20.2 GHz) is designated for GSO/FSS use on a primary basis and 1100 MHz (17.7-18.8 GHz) is designated for GSO/FSS and terrestrial fixed service use on a co-primary basis. The Commission made this disparate allocation to uplinks and downlinks in recognition that added flexibility was needed resulting from the requirement to share and coordinate with terrestrial fixed services in the 17.7-18.8 GHz band.[45] We tentatively conclude that if terrestrial fixed service and GSO/FSS sharing and coordination issues were resolved, only 500 MHz of the 1100 MHz in the 17.7-18.8 GHz band (when coupled with the 500 MHz in 19.7-20.2 GHz) would be required to match the 1000 MHz of uplink bandwidth allocated to GSO/FSS.

26. NGSO/FSS. In the United States, NGSO/FSS systems are currently designated 500 MHz of spectrum for use in the uplink portion of the Ka-band (28.6-29.1 GHz) and 500 MHz of spectrum for use in the downlink portion of the Ka-band (18.8-19.3 GHz). Thus, NGSO/FSS has equal amounts of uplink and downlink spectrum. The Ka-band downlink segment, however, is designated for co-primary use with terrestrial fixed services.

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[44] *See* Letter from Robert J. Miller, Gardere & Wynne, L.L.P., to Ruth Milkman, Deputy Chief, International Bureau, Federal Communications Commission (Nov. 19, 1997).

[45] *28 GHz First Report and Order*, 11 FCC Rcd at 19036.

With the likelihood that more than one NGSO/FSS system will operate in this band, and based on our belief that band redesignation will provide a fast, efficient, and cost effective way to make these services available to the public, we tentatively conclude that designating the existing 500 MHz of downlink spectrum on a primary use basis would be necessary to fulfill NGSO/FSS spectrum requirements.

27. Terrestrial Fixed Service. Terrestrial fixed services operating in the 17.7-19.7 GHz band include CARS, auxiliary broadcasting, local television transmission, fixed point-to-point, and low power point-to-multipoint. These terrestrial fixed service systems operate according to a channeling plan defined in the Commission's Rules.[46] This channeling plan includes frequency separations within the band primarily to accommodate two-way services. Thus, a redesignated band plan should accommodate frequency separations to enable these two-way systems to continue to operate. In addition, some CARS facilities use Amplitude Modulated Link (AML) technology.[47] Cable operators use this technology to distribute their programming and typically use contiguous spectrum in the 17.7-19.7 GHz band. Terrestrial fixed service video operators (*e.g.*, satellite master antenna television operators) also typically use a contiguous block of spectrum.[48] Due to the difficulties of coordinating these point-to-multipoint operations with typical point-to-point terrestrial fixed service operations, these services have generally been licensed in separate portions of the 17.7-19.7 GHz band, although the Commission's Rules do not specify separate frequencies. Broadcast auxiliary operations typically employ contiguous blocks of spectrum, one use of which is for video and audio "back hauls" to support news gathering and other operations. The use of contiguous blocks of spectrum simplifies the design of mobile transmitters and receivers. These transmitters and receivers are designed to be operated over a wide frequency band to enable selection of a frequency that does not conflict with existing operations in a particular area. We tentatively conclude that 600 MHz of contiguous spectrum for CARS and broadcast auxiliary services along with a similar amount of spectrum separated in frequency from the contiguous block to accommodate point-to-point and two-way services should be sufficient to accommodate terrestrial fixed service needs.

28. Other Services. Other services in the 17.7-19.7 GHz frequency band include the Earth Exploration-Satellite ("EES") (passive) and Space Research ("SR") (passive) services[49] allocated at 18.6-18.8 GHz and Government satellite systems[50] operating throughout

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[46] *See* 47 C.F.R. §§ 74.402, 78.18, 101.147.

[47] AML technology uses wideband transmitters to frequency shift multiple cable television channels for transmission at microwave frequencies. Since AML hub facilities are an integral part of a cable system, an average system of 78 channels using 550 MHz of RF bandwidth would require a minimum of 550 MHz of AML microwave spectrum. Cable systems with higher channel capacities (*e.g.*, 750 MHz) would require more microwave spectrum.

[48] Wireless cable and satellite master antenna systems typically use the same type AML equipment as CARS. However, they traditionally offer less programming than franchised cable operators and, thus, need only 440 MHz of contiguous spectrum.

[49] The band 18.6-18.8 GHz is allocated for both Government and non-Government EES (passive) and SR (passive).

the 17.8-20.2 GHz band. It should be noted that non-Government terrestrial fixed service operations and non-Government satellite operations are required to coordinate with Government operations in the 17.8-20.2 GHz band.[51] In addition, the band segment 17.7-17.8 GHz is allocated by the ITU in the Americas ("Region 2") for terrestrial fixed service, FSS,[52] and BSS operations. As discussed below, we propose to implement this BSS allocation domestically to conform to the ITU Region 2 allocation.[53] Accordingly, any band redesignation plan should take into account the consequences of possible future sharing with BSS operations.

2. Primary Proposal

29. To accommodate these spectrum requirements, we propose the following band plan:

FS[54]	GSO/FSS	GSO/FSS and FS	NGSO/FSS	MSS/FL and FS	GSO/FSS
gso/fss and ngso/fss	fs and ngso/fss	ngso/fss	fs and gso/fss	gso/fss	ngso/fss
600 MHz	250 MHz	250 MHz	500 MHz	400 MHz	500 MHz

17.7 18.3 18.55 18.8 19.3 19.7 20.2 GHz

30. Under the current band plan, the entire 2000 MHz of spectrum in the 17.7-19.7 GHz band is shared between terrestrial fixed service and satellite services.[55] Under

[50] *Supra* note 3.

[51] For terrestrial fixed service operations, *see* Amendment of the Commission's Rules to Relocate the Digital Electronic Message Service From the 18 GHz Band to the 24 GHz Band and to Allocate the 24 GHz Band For Fixed Service, *Order*, ET Docket 97-99, 12 FCC Rcd 4990 (1997); *see also*, *Order*, ET Docket 97-99, 13 FCC Rcd 3581 (1997) (low power operations). For satellite services, *see* 47 C.F.R. § 2.106, Footnote US334.

[52] The 17.7-17.8 GHz band is allocated for use by the FSS in both the Earth-to-space and space-to-Earth directions. ITU Radio Regulations Footnote S5.516 limits the uplink use to feeder links for the BSS operating in the 12.2-12.7 GHz band. This footnote allocation is consistent with Footnote US271 in the United States Table of Frequency Allocations and we propose no change to it in this NPRM.

[53] *See infra* Section III.E.

[54] We also propose that, effective April 1, 2007, the frequency segment 17.7-17.8 GHz be designated co-primary for both terrestrial fixed service and BSS downlink use. *See infra* Section III.E.

[55] *See infra* Section II.

the proposed band plan we would redesignate this spectrum as follows. First, we propose to designate to terrestrial fixed service 600 MHz of spectrum for primary use at 17.7-18.3 GHz and 650 MHz of spectrum for co-primary use at 18.55-18.8 GHz and 19.3-19.7 GHz. The total amount of spectrum available for terrestrial fixed service use would be 1250 MHz. Second, we propose to designate to GSO/FSS 250 MHz of spectrum at 18.3-18.55 GHz for primary use and 250 MHz of spectrum at 18.55-18.8 GHz for co-primary shared use. The total amount of spectrum available for GSO/FSS use would be 500 MHz, in addition to the current designation of 500 MHz of spectrum for primary GSO/FSS use at 19.7-20.2 GHz. Third, we propose to designate to NGSO/FSS 500 MHz of spectrum at 18.8-19.3 GHz for primary use. Fourth, we propose that MSS/FL would retain the 400 MHz of spectrum at 19.3-19.7 GHz for co-primary shared use. We note that this proposal does not change the current designation for the 19.3-19.7 GHz band segment.[56] Finally, we propose to grandfather existing terrestrial fixed users in the bands being redesignated for primary satellite use. We tentatively conclude that FSS operators will generally be able to design their systems around these limited number of existing operations.

31. This proposed plan attempts to balance the needs of satellite services and terrestrial fixed services. We tentatively conclude that the proposed plan can accommodate the needs of terrestrial fixed services. First, as indicated above, 600 MHz of contiguous spectrum (17.7-18.3 GHz) would be designated for primary use by terrestrial fixed service. Portions of this spectrum could be used to accommodate CARS AML technology, terrestrial fixed service video operators, and broadcast auxiliary services. Second, terrestrial fixed service would have 650 MHz of spectrum designated for co-primary use at 18.55-18.8 GHz and 19.3-19.7 GHz. The 600 MHz of primary designated spectrum, in conjunction with the 650 MHz of co-primary designated spectrum, should permit the implementation of a terrestrial fixed service channeling plan that can accommodate two-way services. For example, 450 MHz of the 17.7-18.3 GHz band could be channelized similar to the current 18.142-18.58 GHz band for paired or unpaired video use. The remaining 150 MHz of the 17.7-18.3 GHz band, along with the 18.55-18.8 GHz band, could be paired with the 19.3-19.7 GHz band for other terrestrial fixed point-to-point services. Various channel bandwidths could be accommodated in this spectrum. Third, as discussed below, we propose to grandfather on a permanent co-primary basis existing terrestrial fixed service systems operating in the 18.3-18.55 GHz and 18.8-19.3 GHz bands that we propose to designate as primary for satellite services.[57]

32. We tentatively conclude that the proposed plan can also accommodate the needs of Ka-band satellite services. We propose to provide GSO/FSS with 1000 MHz of downlink spectrum, of which 750 MHz of spectrum would be designated on a primary basis. This primary spectrum (18.3-18.55 GHz and 19.7-20.2 GHz) could be used for ubiquitously deployed, blanket licensed satellite earth stations. We propose that the remaining 250 MHz of

[56] We intend to amend the Table of Frequency Allocations in Section 2.106 of the Commission's Rules to conform any changes resulting from a band plan we may adopt in this proceeding. Because we are seeking comment on several alternative variations to our proposal and for the sake of simplicity, we are not displaying in Appendix C to this NPRM proposed changes to the Table of Frequency Allocations.

[57] *See infra* Section III.C.4.

GSO/FSS downlink spectrum (18.55-18.8 GHz) be shared on a co-primary basis with the terrestrial fixed service. Although sharing with terrestrial fixed services in this 250 MHz of spectrum would place some constraints on GSO/FSS satellite licensees, we tentatively conclude that it would be possible for GSO/FSS satellite operators to use this spectrum to meet specialized demands, in particular, the demand for a limited number of large antenna diameter, high-data-rate terminals. As mentioned previously, Lockheed is planning to use 500 MHz in the 17.7-18.8 GHz band for the operation of "Astrolink™" gateway earth stations.[58] These earth stations are expected to use relatively large antenna diameters and are not expected to be ubiquitously deployed. We also note that the 18.6-18.8 GHz band is also allocated to the EES (passive) and SR (passive) services and a strict Power Flux Density ("PFD") limit is placed on fixed satellite service operations in this band.[59] Adherence to this PFD limit may require the use in this band of satellite earth stations with higher gain antennas and might serve as an incentive for licensees to concentrate smaller satellite earth stations in the 750 MHz of unshared GSO/FSS spectrum. For these reasons, and recognizing the need to provide adequate spectrum for both terrestrial fixed service and GSO/FSS, we tentatively conclude that sharing the 18.55-18.8 GHz band between GSO/FSS and terrestrial fixed service is an efficient use of this spectrum. The proposed band plan also provides NGSO/FSS with 500 MHz of primary downlink spectrum; this should satisfy NGSO/FSS spectrum requirements. We also tentatively conclude that, because of the limited number of MSS/FL earth stations in the 19.3-19.7 GHz band, sharing of this band by MSS/FL and terrestrial fixed services should continue under the current sharing requirements.[60] Accordingly, the 19.3-19.7 GHz spectrum band would continue to be designated for use by MSS/FL and terrestrial fixed services on a co-primary basis.

33. To provide flexibility throughout the 17.7-20.2 GHz band, we also propose to allow secondary operations on a non-interference basis by both terrestrial fixed service and FSS. These secondary operations are depicted in the proposed band plan by using lower case letters. We propose that, prior to initiating use of a frequency on a secondary basis, an applicant will be required to demonstrate that such use will not cause interference to users operating on a primary basis, and that it can accept interference from primary service operations. We request comment on the most efficient and effective way to demonstrate such use on a secondary non-interference basis.

3. Comment Requested and Modified Proposals

34. First, we request comment on whether the above proposal adequately meets the spectrum requirements of both terrestrial fixed service and GSO/FSS and NGSO/FSS satellite licensees. In particular, we seek comment on the feasibility of GSO/FSS operations in the 18.55-18.8 GHz band given the strict PFD limit that is imposed by the Commission's Rules

[58] Lockheed comments at 6.

[59] In the band 18.6-18.8 GHz, the fixed satellite service shall be limited to a PFD at the Earth's surface of -101 dBW/m^2 in a 200 MHz band for all angles of arrival. *See* 47 C.F.R. § 2.106, footnote US255.

[60] See 47 C.F.R. §§ 25.203, 101.103.

on fixed satellite service operations in the 18.6-18.8 GHz band in order to protect EES (passive) and SR (passive) services in that portion of the band. We also seek comment on whether allowing secondary operations in the 17.7-20.2 GHz band is desirable and feasible. Currently, there exists a secondary designation for NGSO/FSS throughout the 17.7-18.8 GHz band; however, NASA has suggested that it may be difficult for NGSO/FSS to operate on a secondary basis in the 18.6-18.8 GHz band without causing interference to EES (passive) and SR (passive) operations. We seek comment on this issue.[61] We also seek comment on the impact of a potential future BSS allocation in the 17.7-17.8 GHz band segment on existing and future terrestrial fixed service operations[62] and on the efficiency of continued sharing of the 19.3-19.7 GHz band by terrestrial fixed service and MSS/FL operations. We also request proposals for a modified terrestrial fixed service channelization plan that would conform to our proposed band plan. Finally, we request comment on how continued terrestrial fixed service access to the band can be ensured.

35. Second, we request comment on the merits of modifying our proposal by designating an additional 100 MHz at 18.3-18.4 GHz to be shared on a co-primary basis by terrestrial fixed service and GSO/FSS. Under our primary proposal, 600 MHz (17.7-18.3 GHz) is designated for terrestrial fixed service use while the adjacent 250 MHz (18.3-18.55 GHz) is designated for GSO/FSS use. However, if the 100 MHz at 18.3-18.4 GHz could be shared, terrestrial fixed service would have 700 MHz of contiguous spectrum (17.7-18.4 GHz) and this larger block of contiguous spectrum might make it possible for a more flexible terrestrial fixed service channeling plan to be devised.[63] We seek comment on whether this adjustment to our proposed band plan would more fully meet terrestrial fixed service needs while not being overly restrictive of proposed GSO/FSS operations. We also request proposals for terrestrial fixed service channeling plans that would conform to this proposal.

36. Third, we request comment on modifying our primary proposal by designating the entire 17.7-18.8 GHz band to be shared on a co-primary basis by terrestrial fixed service and GSO/FSS. In developing our proposed band plan we assumed that GSO/FSS might use gateways or other large antenna earth stations at 18.55-18.8 GHz, thus, making sharing feasible in that portion of the band, but that elsewhere in the 17.7-18.8 GHz band GSO/FSS would use ubiquitously deployed small antenna earth stations that would make sharing impractical. It may be possible, however, for GSO/FSS to use gateway type terminals throughout the 17.7-18.8 GHz band, in which case continued sharing might be possible. We seek comment on this issue and on whether continued sharing in the 17.7-18.8 GHz band would better meet the needs of GSO/FSS and terrestrial fixed service licensees.

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[61] We acknowledge NASA's concerns; however, we believe that further study of the potential impact of secondary operation of NGSO/FSS systems in the 18.6-18.8 GHz band is necessary before the Commission changes the NGSO/FSS secondary designation.

[62] *See infra* Section III.E.

[63] *Infra* Section III.C.1 Terrestrial Fixed Service.

37. If the 17.7-18.8 GHz band continues to be shared by terrestrial fixed service and GSO/FSS, two different approaches could be taken with regard to licensing in this band. The first approach would maintain the status quo; that is, we would not allow blanket licensing. Licenses would continue to be required for each individual satellite earth station facility and each facility would be individually coordinated. The second approach would involve issuing a blanket license, but requiring terrestrial fixed and GSO/FSS licensees to coordinate prior to installation of a facility. Under the second approach, we propose that GSO/FSS licensees be required to maintain a database of earth station locations and operating parameters. Although each facility would still undergo coordination, we believe that this second approach could make licensing considerably faster. We request comments on whether either of these is an effective approach, and which approach best meets the needs of both GSO/FSS and terrestrial service licensees. We also request comment on whether there are other ways to streamline the existing coordination process. In addition, we request comment on whether current inter-service sharing criteria need to be amended. Also, we request proposals for a modified terrestrial fixed channelization plan that would conform to this proposal.

38. Fourth, we request comment on the feasibility of retaining our current band plan and thus continuing to share the entire 17.7-19.7 GHz band. Although we believe that band redesignation offers the best solution, we recognize that other solutions are possible. Accordingly, we seek comment on whether there are any streamlined licensing and coordination procedures that would allow satellite earth stations to be deployed in an efficient cost effective manner in a shared 17.7-19.7 GHz band. In addition, we request comment on any other band plans that might best accommodate the needs of both terrestrial fixed service and FSS licensees.

39. Fifth, we note that some of the Ka-band satellite licensees are planning to offer their services both domestically and internationally. Although the band plan we adopt will apply only domestically, we request comment on what effect this band plan would have internationally. We seek comment on whether our proposed band plans would allow equipment manufacturers to make satellite earth stations that can be used both domestically and internationally. In addition, we seek comment on how these plans would affect the manufacturing of terrestrial fixed service transmitters and receivers. We also seek comment on whether a detailed terrestrial fixed service channelization plan would be necessary to facilitate the cost-effective manufacturing of microwave transmitters and receivers for domestic and international markets.

4. Grandfathering

40. In evaluating options for the 18 GHz band, we also need to consider the investments made by existing primary users in the band. There are no commercial satellite systems currently operating in the Ka-band,[64] but there are existing terrestrial fixed service

[64] We note that Government military operations exist in this band and their operations must be protected. *Supra* note 3.

systems operating in the band. To protect the existing investment in terrestrial fixed service operations and, at the same time, anticipating that such existing operations would not overly restrict new satellite operations, we propose to grandfather terrestrial fixed service operations that have been either licensed or for which applications are pending, as of the release date of this NPRM, for any band that is proposed to be designated for fixed satellite service use on a primary basis. Under this proposal, new terrestrial fixed service applications could continue to be filed and granted after the NPRM release date, but the licensees would have only secondary status in those bands designated for fixed satellite service use on a primary basis. Under the proposed band plan, for example, this would apply to the 18.3-18.55 GHz and 18.8-19.3 GHz bands. Due to the sensitivity of satellite earth station receivers, the most likely case of interference involves satellite earth stations receiving unwanted signals from terrestrial fixed service operations. Since detailed technical operating parameters (including specific location information) for these terrestrial fixed stations exist, we tentatively conclude that satellite operators will be able to design their systems and locate their facilities to avoid reception of such interference. Under this proposal, grandfathered terrestrial fixed service operations would receive interference protection from satellite operations and satellite earth stations must accept whatever interference they receive from those grandfathered terrestrial fixed service operations. We propose that new satellite earth stations will have to coordinate with grandfathered terrestrial fixed service operations, but that, grandfathered terrestrial fixed service licensees would not be allowed to expand or change their current operations in any of the bands in which grandfathering applies in any manner that might increase interference to satellite earth stations. For those terrestrial facilities applied for after the release of the NPRM, we reiterate that such terrestrial facilities will be required to accept interference from satellite operations and if a terrestrial facility interferes with a satellite earth station, and the terrestrial licensee can not cure it, the terrestrial licensee would be required to discontinue the operation of the interfering facility. We request comment on this grandfathering proposal.

41. In addition, if satellite operators are unable to design their systems to avoid interference from existing terrestrial fixed service operations, relocation of some or all terrestrial facilities (elsewhere within the 17.7-19.7 GHz band or another frequency band allocated for terrestrial fixed service) may be desirable. In order to balance the needs of both existing terrestrial fixed and future satellite systems, we request comment on the conditions under which relocation might become necessary. Commenters should specifically address the advantages and disadvantages to wholesale relocation of all incumbent users in any band in which grandfathering applies, as opposed to relocating only those links that are likely to cause interference. We note that in bands where terrestrial fixed service is primary or co-primary, no relocation will be required. We also request comment on whether we should allow satellite operators to force the relocation of individual terrestrial fixed service stations as long as the satellite operator pays all relocation costs. Commenters should also discuss how a case-by-case relocation process could be constructed, and whether it would impose undue burdens on licensees, the public, or the Commission. Relocation of terrestrial facilities was addressed in our Emerging Technology proceeding, ET Docket No. 92-9,[65] and Mobile Satellite Service

[65] *See* Redevelopment of Spectrum to Encourage Innovation in the Use of New Telecommunications Technologies, *First Report and Order and Third Notice of Proposed Rule Making*, 7 FCC Rcd 6886 (1992); *Second Report and Order*, 8 FCC Rcd 6495 (1993); *Third Report and Order and Memorandum Opinion and Order*, 8 FCC

at 2 GHz allocation proceeding, ET Docket No. 95-18.[66] In the event general relocation of terrestrial fixed service operations becomes necessary, we request comment on whether the relocation principles discussed in those proceedings should be applied here. Commenters should also discuss alternative relocation mechanisms and improvements to Commission procedures that would facilitate general or specific relocation of existing terrestrial fixed service facilities.

42. An exception to the preceding discussion on grandfathering involves low power point-to-multipoint terrestrial fixed systems. Since these systems are limited to an equivalent isotopically radiated power of 1 watt, we do not anticipate that the operation of these systems will cause harmful interference to FSS earth station operations. We propose to continue licensing these low power point-to-multipoint systems in the 18.82-18.87 GHz and 19.16-19.21 GHz bands on a primary basis. We request comment on whether and under what conditions continued licensing and operation of these systems could cause harmful interference to FSS satellite earth stations operating in the specified bands, and we seek proposals on methods to resolve such interference.

D. Blanket Licensing

43. As discussed above, we recognize that blanket licensing of FSS earth stations in band segments that are shared with terrestrial fixed services could present certain difficulties.[67] If blanket licensing were adopted without requiring coordination of individual earth stations, then, as TIA-FPTP notes, large areas could be closed to terrestrial fixed service use. It could be possible to adopt blanket licensing but require terrestrial fixed service and FSS licensees to coordinate prior to installing a facility. The Commission's Rules currently define a coordination procedure for frequency bands shared between satellite and terrestrial fixed services.[68] While this coordination method can be effective in bands where there are limited numbers of individually licensed satellite earth stations, it may prove burdensome once large numbers of satellite earth stations are present. In this case, the growth of terrestrial fixed service and the future deployment of satellite earth stations may be hindered. We tentatively conclude that coordination between terrestrial fixed service facilities and a large number of satellite earth stations will significantly add to the cost and time to implement satellite services and will adversely affect the ability of the public to receive the benefits of these new satellite services and also delay terrestrial deployment. We further tentatively conclude that,

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Rcd 6589 (1993); *Memorandum Opinion and Order*, 9 FCC Rcd 1943 (1994); *Second Memorandum Opinion and Order*, 9 FCC Rcd 7797 (1994).

[66] See Amendment of Section 2.106 of the Commission's Rules to Allocate Spectrum at 2 GHz for Use by the Mobile-Satellite Service, *First Report and Order and Further Notice of Proposed Rule Making,* 12 FCC Rcd 7388, 7396-7407; 7414-21 (1997).

[67] This discussion of blanket licensing applies only to FSS earth stations. The frequency band 19.3-19.7 GHz is shared between terrestrial fixed service and MSS/FL. MSS/FL earth stations are not ubiquitously deployed, do not require blanket licensing, and a coordination procedure is already in place (*See* 47 C.F.R. §§ 25.203, 101.103).

[68] *See* 47 C.F.R. §§ 25.203, 101.103.

given our band redesignation proposal, satellite earth station blanket licensing would be possible in some sub-bands, while still allowing terrestrial fixed service operators primary or co-primary access to other portions of the band. Under these circumstances, we tentatively conclude that blanket licensing is in the public interest and propose the following requirements for satellite earth station blanket licensing in the Ka-band.

1. GSO/FSS

a. Blanket Licensing in Unshared Bands

(1) General Requirements

44. We propose a blanket licensing procedure for GSO/FSS earth stations operating in the unshared 18.3-18.55 GHz, 19.7-20.2 GHz, 28.35-28.6 GHz, and 29.5-30.0 GHz bands. Under our proposed band plan and prior orders, these bands are designated for use by GSO/FSS on a primary basis. We propose to allow satellite licensees in these bands to apply for a blanket authorization under which each applicant could construct and operate a specified number and type of qualified earth stations. We further propose that the license term for a blanket authorization coincide with the underlying operating license. Existing Commission satellite earth station licensing rules specify a license term of ten years from the date the license is granted.[69] We request comment on this blanket licensing proposal and on our proposed ten year license period that will be co-terminus with the underlying operating license.

45. In addition, to ensure that secondary users in these bands have the information necessary to avoid causing harmful interference to GSO/FSS earth stations, we propose that applicants be required to designate a point of contact where records on location and frequency use of satellite earth stations will be maintained. We recognize, however, that some operators plan to market earth stations to large segments of the public and that monitoring the location of these earth stations may prove difficult. We seek comment on the feasibility of our proposal and request comment on alternative approaches.

46. We also propose an annual reporting requirement to allow the Commission to monitor the development of these new satellite services. We propose that licensees be required to include the number of earth stations actually brought into service in a yearly report to the Commission. This annual reporting requirement is consistent with requirements initially placed on Very Small Aperture Terminal ("VSAT") blanket earth station licensees in the 12/14 GHz frequency range (Ku-band)[70] to allow the Commission to monitor the development

[69] *See* 47 C.F.R. § 25.121.

[70] *See* Routine Licensing of Large Networks of Small Antenna Earth Stations Operating in the 12/14 GHz Frequency Bands, *Declaratory Order*, 11 FCC Rcd 1162 (1986) ("*VSAT Order*").

of that service.[71] We seek comment on this proposal for annual reporting, including comments on whether the above information is sufficient and appropriate.

(2) Technical Requirements for Intra Service Sharing

47. The Commission's GSO/FSS licensing policy is based upon uniform 2-degree spacing between adjacent satellites operating in the same frequency bands. To implement 2-degree spacing for GSO/FSS systems in the 4/6 GHz and 12/14 GHz frequency bands, the Commission established rules that define uplink and downlink power densities[72] and antenna performance standards.[73] In combination, these power density limits and antenna performance standards ensure that conforming satellite systems will not emit power at off-axis angles at levels high enough to cause unacceptable interference to adjacent satellites spaced at 2-degree intervals. Petitioners note that blanket licensing has been successfully used for VSAT earth stations operating in the Ku-band, pursuant to the Commission's Rules.[74] Successful implementation of blanket licensing for Ka-band GSO/FSS earth stations requires that analogous technical criteria be developed.

(a) Uplink Off-Axis EIRP Density

48. To enable blanket licensing for Ka-band GSO/FSS earth stations, Motorola proposes uplink transmit Equivalent Isotropically Radiated Power ("EIRP") density limits and downlink Power Flux Density ("PFD") threshold values to prevent harmful interference among Ka-band GSO/FSS systems.[75] In particular, Motorola proposes a downlink threshold PFD limit of -122 dBW/m^2/MHz, and uplink EIRP limits of 15 dBW/MHz and 10 dBW/MHz at 2.2° and 4.4° from antenna boresight, respectively.[76]

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[71] We note that the Commission recently eliminated the annual reporting requirements for Ku-band VSAT licensees in favor of a single report to be submitted upon application for license renewal. *See*, Streamlining the Commission's Regulations for Satellite Application and Licensing Procedures, *Report and Order*, 11 FCC Rcd 21581 (released December 16, 1996). This decision was made in light of the recognition that the Ku-band VSAT industry had matured sufficiently to the point where it was no longer necessary to monitor growth on an annual basis. At a future date a similar modification to the Ka-band earth station reporting requirement might also be made.

[72] *See* 47 C.F.R. §§ 25.134, 25.208.

[73] *See* 47 C.F.R. § 25.209.

[74] *See* 47 C.F.R. § 25.134. Section 25.134 establishes uplink and downlink power density limits and simultaneously provides a mechanism for licensing of those systems that do not conform to the power levels specified.

[75] Motorola comments at 8.

[76] 2-degree orbital spacing assumes a coordinate system referenced to the Earth's center. Off-axis angle is measured relative to the antenna boresight and the coordinate system is referenced to the Earth's surface (topocentric). This difference yields an increase in the size of the off-axis antenna angle measured between antenna boresight and a point on the geostationary arc, relative to the orbital spacing angle. This difference is on the order

49. Adherence to the earth station antenna off-axis EIRP density limits proposed by Motorola (15 dBW/MHz and 10 dBW/MHz) requires antenna performance significantly more stringent than currently specified in Section 25.209(a)(1) of the Commission's Rules.[77] We recognize that such antenna performance, if achievable, would greatly enhance sharing possibilities in the 2-degree orbital spacing environment.[78] However, we question whether present antenna technology is sufficiently advanced to provide a mass-producible, small diameter antenna that would meet these stringent requirements. At present, the trade-offs in antenna size and cost to the operator in achieving such performance are unknown.

50. Antenna manufacturers have indicated that small diameter Ka-band antennas that achieve 29 - 25 $\log_{10}(\theta)$ sidelobe performance are likely attainable, albeit, at some cost increase.[79] While manufacturers could not be definitive regarding the cost of higher performance antennas, it appears that a significant increase in performance, such as that proposed by Motorola, may be extremely difficult to achieve and could significantly increase the cost of the antennas. A large increase in equipment cost would greatly limit the ability of licensees to deploy a ubiquitous consumer-oriented service. Consequently, we propose antenna performance requirements that are no more stringent than those now specified in Section 25.209.

51. Although we are not proposing to adopt Motorola's proposed earth station antenna off-axis EIRP density thresholds, we tentatively agree that the approach of establishing a single off-axis EIRP density value, rather than separate standards for antenna sidelobe performance and maximum antenna input power densities, is reasonable as it may afford the operator more flexibility in system design while achieving the desired level of interference protection in the 2-degree environment. We note, however, that Motorola's proposed uplink criteria restrict radiation only toward the first two adjacent orbital positions (2.2° and 4.4°) and do not address orbital locations further along the geostationary arc or between orbital slots.[80] In this regard, we consider the proposal incomplete. Rather, we

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of 0.2° for an earth station along the equator, and decreases for earth stations at higher latitudes.

[77] 47 C.F.R. § 25.209(a)(1). The Motorola proposed values are based upon an antenna uplink discrimination of -30 dB at 2.2° and -35 dB at 4.4°. This is in contrast to the current Section 25.209(a)(1) envelope that imposes a discrimination of -24 dB at 2.2° and -31.5 dB at 4.4°, respectively, on an antenna with the same peak-beam gain.

[78] Earth station antenna patterns assume the general form $G(\theta) = A - B \log_{10}(\theta)$. Solving for the constants A and B would establish an envelope bounding the two points specified in the Motorola comments, this yields the equation $G(\theta) = 20.2 - 16.7 \log_{10}(\theta)$. Such an envelope would afford improved protection to the first thirteen adjacent orbital slots, relative to the present requirement.

[79] Seminar on Ka-band Earth Station Antenna Technology presented to the Industry Working Group on Blanket Licensing on October 14, 1997.

[80] To ensure protection along the geostationary arc, the current Commission's Rules specify an envelope below which the gain from an earth station antenna should lie. Section 25.209(a)(1) specifies a composite curve in the plane of the geostationary arc as a function of off-axis angle (θ):

believe that a composite curve defining an earth station antenna off-axis EIRP density value over the entire geostationary arc provides a more complete criterion.

52. Informal discussions among licensees suggest that GSO/FSS systems are likely to operate with uplink EIRP densities which vary from approximately 24 dBW/MHz to approximately 30 dBW/MHz at 2° off-axis. These suggested uplink off-axis EIRP density values are not evenly distributed throughout this range. Rather, the majority are clustered between approximately 25 and 27 dBW/MHz, with one or two licensees proposing values at the high and low ends. We seek a threshold value that will accommodate the requirements of the majority of systems and choose to define an uplink off-axis EIRP density requirement that permits transmission at the middle levels. Accordingly, we propose that under clear sky conditions, all earth stations operating in the 28.35-28.6 GHz and 29.5-30 GHz bands be required to transmit in the plane of the geostationary orbit with off-axis EIRP densities no greater than the composite curve described below:[81]

$35 - 25 \log_{10}(\theta)$	dBW/MHz	$1° \leq \theta \leq 7°$
13.9	dBW/MHz	$7° < \theta \leq 9.2°$
$38 - 25 \log_{10}(\theta)$	dBW/MHz	$9.2° < \theta \leq 48°$
-4	dBW/MHz	$48° < \theta \leq 180°$

53. At present, Section 25.209 specifies one antenna performance standard in the direction of the geostationary orbit and another, more relaxed standard, in all other directions. We recognize that the $29 - 25 \log_{10}(\theta)$ antenna sidelobe performance requirements may be more easily met by small-diameter Ka-band antennas if the standard in directions other than toward the geostationary arc are relaxed, thereby permitting the use of elliptical and offset-fed antennas.[82] Accordingly, we propose that the uplink power density envelope described above be imposed only in the plane of the geostationary orbit. In all other directions the more relaxed EIRP density envelope under clear sky conditions shall be:

$G(\theta) = 29 - 25 \log_{10}(\theta)$ dBi	$1° \leq \theta \leq 7°$
$G(\theta) = +8$ dBi	$7° < \theta \leq 9.2°$
$G(\theta) = 32 - 25 \log_{10}(\theta)$ dBi	$9.2° < \theta \leq 48°$
$G(\theta) = -10$ dBi	$48° < \theta \leq 180°$.

These criteria are defined in 47 C.F.R. § 25.209(a)(2) for all other directions, or in the plane of the horizon including any out-of-plane potential terrestrial interference paths by:

$32 - 25 \log_{10}(\theta)$ dBi	$1° \leq \theta \leq 48°$
-10 dBi	$48° < \theta \leq 180°$.

[81] This composite threshold is the product of off-axis earth station antenna gain mask and a maximum antenna input power density. The antenna gain values are those currently given in § 25.209 and the antenna input power density is approximately 6 dBW/MHz. Resulting EIRP densities at 2.2° and 4.4° off-axis are 26.4 dBW/MHz and 18.4 dBW/MHz, respectively.

[82] *See supra* note 79, Seminar on Ka-band Earth Station Antenna Technology.

$38 - 25 \log_{10}(\theta)$	dBW/MHz	$1° \leq \theta \leq 48°$
-4	dBW/MHz	$48° < \theta \leq 180°$

54. We seek comment on whether the proposed earth station antenna off-axis EIRP density values are appropriate and whether they supply sufficient protection to adjacent GSO/FSS satellites. We also request comment on whether the specified earth station antenna off-axis EIRP density values are sufficient and achievable without placing undue burden upon the licensee. We recognize that by choosing to accommodate a median value of EIRP density there is some risk that adjacent-satellite carrier-to-interference ratios may become unacceptable, particularly in those systems designed to operate with lower uplink power density levels. Recognizing further that systems wishing to operate at higher EIRP density values may be precluded from doing so, we seek comment on possible methods to accommodate any systems wishing to transmit with higher or lower powers. There are advantages to be gained by imposing more stringent antenna sidelobe performance requirements, and we therefore seek comment on whether we should impose a composite curve meeting Motorola's proposed 15 dBW/MHz and 10 dBW/MHz requirement (at 2.2° and 4.4°), or whether we should impose some other EIRP density requirement, perhaps less stringent that the Motorola value, but more restrictive than our current proposal. We also seek comment on whether there are advantages to maintaining separate antenna performance requirements and maximum input power density values for the earth station antenna rather than the composite performance curve that we are proposing.

55. The Commission now has NGSO/FSS applications on file that seek to use spectrum outside of the band segments designated for primary use by NGSO/FSS systems. Unlike GSO systems, NGSO space stations are not confined to locations along the geostationary arc; rather they may traverse any portion of the sky relative to the earth station. The 1997 World Radiocommunication Conference ("WRC-97") recently adopted provisional PFD limits to accommodate introduction of NGSO/FSS systems into traditionally GSO/FSS bands. As a result of the WRC-97 action, we recognize that GSO satellite systems may be required to share frequency spectrum with NGSO systems in the future. Although according to our domestic band plan, these NGSO systems would be required to operate on a secondary basis relative to GSO/FSS systems in the 28.35-28.6 GHz and 29.5-30 GHz bands, we believe that it is in the public interest to provide for the most flexible and efficient use of spectrum resources possible. We seek comment on whether imposing the more stringent uplink power density envelope described above in directions other than in the plane of the geostationary orbit, could facilitate sharing with NGSO/FSS systems, or whether it might place an undue burden upon the GSO operators. Finally, we seek suggestions on other performance requirements that might result in improved GSO/NGSO FSS sharing.[83]

56. We note that beamwidths in excess of 1° can be anticipated from small diameter earth station antennas operating at Ka-band frequencies. It may be desirable to re-

[83] This EIRP density proposal is for co-channel sharing between GSO/FSS systems. Notwithstanding that NGSO/FSS in the band 28.35-28.6 GHz is secondary, we may need to develop Effective PFD values for NGSO/FSS systems for the protection of the primary GSO/FSS systems. This sharing issue is being analyzed by the ITU-R and is to be determined at WRC-99.

evaluate the minimum off-axis angle at which we impose the performance envelope, similar to the example followed for small diameter Ku-band antennas in Section 25.209(g).[84] We request comment on whether 1° is an appropriate value to facilitate licensing of small antenna diameter earth stations, or whether another less stringent value might be imposed, and at what minimum antenna diameter it might be appropriately applied.

(b) Uplink Adaptive Power Control

57. The uplink off-axis EIRP density limits defined above are for clear sky conditions only. GSO FSS systems operating at Ka-band can suffer significant signal attenuation in the presence of precipitation (*e.g.*, rain) and will need to transmit at higher powers during such weather conditions in order to overcome the effects of rain fade. Most licensees have indicated the need to employ uplink adaptive power control to provide transmit power levels sufficient to meet the desired link performance during unfavorable weather events, while simultaneously ensuring that threshold power levels are not excessive at other times. ITU Radio Regulation S5.541A requires certain earth stations operating in the 29.1-29.4 GHz band to employ uplink adaptive power control or other methods of fade compensation,[85] and ITU Radio Regulation S5.538 provides an allocation for beacon transmissions (space-to-Earth) intended for uplink power control. In the *28 GHz First Report and Order*, we amended Section 25.204 of the Commission's Rules to require that all Ka-band FSS earth stations employ adaptive uplink power control or other methods of fade compensation.[86] We propose that all applicants for earth station blanket licensing authorization submit to the Commission a technical description of how they will comply with this requirement. We seek comment on whether this technical description would help avoid mutual-interference events among Ka-band GSO satellites by substantiating compliance with Commission requirements, or whether it would place an unnecessary burden upon the applicant.

58. In the *28 GHz First Report and Order,* we stated that uplink power control limits would facilitate operations across the entire 27.5-30 GHz band, although we recognized that the C- and Ku-band requirements might not be appropriate for Ka-band systems. We also stated that we would address uplink adaptive power control levels in our next earth station rulemaking.[87] The Commission's Rules governing use of uplink adaptive power control at Ku-band require that in the presence of rain fade, uplink power levels be increased only to the extent that the PFD at the fixed-satellite space station does not exceed the PFD level resulting

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[84] 47 C.F.R. § 25.209(g). The antenna performance standard for small antennas operating in the 12/14 GHz band with diameters as small as 1.2 meters starts at 1.25° instead of 1°.

[85] This requirement is for networks whose coordination information was received by the ITU after May 17, 1996; use of these techniques is encouraged for other networks.

[86] 47 C.F.R. § *25.204. See 28 GHz First Report and Order,* 11 FCC Rcd at 19005.

[87] *Id.*

from use of the uplink power limits specified for use under clear sky conditions.[88] However, rain fade in the Ka-band can be much more significant than at Ku-band (*e.g.*, 30-40 dB) and earth stations transmitting at correspondingly elevated power levels could cause significant interference to adjacent satellites, the path to which may not be subject to a comparable degree of rain attenuation. We seek comment on whether a requirement similar to the Ku-band rule is appropriate for Ka-band uplink adaptive power control, or whether other, more effective parameters might be specified. In particular, we seek comment on values which might be applied to Ka-band uplink adaptive power control, including: a minimum signal attenuation required before uplink transmit power may be increased; an upper limit on the permissible transmit power increase; an accuracy requirement over the range of path attenuations; and other possible parameters such as control-loop response time and overshoot limits.

(c) Power Flux Density[89]

59. In informal discussions, Ka-band GSO/FSS licensees have indicated plans to operate with downlink PFD values that range between approximately -118 dBW/m^2/MHz and -125 dBW/m^2/MHz for digital carriers.[90] Although Motorola's proposed value of -122 dBW/m^2/MHz falls within this general range, some systems planning to operate at slightly higher power levels may not be able to meet this threshold value. Therefore, we propose that a maximum downlink PFD threshold of -120 dBW/m^2/MHz averaged over any contiguous 40 MHz band segment, and -118 dBW/m^2/MHz in any 1 MHz band not be exceeded by GSO FSS space stations seeking to operate in the 18.3-18.55 GHz and 19.7-20.2 GHz bands.[91] We request comment on whether these values provide sufficient power for Ka-band operators to implement a viable service, and whether they are adequate to protect co-channel adjacent satellite operations from harmful interference. We recognize that the proposed PFD threshold values are more restrictive than the current PFD limits that apply equally to United States Government, United States non-Government, and foreign satellite systems. We request comment on whether any future disparity in the operating PFD values between government and commercial systems could adversely affect the ability of the latter to provide service. Further, we request comment on whether a similar disparity in the operating PFD values of domestically licensed and foreign satellite systems could adversely affect the ability of the domestic licensee to effect a workable coordination agreement. We also recognize that under

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[88] *See* 47 C.F.R. §25.204(f).

[89] PFD levels are normally addressed at the space segment licensing stage. Because definition of acceptable PFD levels is a necessary condition for blanket licensing, we include them in this document.

[90] At least one operator has indicated plans to use analog TV carriers that would operate with greater downlink PFD values at the earth's surface. *See* Application of Hughes Communications GALAXY Inc., FCC File Nos. 3/4-DSS-P/LA-94, CSS-94-021 through CSS-94-025.

[91] Because operators plan to use wideband receivers on the order of 40 MHz, the higher power density threshold value of -118 dBW/MHz can be permitted in a 1 MHz band segment, provided that the (lesser) average value of -120 dBW/MHz is met over a 40 MHz bandwidth.

certain circumstances some operators might wish to use carriers with higher PFD values. Under our proposal, PFD threshold values need not preclude operation at higher levels provided that these carriers are successfully coordinated with other affected satellite operations.[92] Licensing of non-compliant systems may be accommodated as discussed further below.

(d) Non-Compliant Earth Stations

60. Under our proposal, uplink EIRP density and downlink PFD threshold values would be used to permit routine blanket licensing of earth stations. However, these values need not preclude licensing of earth stations operating at higher uplink power density or downlink PFD levels provided that these earth stations are successfully coordinated with other Ka-band satellite systems. Section 25.134(b) of the Commission's Rules governs the licensing of VSAT networks that do not conform to the required carrier power density values. Applicants for non-compliant systems are required to conduct an engineering analysis using the Sharp, Adjacent Satellite Interference Analysis ("ASIA") program.[93] Applicants must submit a list of input parameters used in making the analysis, summaries of the program's output and a narrative summary addressing any margin shortfalls and their resolution. Applicants also must submit link budget analyses and a description of how each figure is derived and an affidavit stating that all potentially affected parties acknowledge and do not object to the applicant's proposed system. We propose to extend this approach to non-compliant GSO/FSS earth station applications in the Ka-band. We seek comment on the licensing of non-compliant earth stations, and the effect such licensing would have on present and future licensees in the band. In particular, we seek comment on use of the ASIA program for licensing of systems that do not conform to specified uplink power density or downlink PFD threshold levels. An alternative approach would be to establish fixed limits that serve as both the criteria for blanket licensing and the maximum permissible uplink and downlink power limits. We request comment on this alternative approach and whether it offers a more efficient way to handle licensing of satellite earth stations that do not meet uplink power density and downlink PFD thresholds.

(e) Antenna Pointing Requirements

61. The accuracy of earth station antenna pointing is significant because pointing errors of less than a degree could result in harmful interference to neighboring systems. It is essential that transmitting earth stations be installed with precision and that pointing angles be carefully monitored and maintained. Petitioners, however, suggest that a significant volume of GSO/FSS transceivers will be mass-marketed in a manner comparable to that of wireless or wireline telephones today.[94] If consumers make off-the-shelf purchases of Ka-band transceivers, accurate installation and maintenance of earth station pointing may be difficult to

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[92] *Infra* Section III.D.1.a(2)(d).

[93] 47 C.F.R. § 25.134(b).

[94] Petition at 3.

achieve. Some possible methods for preventing or correcting harmful interference due to pointing inaccuracies include: (1) requiring installation by approved technicians; (2) using automatic transmitter identification systems on all uplink signals; or (3) using a pilot tone from the satellite which, if not received by the earth station above some threshold level due to off-axis pointing, would preclude transmission by the earth station antenna.

62. At this time, we are not proposing any pointing requirements; however, we seek comment on whether some type of a pointing requirement for Ka-band GSO/FSS earth stations is necessary. We also seek comment on the three methods listed above and on whether implementation of these methods, individually or in combination, would be necessary to ensure an interference-free operating environment. In addition, we request alternate proposals for mitigating and correcting harmful interference resulting from pointing inaccuracies.

b. Shared Bands

(1) Uplink Band Shared with MSS Feeder Links

63. The frequency segment 29.25-29.5 GHz of the satellite uplink band is designated for MSS/FL and GSO/FSS co-primary use. Petitioners assert that blanket licensing can be implemented in this band by including GSO/FSS-to-MSS/FL sharing principles from the *28 GHz First Report and Order* in the blanket licensing criteria.[95] Iridium, however, opposes blanket licensing in this band on the grounds that it would adversely affect the development of non-geostationary orbit MSS systems.[96] Iridium asserts that coordination between MSS/FL and blanket licensed GSO/FSS earth stations appears to be impossible.[97] It also asserts that although GSO/FSS petitioners acknowledge their obligation to coordinate with current MSS/FL licensees, they make no mention of how to coordinate with future MSS/FL operations in the band. We note that coordination of ubiquitous earth stations with future MSS/FL operations raises questions beyond the GSO/FSS-to-GSO/FSS sharing issues raised in other band segments. Moreover, we recognize the need to maintain access to feeder link spectrum for future mobile satellite systems. For these reasons, we propose not to implement blanket licensing in the 29.25-29.5 GHz band at this time. We seek comment on this proposal. In particular, we seek comment on our current coordination procedures between MSS/FL and GSO/FSS earth station licensees. We also seek comment on any possible sharing criteria such as revised antenna performance standards, power limits, or geographic restrictions that might permit blanket licensing of GSO/FSS earth stations in this

[95] These sharing principles are summarized as follows: (1) NGSO/MSS licensees will provide the locations for their feeder links; (2) all GSO/FSS proponents will implement frequency and polarization selection techniques in the area of NGSO/MSS feeder link complexes to minimize instances of unacceptable interference; and (3) use of the 29.25-29.5 GHz band by another NGSO/MSS system for feeder link earth stations will be subject to coordination agreements with existing GSO/FSS parties. *28 GHz First Report and Order*, 11 FCC Rcd at 19005.

[96] Iridium comments at 3.

[97] *Id.* at 2.

band.

(2) Downlink Band Shared with Terrestrial Fixed Service

64. In our proposed band plan, the frequency segment 18.55-18.8 GHz is designated for co-primary use by terrestrial fixed service and GSO/FSS downlinks. Coordination between satellite and terrestrial services is necessary in a shared band. Therefore, we propose not to implement blanket licensing in the 18.55-18.8 GHz band. Instead, we propose that applicants seeking satellite earth station licenses to operate in this band follow the coordination procedures in Section 25.203 of the Commission's Rules, and that these earth stations be individually licensed.[98] Due to the stricter PFD limits and the difficulty of operating in an environment where satellite operations are shared with terrestrial fixed services, we anticipate that satellite systems may use this segment mainly for large diameter earth stations such as gateways.

65. We seek comment on this proposal. In particular, we seek comment on our current coordination procedures between terrestrial fixed service and GSO/FSS earth station licensees. We also seek comment on any possible changes to sharing criteria, such as revised antenna performance standards, power limits, or geographic restrictions that might permit blanket licensing of GSO/FSS earth stations in this band. We also seek comment on whether blanket licensing can be implemented with the condition that coordination between terrestrial and satellite users take place prior to deployment of an individual facility. In such a case, the coordination would be conducted between licensees without the involvement of the Commission. Such condition would require that a database of detailed technical information on all satellite earth station operations be maintained by the satellite licensee and be made publicly available.

2. NGSO/FSS

66. Currently, the 18.8-19.3 GHz band is designated for NGSO/FSS downlink use and the 28.6-29.1 GHz band for uplink use.[99] Teledesic proposes that blanket licensing procedures be developed for FSS operations throughout the 17.7-20.2 GHz and 27.5-30.0 GHz bands, including those bands that are designated for NGSO/FSS use. Teledesic asserts that NGSO/FSS and GSO/FSS systems propose to offer similar types of services to the public, and that both predict high-density deployment of earth stations, which is the primary reason for adopting blanket licensing.[100] Teledesic also points out that there is precedent for blanket

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[98] 47 C.F.R. § 25.203.

[99] We note that use of these bands was affected by a modification to footnote S5.523A at the 1997 World Radiocommunication Conference. This footnote, applicable to all Regions, states that Administrations having GSO networks under coordination in these bands prior to November 18, 1995 shall coordinate with NGSO networks and that NGSO networks shall not cause unacceptable interference to such GSO networks.

[100] Teledesic comments filed February 18, 1997, at 3.

licensing of NGSO systems.[101] Finally, Teledesic states that because GSO/FSS and NGSO/FSS systems will be competing for the same customers, licensing procedures for both types of systems should be considered simultaneously and at the earliest possible date. Petitioners do not oppose inclusion of additional bands in the blanket licensing proceeding, but point out that the sharing issues raised in NGSO bands are different, and may take longer to resolve, than those in the GSO/FSS bands. The Petitioners and several commenters request that Ka-band blanket licensing be addressed on a sub-band by sub-band basis and in separate industry working groups.[102]

67. We tentatively agree that the reasons for instituting blanket licensing procedures (*i.e.*, the large number of earth stations) are the same for both GSO/FSS and NGSO/FSS. We also tentatively agree that it is in the public interest to develop blanket licensing procedures for NGSO/FSS systems in order to eliminate delay and undue administrative burden. Finally, we agree tentatively that both issues should be addressed at the earliest possible date to permit licensees to move forward with their plans. However, we also recognize the validity of Petitioners' assertion that the issues raised with regard to NGSO intra-service sharing are different than in the GSO/FSS case.

68. Many of the NGSO-to-NGSO sharing issues are typically resolved at the space segment licensing stage. To effect blanket licensing of NGSO earth stations in the 18.8-19.3 GHz and 28.6-29.1 GHz bands, it is necessary that criteria analogous to those developed for GSO systems (*e.g.*, downlink PFD and uplink off-axis EIRP density) be established to facilitate sharing among multiple NGSO systems in the band. At this time, the record contains little information on values that might be sufficient and appropriate to achieve this goal. While the threshold values proposed for GSO systems might be extended to NGSO systems, we recognize that these values were developed based on the presumption of sharing in a 2-degree spacing environment; this same orbital geometry does not apply in the NGSO-to-NGSO case. Accordingly, we do not have sufficient information to propose specific blanket licensing criteria for NGSO systems and request comment on what criteria should be used.

69. We seek comment on what downlink PFD and uplink off-axis EIRP density values are appropriate to effect blanket licensing of multiple NGSO systems in the 18.8-19.3 GHz and 28.6-29.1 GHz bands. In particular, we request comment on whether the proposed GSO uplink transmit power parameters are sufficient and achievable without placing undue burden upon the licensee, or whether different values should be adopted. In addition, we seek comment on what downlink PFD level would be appropriate. Section 25.208(c) of

[101] *See* 8 FCC Rcd at 8453-54; In Re Application of U.S. LEO Services Inc., *Order and Authorization*, 11 FCC Rcd 20474 (1996).

[102] Lockheed comments at 5; Loral comments at 3; Motorola comments at 9; NSMA comments at 4.

the Commission's Rules currently specifies PFD limits for the 18.8-19.3 GHz band.[103] We seek comment on whether these limits are sufficient or whether the PFD threshold value proposed for GSO systems, or some other value altogether, might be most appropriate to facilitate blanket licensing of NGSO/FSS earth stations in the 18.8-19.3 GHz and 28.6-29.1 GHz bands. Further, we seek proposals for alternative technical criteria that might be used to enable blanket licensing of NGSO/FSS earth stations, recognizing that such criteria must permit multiple NGSO/FSS systems to share the band. We also request comment on the same issues that were raised in the discussion on blanket licensing of GSO/FSS earth stations: record keeping requirements, reporting requirements, adaptive power control, and licensing of non-compliant systems. We believe that our proposals for GSO systems regarding record keeping, reporting, adaptive power control, and licensing of non-compliant systems apply equally to NGSO systems. However, we ask for comment on whether there are differences between GSO and NGSO operations that we must take into account.

3. International Coordination

70. Canada and Mexico have allocated the 18.3-18.55 GHz, 18.8-19.3 GHz, 28.35-28.6 GHz, 28.6-29.1 GHz and 29.25-29.5 GHz bands for co-primary use by both terrestrial fixed services and FSS. Although, we propose to designate these band segments for primary use by GSO/FSS or NGSO/FSS only, coordination with Canadian and Mexican terrestrial fixed stations will be required by Ka-band FSS licensees operating earth stations in the border areas. Petitioners suggest that we add criteria to any blanket licensing provision to accommodate bilateral crossborder coordination. First, Petitioners propose that Ka-band FSS earth stations located more than a certain distance, *e.g.,* 16 kilometers, from the Canadian or Mexican border would not be subject to any additional criteria. Second, they propose that Ka-band FSS earth stations located closer to the border be required to limit their horizontally radiated emissions to adhere to a PFD threshold at the border. Third, they propose that earth station operators wishing to exceed this PFD threshold coordinate on a case-by-case basis with terrestrial fixed licensees in Canada or Mexico.

71. We agree with the approach of limiting radiated power in the vicinity of the Canadian and Mexican borders in order to facilitate coordination, but we seek comment on other approaches. In particular, we seek comment on whether we should impose a border zone for the coordination of Ka-band satellite earth stations with Canada and Mexico and whether 16 kilometers or some other value is an appropriate distance. We also seek comment on an appropriate value for a PFD threshold at the border that triggers international coordination and on alternatives to a border zone restriction distance and a PFD threshold at the border.

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[103] 47 C.F.R. § 25.208(c). PFD requirements across the entire 17.7-19.7 GHz band are defined as a function of angle of arrival ϕ above the horizon as follows:

-115	dBW/m²/MHz	$0° \le \phi \le 5°$
$-115 + 0.5(\phi-5)$	dBW/m²/MHz	$5° \le \phi \le 25°$
-105	dBW/m²/MHz	$25° \le \phi \le 90°$

4. Timing Issues

72. Petitioners are concerned that inter-service sharing issues may delay the implementation of blanket licensing in bands where no inter-service sharing issues exist (19.7-20.2 GHz, 28.35-28.6 GHz, and 29.5-30.0 GHz).[104] Petitioners request that the proceeding be structured to permit the earliest adoption of blanket licensing on a sub-band or service basis.[105] The frequency segments 19.7-20.2 GHz, 28.35-28.6 GHz, and 29.5-30.0 GHz are currently designated to GSO/FSS on a primary basis, as a result, blanket licensing in these bands would not involve inter-service sharing, coordination, or band redesignation issues. We request comment on whether we should implement blanket licensing in the 19.7-20.2 GHz, 28.35-28.6 GHz, and 29.5-30.0 GHz GSO/FSS bands before resolving the other more complex sharing, coordination, and band redesignation issues.

E. BSS Allocation

73. A Petition for Rulemaking filed by DIRECTV requests that the Commission allocate spectrum in the 17.3-17.8 GHz band to BSS downlinks, and in the 24.75-25.25 GHz band to FSS for BSS feeder links.[106] DIRECTV asserts that these changes are necessary to implement the Final Acts of World Administrative Radio Conference (1992) ("WARC-92") and to correct a shortage of spectrum available for BSS service in the United States.

74. ITU Footnote S5.517 provides that the International Region 2 Allocation for BSS at 17.3-17.8 GHz does not come into effect until April 1, 2007.[107] DIRECTV requests that we not wait until 2007 to make this allocation domestically, but rather that we implement it as soon as possible, arguing that there is no reason to constrain the use of the band prior to that date.[108] DIRECTV further requests that the Commission adopt a 4.5 degree orbital spacing policy[109] in the 17.3-17.8 GHz and 24.75-25.25 GHz bands, and apply Part 25 PFD limits to BSS transmissions at 17.7-17.8 GHz to protect terrestrial fixed services in this band.[110] DIRECTV asserts that the potential for harmful interference to terrestrial fixed service does not exist as long as BSS transmissions comply with the existing PFD limits set

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[104] Petitioners reply comments at 3.

[105] *Id.*

[106] This Petition for Rulemaking was filed on June 5, 1997 and appeared on public notice July 1, 1997. *See "Office of Public Affairs Reference Operations Division Petitions for Rulemaking Filed", Public Notice*, Report No. 2208 (rel. July 1, 1997).

[107] *Supra* note 8.

[108] DIRECTV petition at 12.

[109] The Commission has authorized BSS in the 11.7-12.2 GHz band with 9° orbital separation between satellites.

[110] DIRECTV petition at 7-9.

forth in Section 25.208 of the Commission's Rules.[111]

75. GE American Communications, Inc. ("GE Americom"), Lockheed Martin Corporation ("Lockheed"), and Loral Space & Communications, LTD ("Loral") each support the need for additional BSS spectrum. GE Americom states that demand for BSS cannot be met within the constraints of the "Planned BSS Band" at 12 GHz because there are only three orbital locations capable of providing coverage to the entire continental United States ("full Conus") in that band, and the Commission has licensed all channels at the 3 full Conus locations.[112] GE Americom states that unless additional capacity is made available, BSS will not be able to achieve its full potential in the United States. Lockheed states that the allocations requested by DIRECTV would provide essential spectrum required for the development of next-generation BSS services and advanced satellite telecommunications technologies needed to implement those services. Additionally, Loral states that today there is great competition for the limited number of orbital locations and that there is insufficient bandwidth in traditional FSS and BSS commercial frequency bands.

76. Digital Services Corporation, Microwave Services, Inc., and Teligent, L.L.C. ("Joint Commenters") oppose DIRECTV's petition. The Joint Commenters state that they are licensees and applicants in the Digital Electronic Message Service, which the Commission recently relocated from the 18.82-18.92 GHz and 19.16-19.26 GHz bands to the 24.25-24.45 GHz and 25.05-25.25 GHz bands.[113] The Joint Commenters argue that DIRECTV fails to make the required *prima facie* showing that a grant of its petition is supported by sufficient evidence and would serve the public interest. Additionally, they argue that DIRECTV's petition is moot, given that the Commission's 25.05-25.25 GHz DEMS reallocation effectively precludes BSS uplinks in this band. Specifically, the Joint Commenters contend that BSS service uplinks in the 25.05-25.25 GHz band would be incompatible with DEMS systems because distance separations of 94 to 316 miles between such uplinks and DEMS receivers could be needed to protect against harmful interference from BSS to DEMS. Finally, the Joint Commenters argue that BSS use of the 17.7-17.8 GHz band is incompatible with existing terrestrial microwave operations in the band.

77. Skybridge L.L.C ("Skybridge") also opposes DIRECTV's petition. Skybridge states that it has on file with the Commission an application for authority to launch a global network of NGSO satellites in the Ku-band, and that it proposes to operate earth stations in the 17 GHz band.[114] Skybridge states that DIRECTV's proposal involves a mode of operation

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[111] 47 C.F.R. § 25.208.

[112] The three full Conus BSS orbital locations are at 101°, 110°, and 119°. A complete listing of the United States orbital locations are listed in Appendix S30 of the ITU Radio Regulations.

[113] *Supra* note 20.

[114] *See* In the Matter of the Application of Skybridge L.L.C. for Authority to Launch and Operate a Global Network of Low Earth Orbit Communications Satellites Providing Broadband Services in the Fixed Satellite Service, File No. 48-SAT-P/LA-97, filed February 28, 1997; Amendment Filed July 3, 1997.

that may threaten the ability of BSS systems to coexist with the Skybridge system because Skybridge proposes to operate uplinks in the 17 GHz band, where DIRECTV proposes to operate downlinks. Skybridge argues that, pursuant to ITU regulations, use of the 17.3-17.7 GHz band for GSO downlinks of any kind is not contemplated prior to April 1, 2007, and that use of the 17.7-17.8 GHz band prior to that date is contemplated for FSS downlinks only. Skybridge states that there is no rational public interest basis for allowing the premature use of these bands for BSS downlinks and that DIRECTV has presented no analysis to demonstrate its ability to share with other GSO or NGSO systems.

78. In reply comments, DIRECTV states that the interference concerns of the Joint Commenters and Skybridge are theoretical. DIRECTV states that there is no potential for its proposed downlink use of the 17 GHz band to cause interference to existing uplinks, and that Skybridge has no greater rights than DIRECTV in applying to use the 17 GHz band for an NGSO system. DIRECTV also states that the Joint Commenters' allegation that BSS use of the 17.7-17.8 GHz band would be incompatible with existing terrestrial microwave operations is unsupported by any microwave licensee in that band. DIRECTV contends that it has been successful at mitigating microwave interference into its direct broadcast satellite receivers in the 12 GHz band, and does not anticipate a significant problem from microwave operators at 17.7-17.8 GHz. Finally, DIRECTV submits a technical response to the Joint Commenters' 25.05-25.25 GHz sharing analysis. In its response, DIRECTV contends that it is possible for BSS uplinks and DEMS receivers in this band to share spectrum on a co-frequency basis at distances in the range of only 0.2 miles.

79. We note that BSS is a rapidly growing service, and that additional spectrum may be required for BSS within the next decade. However, the 17.3-17.8 GHz allocation requested by DIRECTV cannot be implemented prior to April 1, 2007 because of the operational needs of United States Government systems in this band. The Department of Defense ("DoD") has recently confirmed the requirement to maintain the 2007 implementation date to accommodate the needs of these systems.[115] Further, there remain unresolved sharing issues in the 17.3-17.8 GHz band. For example, it is not clear that sharing between BSS and terrestrial fixed services is feasible in the 17.7-17.8 GHz band and before this allocation can be used, appropriate sharing criteria will have to be developed. For instance, we note that to accommodate BSS at 12.2-12.7 GHz we found it necessary to freeze licensing of terrestrial fixed service operations. However, we believe that an implementation date of April 1, 2007 for BSS use of the 17.3-17.8 GHz band may allow sufficient time for such sharing issues to be resolved. Accordingly, we propose to make a domestic allocation to the BSS in the 17.3-17.8 GHz band that conforms to the ITU Region 2 allocation and that will come into effect on April 1, 2007. Specifically we propose to add a non-Government footnote to Section 2.106 of the Commission's Rules which reads: "The allocation to the broadcasting-

[115] *See* letters from Richard M. Dyson, United Stated Department of Defense, to Richard Parlow, Associate Administrator, Office of Spectrum Management, National Telecommunications and Information Administration and from Richard Parlow to Regina M. Keeney, Chief, International Bureau, Federal Communications Commission (Dec. 30, 1997).

satellite service in the band 17.3-17.8 GHz shall come into effect on 1 April 2007."[116] We request comment on the proposed addition of this BSS allocation to the Commission's Table of Frequency Allocations.[117]

80. With respect to the 24.75-25.25 GHz band, DIRECTV proposes to use it as the corresponding feeder link band for the new BSS allocation at 17.3-17.8 GHz. This is the only proposed use of FSS in this band before the Commission at this time. We believe sharing between terrestrial fixed service operations and BSS feeder links should be possible because BSS feeder links will not be ubiquitously deployed. Moreover, we note that the international FSS allocation gives priority to use of BSS feeder links over other FSS operations. Accordingly, we propose to reflect the FSS allocation at 24.75-25.25 GHz in the United States Table of Frequency Allocations and to limit its use to feeder links for the broadcasting-satellite service operating in the 17.3-17.8 GHz band. Specifically, we propose to add a non-Government footnote to Section 2.106 of the Commission's Rules, to read: "In the band 24.75-25.25 GHz, feeder links to stations of the broadcasting-satellite service shall have priority over other uses in the fixed-satellite service (Earth-to-space). Such other uses shall protect and shall not claim protection from existing and future operating feeder link networks to such broadcasting satellite stations." It should be noted that we are proposing this allocation as a co-primary allocation between Radionavigation and FSS in the 24.75-25.05 GHz band and as a co-primary allocation between Radionavigation, terrestrial fixed service, and FSS in the 25.05-25.25 GHz band. We request comment on the BSS feeder link allocation and whether this allocation is sufficient to meet BSS feeder link needs.

81. As indicated previously, the proposed corresponding downlink BSS allocation at 17.3-17.8 GHz cannot become effective before April 1, 2007; thus, there appears to be no need to implement the FSS allocation for BSS feeder link use at 24.75-25.25 GHz prior to the April 1, 2007 effective date of the 17.3-17.8 GHz BSS allocation. In addition, delaying the FSS allocation would allow sufficient time for a detailed sharing methodology to be formulated between terrestrial fixed service interests and satellite interests to resolve any potential interference problems between services. Therefore, we propose that this allocation become effective April 1, 2007 to coincide with the effective date of the 17.3-17.8 GHz BSS allocation. We request comment on whether the effective date of the FSS allocation for BSS feeder link use at 24.75-25.25 GHz should coincide with the effective date of the downlink BSS allocation at 17.3-17.8 GHz or whether the FSS allocation for use by BSS feeder links should become effective before the April 1, 2007 effective date of the BSS allocation.

82. Finally, we believe that it is premature to address DIRECTV's request that the Commission adopt a 4.5° orbital spacing policy for the use of the 17.3-17.8 GHz and

[116] Our proposed new allocation is for broadcasting-satellite service use in the space-to-Earth direction and conforms to ITU Radio Regulations Footnote S5.517. Both ITU Radio Regulations Footnote S5.516 and Footnote US271 in the United States Table of Frequency Allocations currently permit Earth-to-space use of the 17.3-17.8 GHz FSS allocation by feeder links for the BSS operating in the 12.2-12.7 GHz band. No change is proposed to this existing U.S. footnote allocation.

[117] 47 C.F.R. § 2.106.

24.75-25.25 GHz bands, because we are proposing that these allocations will not become effective for nearly ten years. We anticipate significant changes in technology during this period. We propose to address relevant sharing and implementation issues, including power density limits and orbital spacing, in a future proceeding.

IV. PROCEDURAL MATTERS

A. Regulatory Flexibility Analysis

83. The analysis required pursuant to the Regulatory Flexibility Act, *see* 5 U.S.C. § 603, is contained in Appendix B.

B. Paperwork Reduction Act Statement

84. This NPRM contains either a proposed or modified information collection. As part of our continuing effort to reduce paperwork burdens, we invite the general public and the Office of Management and Budget (OMB) to take this opportunity to comment on the information collections contained in this NPRM, as required by the Paperwork Reduction Act of 1995, Pub. L. No. 104-13. Public and agency comments are due at the same time as other comments on this NPRM; OMB comments are due 60 days from date of publication of this NPRM in the Federal Register. Comments should address: (a) whether the proposed collection of information is necessary for the proper performance of the functions of the Commission, including whether the information shall have practical utility; (b) the accuracy of the Commission's burden estimates; (c) ways to enhance the quality, utility, and clarity of the information collected; and (d) ways to minimize the burden of the collection of information on the respondents, including the use of automated collection techniques or other forms of information technology.

C. Comment Dates

85. Pursuant to Sections 1.415 and 1.419 of the Commission's rules, 47 C.F.R. §§ 1.415, 1.419, interested parties may file comments on before November 5, 1998, and reply comments on or before December 7, 1998. Comments may be filed using the Commission's Electronic Comment Filing System (ECFS) or by filing paper copies. *See Electronic Filing of Documents in Rulemaking Proceedings*, 63 Fed. Reg. 24,121 (1998).

86. Comments filed through the ECFS can be sent as an electronic file via the Internet to <http://www.fcc.gov/e-file/ecfs.html>. Generally, only one copy of an electronic submission must be filed. If multiple docket or rulemaking numbers appear in the caption of this proceeding, however, commenters must transmit one electronic copy of the comments to each docket or rulemaking number referenced in the caption. In completing the transmittal screen, commenters should include their full name, Postal Service mailing address, and the applicable docket or rulemaking number. Parties may also submit an electronic comment by Internet e-mail. To get filing instructions for e-mail comments, commenters should send an e-mail to ecfs@fcc.gov, and should include the following words in the body of the message, "get form <your e-mail address>." A sample form and directions will be sent in reply.

87. Parties who choose to file by paper must file an original and four copies of each filing. If more than one docket or rulemaking number appear in the caption of this proceeding, commenters must submit two additional copies for each additional docket or rulemaking number. All filings must be sent to the Commission's Secretary, Magalie Roman Salas, Office of the Secretary, Federal Communications Commission, 1919 M St. N.W., Room 222, Washington, D.C. 20554.

88. Written comments by the public on the proposed and/or modified information collections are due on or before November 5, 1998. Written comments must be submitted by the Office of Management and Budget (OMB) on the proposed and/or modified information collections on or before 60 days after date of publication in the Federal Register. In addition to filing comments with the Secretary, a copy of any comments on the information collections contained herein should be submitted to Judy Boley, Federal Communications Commission, Room 234, 1919 M Street, N.W., Washington, DC 20554, or via the Internet to jboley@fcc.gov.

D. Ex Parte Presentations

89. This is a permit-but-disclose notice and comment rulemaking proceeding. *Ex parte* presentations are permitted, except during the Sunshine Agenda period, provided they are disclosed as provided in the Commission's Rules. *See generally* 47 C.F.R. §§ 1.1202, 1.1203, and 1.1206.

E. Contacts

90. For further information concerning this rulemaking proceeding, contact Charles Magnuson (202) 418-2150, International Bureau, Federal Communications Commission, Washington, D.C. 20554.

V. ORDERING CLAUSES

91. Accordingly, IT IS ORDERED that pursuant to the authority contained in Sections 1, 4(i), 4(j), 301, 303, and 403 of the Communications Act of 1934, as amended, 47 U.S.C. §§ 151, 154(i), 154(j), 301, 303 and 403, this NOTICE OF PROPOSED RULEMAKING is ADOPTED.

92. IT IS FURTHER ORDERED that the Petition filed by Lockheed Martin Corporation, et al., is GRANTED to the extent indicated herein and OTHERWISE DENIED.

93. IT IS FURTHER ORDERED that the Petition filed by DIRECTV Enterprises, Inc. is GRANTED to the extent indicated herein and OTHERWISE DENIED.

94. IT IS FURTHER ORDERED that the Commission's Office of Public Affairs, Reference Operations Division, SHALL SEND a copy of this NOTICE OF PROPOSED RULEMAKING, including the Initial Regulatory Flexibility Analysis, to the Chief Counsel for Advocacy of the Small Business Administration.

FEDERAL COMMUNICATIONS COMMISSION

Magalie Roman Salas

Magalie Roman Salas
Secretary

APPENDIX A

List of Commenters

RM-9005

Comments in Response to January 16, 1997 Public Notice

Lockheed Martin Corporation, AT&T Corp., Hughes Communications, Inc., Loral Space & Communications, Ltd., and GE American Communications, Inc. ("Petitioners")
Teledesic Corporation ("Teledesic")

Comments in Response to September 5, 1997 Public Notice

ABC, Inc. and CBS, Inc. ("ABC")
Alcatel Network Systems, Inc. ("Alcatel")
American Petroleum Institute ("API")
Comm, Inc. and Motorola Global Communications, Inc. ("Motorola")
County of San Bernardino, General Services Group ("San Bernardino")
GE American Communications, Inc. ("GE")
GTE Service Corporation ("GTE")
Harris Corporation-Farinon Division ("Harris")
Hughes Communications, Inc. and Hughes Communications Galaxy, Inc. ("Hughes")
Independent Cable & Telecommunications Association ("ICTA")
Iridium LLC ("Iridium")
Lockheed Martin Corporation ("Lockheed")
Loral Space & Communications Ltd. ("Loral")
National Association of Broadcasters ("NAB")
National Spectrum Managers Association, Inc. ("NSMA")
OpTel, Inc. ("Optel")
PanAmSat Corporation ("PanAmSat")
Telecommunications Industry Association, Network Equipment Division,
Fixed Point-to-Point Communications Section ("TIA-FPTP")
Telecommunications Industry Association, Satellite Communications Division ("TIA-SAT")
Teledesic Corporation ("Teledesic")
UTC, The Telecommunications Association ("UTC")
The Wireless Cable Association International, Inc. ("WCA")

APPENDIX A (continued)

List of Commenters

RM-9118

Comments in Response to July 1, 1997 Public Notice

Bradford D. Carey
Digital Services Corporation, Microwave Services, Inc., and Teligent, L.L.C. ("Joint Commenters")
EchoStar Communications Corporation
GE American Communications, Inc. ("GE Americom")
Lockheed Martin Corporation ("Lockheed")
Loral Space & Communications, LTD ("Loral")
Skybridge L.L.C. ("Skybridge")

Reply Comments in Response to July 1, 1997 Public Notice

Digital Services Corporation, Microwave Services, Inc., and Teligent, L.L.C. ("Joint Commenters")
DIRECTV Enterprises, Inc. ("DIRECTV")
GE American Communications, Inc. ("GE Americom")
DEMS Licensees

APPENDIX B

Initial Regulatory Flexibility Analysis

As required by the Regulatory Flexibility Act (RFA),[1] the Commission has prepared this present Initial Regulatory Flexibility Analysis (IRFA) of the possible significant economic impact on small entities by the policies and rules proposed in this Notice of Proposed Rulemaking. Written public comments are requested on this IRFA. Comments must be identified as responses to the IRFA and must be filed by the deadlines for comments on the Notice of Proposed Rulemaking provided above in paragraphs 85-87. The Commission will send a copy of the Notice of Proposed Rulemaking, including this IRFA, to the Chief Counsel for Advocacy of the Small Business Administration. *See* 5 U.S.C. § 603(a). In addition, the Notice of Proposed Rulemaking and IRFA (or summaries thereof) will be published in the Federal Register.

A. Need for, and Objectives of, the Proposed Rules

This rulemaking proceeding is being initiated to obtain comment and develop a record on certain proposals in the 17.7-20.2 GHz and 27.5-30.0 GHz frequency bands. Specifically, this *Notice* proposes to redesignate the 17.7-19.7 GHz frequency band to designate for use separate band segments for terrestrial fixed service and fixed satellite services and establish service rules for "blanket licensing" of the satellite services in the 17.7-20.2 GHz and 27.5-30.0 GHz bands. We are also seeking comments on proposals for sharing of the 17.7-19.7 GHz frequency band. The Commission seeks to develop a blanket license procedure for the implementation of Ka-band satellite systems. It also seeks to develop a band plan where terrestrial fixed and satellite systems can co-exist in the 17.7-19.7 GHz frequency band. These proposals will facilitate the equitable use of the frequencies by separate services and will simplify coordination and licensing procedures for satellite licensees. In addition, this rulemaking proceeding is being initiated to obtain comment and develop a record on the proposed Allocation of additional spectrum in the 17.3-17.8 GHz and 24.75-25.25 GHz band to accommodate BSS operations. These proposals will promote efficient use of the spectrum and an efficient introduction of new satellite technologies.

B. Legal Basis

The proposed action is authorized under Sections 1, 4(i), 4(j), 301, and 303 of the Communications Act of 1934, as amended, 47 U.S.C. §§ 151, 154(i), 154(j), 301, and 303.

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[1] *See* 5 U.S.C. § 603. The RFA, *see*, 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).

C. Description and Estimate of the Number of Small Entities To Which the Proposed Rules May Apply

The RFA directs agencies to provide a description of and, where feasible, an estimate of the number of small entities that may be affected by the proposed rules, if adopted.[2] The RFA generally defines the term "small entity " as having the same meaning as the terms "small business," "small organization," and "small governmental jurisdiction."[3] In addition, the term "small business" has the same meaning as the term "small business concern" under the Small Business Act.[4] A small business concern is one which: (1) 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). [5] A small organization is generally "any not-for-profit enterprise which is independently owned and operated and is not dominant in its field."[6] Nationwide, as of 1992, there were approximately 275,801 small organizations.[7] "Small governmental jurisdiction" generally means "governments of cities, counties, towns, townships, villages, school districts, or special districts, with a population of less than 50,000."[8] As of 1992, there were approximately 85,006 such jurisdictions in the United States.[9] This number includes 38,978 counties, cities, and towns; of these, 37,566, or 96 percent, have populations of fewer than 50,000.[10] The Census Bureau estimates that this ratio is approximately accurate for all governmental entities. Thus, of the 85,006 governmental entities, we estimate that 81,600 (91 percent) are small entities. Below, we further describe and estimate the number of small entity licensees that may be affected by the proposed rules, if adopted.

1. Cable Services. The SBA has developed a definition of small entities for cable and

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[2] 5 U.S.C. § 603(b)(3).

[3] *Id.* § 601(6).

[4] 5 U.S.C. § 601(3) (incorporating by reference the definition of "small business concern" in 15 U.S.C. § 632). Pursuant to the RFA, the statutory definition of a small business applies "unless an agency, after consultation with the Office of Advocacy of the Small Business Administration and after 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." 5 U.S.C. § 601(3).

[5] Small Business Act, 15 U.S.C. § 632 (1996).

[6] 5 U.S.C. § 601(4).

[7] 1992 Economic Census, U.S. Bureau of the Census, Table 6 (special tabulation of data under contract to Office of Advocacy of the U.S. Small Business Administration).

[8] 5 U.S.C. § 601(5).

[9] U.S. Dept. of Commerce, Bureau of the Census, "1992 Census of Governments."

[10] *Id.*

other pay television services, which includes all such companies generating $11 million or less in revenue annually. This definition includes cable systems operators, closed circuit television services, direct broadcast satellite services, multipoint distribution systems, satellite master antenna systems and subscription television services. According to the Census Bureau, there were 1,788 total cable and other pay television services and 1,423 had less than $11 million in revenue. The Commission has developed its own definition of a small cable system operator for the purposes of rate regulation. Under the Commission's Rules, a "small cable company," is one serving fewer than 400,000 subscribers nationwide. Based on our most recent information, we estimate that there were 1,439 cable operators that qualified as small cable system operators at the end of 1995. Since then, some of those companies may have grown to serve over 400,000 subscribers, and others may have been involved in transactions that caused them to be combined with other cable operators. Consequently, we estimate that there are fewer than 1,439 small entity cable system operators.

The Communications Act also contains a definition of a small cable system operator, which is "a cable operator that, directly or through an affiliate, serves in the aggregate fewer than 1 percent of all subscribers in the United States and is not affiliated with any entity or entities whose gross annual revenues in the aggregate exceed $250,000,000." The Commission has determined that there are 61,700,000 subscribers in the United States. Therefore, we found that an operator serving fewer than 617,000 subscribers shall be deemed a small operator, if its annual revenues, when combined with the total annual revenues of all of its affiliates, do not exceed $250 million in the aggregate. Based on available data, we find that the number of cable operators serving 617,000 subscribers or less totals 1,450. We do not request nor do we collect information concerning whether cable system operators are affiliated with entities whose gross annual revenues exceed $250,000,000, and thus are unable at this time to estimate with greater precision the number of cable system operators that would qualify as small cable operators under the definition in the Communications Act.

International Services

The Commission has not developed a definition of small entities applicable to licensees in the international services. Therefore, the applicable definition of small entity is generally the definition under the SBA rules applicable to Communications Services, Not Elsewhere Classified (NEC).[11] This definition provides that a small entity is expressed as one with $11.0 million or less in annual receipts.[12] According to the Census Bureau, there were a total of 848 communications services providers, NEC, in operation in 1992, and a total of 775 had annual receipts of less than $9.999 million.[13] The Census report does not provide more precise data.

[11] An exception is the Direct Broadcast Satellite (DBS) Service, *infra*.

[12] 13 C.F.R. § 120.121, SIC code 4899.

[13] *1992 Economic Census Industry and Enterprise Receipts Size Report*, Table 2D, SIC code 4899 (U.S. Bureau of the Census data under contract to the Office of Advocacy of the U.S. Small Business Administration).

2. Fixed Satellite Transmit/Receive Earth Stations. Currently there are no authorized fixed satellite transmit/receive earth stations authorized for use in the 17.7-20.2 GHz band. However, with 13 GSO/FSS licensees and 1 NGSO/FSS licensee we expect FSS earth stations to appear in the near future. We do not request nor collect annual revenue information, and thus are unable to estimate the number of the earth stations that would constitute a small business under the SBA definition.

3. Mobile Satellite Earth Station Feeder Links. There are two licensees. We do not request nor collect annual revenue information, and thus are unable to estimate of the number of mobile satellite earth stations that would constitute a small business under the SBA definition.

4. Space Stations (Geostationary). Commission records reveal that there are 13 space station licensees. We do not request nor collect annual revenue information, and thus are unable to estimate of the number of geostationary space stations that would constitute a small business under the SBA definition.

5. Space Stations (Non-Geostationary). There are three Non-Geostationary Space Station licensees, of which only one system is operational. We do not request nor collect annual revenue information, and thus are unable to estimate of the number of non-geostationary space stations that would constitute a small business under the SBA definition.

6. Direct Broadcast Satellites. Because DBS provides subscription services, DBS falls within the SBA definition of Cable and Other Pay Television Services (SIC 4841). This definition provides that a small entity is expressed as one with $11.0 million or less in annual receipts. As of December 1996, there were eight DBS licensees. However, the Commission does not collect annual revenue data for DBS and, therefore, is unable to ascertain the number of small DBS licensees that could be impacted by these proposed rules. Although DBS service requires a great investment of capital for operation, we acknowledge that there are several new entrants in this field that may not yet have generated more than $11 million in annual receipts, and therefore may be categorized as a small business, if independently owned and operated.

7. Auxiliary, Special Broadcast and other program distribution services. This service involves a variety of transmitters, generally used to relay broadcast programming to the public (through translator and booster stations) or within the program distribution chain (from a remote news gathering unit back to the station). The Commission has not developed a definition of small entities applicable to broadcast auxiliary licensees. Therefore, the applicable definition of small entity is the definition under the Small Business Administration (SBA) rules applicable to radio broadcasting stations (SIC 4832) and television broadcasting stations (SIC 4833). These definitions provide, respectively, that a small entity is one with either $5.0 million or less in annual receipts or $10.5 million in annual receipts. 13 C.F.R. § 121.201, SIC CODES 4832 and 4833. There are currently 2,720 FM translators and boosters, 4,952 TV translators. The FCC does not collect financial information on any broadcast facility and the Department of Commerce does not collect financial information on

these auxiliary broadcast facilities. We believe, however, that most, if not all, of these auxiliary facilities could be classified as small businesses by themselves. We also recognize that most translators and boosters are owned by a parent station which, in some cases, would be covered by the revenue definition of small business entity discussed above. These stations would likely have annual revenues that exceed the SBA maximum to be designated as a small business (as noted, either $5 million for a radio station or $10.5 million for a TV station). Furthermore, they do not meet the Small Business Act's definition of a "small business concern" because they are not independently owned and operated.

8. Microwave Services. Microwave services includes common carrier, private operational fixed, and broadcast auxiliary radio services. At present, there are 22,015 common carrier licensees, approximately 61,670 private operational fixed licensees and broadcast auxiliary radio licensees in the microwave services. Inasmuch as the Commission has not yet defined a small business with respect to microwave services, we will utilize the SBA's definition applicable to radiotelephone companies -- i.e., an entity with no more than 1,500 persons. 13 C.F.R. § 121.201, SIC CODE 4812. We estimate, for this purpose, that all of the Fixed Microwave licensees (excluding broadcast auxiliary licensees) would qualify as small entities under the SBA definition for radiotelephone companies.

D. Description of Projected Reporting, Recordkeeping, and Other Compliance Requirements

The Commission's existing rules in Part 25 on FSS operations contain reporting requirements for FSS systems, and we propose to modify these reporting requirements to eliminate duplicative costs of filing multiple applications. In addition, we propose to add an annual reporting requirement to indicate the number of satellite earth stations actually brought into service. The proposed blanket licensing procedures do not affect small entities disproportionately and it is likely no additional outside professional skills are required to complete the annual report indicating the number small antenna earth stations actually brought into service. We seek comment on these proposed changes.

E. Steps Taken to Minimize Significant Economic Impact on Small Entities, and Significant Alternatives Considered

This Notice solicits comment on several alternatives for spectrum sharing, blanket licensing, and band segmentation. This item should positively impact both large and small businesses by providing a faster, more efficient, and less economically burdensome coordination and licensing procedure. The proposed blanket licensing service rules provide for consolidation of licensing for small antenna earth stations, a simplification of compliance procedures, and one new minor annual reporting requirement which indicates the number of satellite earth stations brought into service in the last year.

F. Federal Rules that May Duplicate, Overlap, or Conflict With the Proposed Rules

None.

APPENDIX C

Proposed Rules

Part 25 of Title 47 of the Code of Federal Regulations is proposed to be amended 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 sec. 303, 47 U.S.C. 303. 47 U.S.C. sections 154, 301, 302, 303, 307, 309 and 332, unless otherwise noted.

2. Section 25.115 is amended by adding a new paragraph (e) to read as follows:

§ 25.115 Application for earth station authorizations.

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(e) Geostationary fixed-satellite service earth stations operating in the 18.3-18.55 GHz, 19.7-20.2 GHz, 28.35-28.6 GHz, and 29.5-30 GHz bands need not be individually licensed. Applications to license small antennas may be filed on FCC Form 312, Main Form and Schedule B, and specifying the number of units to be covered by the blanket license. Each application for a blanket license under this section shall conform to the requirements specified in § 25.138.

3. A new § 25.138 is added to read as follows:

§ 25.138 Licensing provisions for geostationary fixed-satellite service earth stations operating in the 18.3-18.55 GHz, 19.7-20.2 GHz, 28.35-28.6 GHz, and 29.5-30.0 GHz bands.

(a) All applications for geostationary fixed-satellite service earth station licenses operating in the 18.3-18.55 GHz, 19.7-20.2 GHz, 28.35-28.6 GHz and 29.5-30 GHz bands will be routinely processed provided the following criteria are met:

(1) Emissions from associated geostationary space stations shall operate with a maximum downlink power flux density at the Earth's surface as specified in § 25.208.

(2) In the plane of the geostationary satellite orbit as it appears at the particular earth station location, the uplink EIRP density of any earth station antenna operating in the 28.35-28.6 GHz or 29.5-30 GHz band under clear sky conditions shall lie below the envelope defined below:

$35 - 25 \log_{10}(\theta)$	dBW/MHz	$1° \leq \theta \leq 7°$
13.9	dBW/MHz	$7° < \theta \leq 9.2°$
$38 - 25 \log_{10}(\theta)$	dBW/MHz	$9.2° < \theta \leq 48°$
-4	dBW/MHz	$48° < \theta \leq 180°$

where θ is the angle, in degrees, from the axis of the main lobe. For the purposes of this section, the peak EIRP density of an individual sidelobe may not exceed the envelope defined above for θ between 1° and 7°. for θ greater than 7°, the envelope may be exceeded by no more than 10% of the side lobes, provided that no individual sidelobe exceeds the EIRP density envelope given above by more that 3 dB.

(3) In all other directions, or in the plane of the horizon including any out-of-plane potential terrestrial interference paths:

(i) Outside the main beam, the uplink EIRP density under clear sky conditions shall lie below the envelope defined by:

$38 - 25 \log_{10}(\theta)$	dBW/MHz	$1° \leq \theta \leq 48°$
-4	dBW/MHz	$48° < \theta \leq 180°$

(ii) For the purposes of this section, the envelope may be exceeded by no more than 10% of the sidelobes provided no individual sidelobe exceeds the EIRP density envelope by more than 6 dB. The region of the main reflector spillover energy is to be interpreted as a single lobe and shall not exceed the envelope by more than 6 dB.

(b) Applicants for earth station licenses in the fixed-satellite service, proposing to operate with maximum downlink PFD values or maximum uplink EIRP densities in excess of the threshold values defined by paragraph (a) of this section, shall bear the burden of coordinating with any applicants or licensees whose satellite or proposed compliant earth station, as defined by paragraph (a) of this section, is potentially or actually adversely affected by the operation of the non-compliant licensee. Applicants shall provide proof by affidavit that all potentially affected parties acknowledge and do not object to the use of the applicant's higher power density.

(c) Applicants for earth station licensing authorization shall submit a technical description of how they will comply with the requirement for uplink automatic power control or other methods of fade compensation, as specified in § 25.204(f).

(d) Licensees shall notify the Commission in writing on a yearly basis, specifying the number of earth stations actually brought into service.

4. Section 25.208 is amended by revising paragraph (c) introductory text and by adding a new paragraph (d) to read as follows:

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(c) In the 17.70-18.30 GHz, 18.55-19.70 GHz, 22.55-23.00 GHz, 23.00-23.55 GHz, and 24.45-24.75 GHz frequency bands, the power flux density at the Earth's surface produced by emissions from a space station for all conditions and for all methods of modulation shall not exceed the following values:

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(d) In the 18.30-18.55 GHz and 19.7-20.2 GHz frequency bands, the power flux density at the Earth's surface produced by emissions from a space station for all conditions and for all methods of modulation shall not exceed -120 dBW/m^2/MHz averaged over any contiguous 40 MHz band segment, and -118 dB (W/m^2) in any 1 MHz band, for all angles of arrival.